INFORMATION AND COMMUNICATION TECHNOLOGY ADOPTION IN BUSINESS SCHOOLS: AN ASSESSMENT OF BEHAVIORAL INTENTION TO USE TECHNOLOGY AMONG FACULTIES IN SELECTED UNIVERSITIES OF PUNJAB

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By

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DECLARATION

I, hereby declared that the presented work in the thesis entitled **"Information and Communication Technology Adoption in Business Schools: An Assessment of Behavioral Intention to Use Technology Among Faculties in Selected Universities of Punjab"** in fulfilment of degree of **Doctor of Philosophy (Ph.D.)** is outcome of research work carried out by me under the supervision of **Dr. Pawan Kumar**, working as Professor, in Mittal School of Business of Lovely Professional University, Punjab, India. In keeping with general practice of reporting scientific observations, due acknowledgements have been made whenever work described here has been based on findings of other investigator. This work has not been submitted in part or full to any other University or Institute for the award of any degree.

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CERTIFICATE

This is to certify that the work reported in the Ph. D. thesis entitled **“Information and Communication Technology Adoption in Business Schools: An Assessment of Behavioral Intention to Use Technology Among Faculties in Selected Universities of Punjab”** submitted in fulfillment of the requirement for the reward of degree of **Doctor of Philosophy (Ph.D.)** in Commerce, Mittal School of Business, is a research work carried out by Jasdeep Singh Walia, 41700097, is bonafide record of his/her original work carried out under my supervision and that no part of thesis has been submitted for any other degree, diploma or equivalent course.

(Signature of Supervisor)

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Abstract

Education is an essential resource that is acknowledged worldwide for its significance to both individuals and communities. Its goal is to provide the next generation the knowledge and abilities they will need to prosper in the world they will eventually inherit. In the past two centuries, there has been a significant expansion of education worldwide. India has a unique education system that emphasizes the holistic growth of an individual, including the moral, physical, spiritual, and mental aspects of life. However, British rule led to the replacement of this system with antiquated ones that require frequent revisions. Although India's education system has expanded since independence, it still falls short of meeting the needs of an evolving global marketplace.

Digital literacy and employability are dynamically linked, and this relationship is crucial. The business world has changed dramatically in recent years, necessitating a new viewpoint on literacy and employability skills. Gaining digital literacy skills will undoubtedly increase students' employability, and the Indian government's next major priority for its citizens is to be digitally literate. Acquiring digital skills is equally crucial as establishing digital infrastructure since it has direct effects on economic growth and job creation. Nonetheless, it is vital to improve the standard of education, and this effort should not be limited to enhancing proficiency in digital skills alone. Many people are worried that the education they are receiving is of poor quality and too slow, even as the number of people who can read is growing. To enter the workforce, many young Indians lack the necessary literacy skills, and employers report dissatisfaction with the quality of workers' literacy and lack of necessary skills. Remedial literacy and writing instruction, as well as increased collaboration between the government and educational institutions, are essential for creating a competent and realistic labour force. Literacy initiatives should encourage the growth of a knowledge-based economy, incorporating problem-solving skills into literacy initiatives in India to reach employment goals.

Technology has had a profound impact on human civilisation, culminating in the fusion of cultures with technical systems that are now essential. Advancements in technology have facilitated the simplification of tasks and the resolution of human problems,

uniting instruments that promote development, utilization, and information exchange. The incorporation of technology into educational settings is essential to maintaining civilization. India has been successful in digitalizing its knowledge economy through the Digital India campaign. Also, it is a significant fact that traditional teaching and learning methods can be innovated and made more interesting through technology. Geographical and temporal barriers can be removed through the use of technology, enhancing access to education for people from all backgrounds and encouraging lifelong learning. The existing studies on technology adoption have shown remarkable results in the academic performance of the students, allowing for effective learning and the development of most important skills required in the modern-day world i.e., critical thinking and problem-solving. Additionally, technology can individualize the learning experience, empowering students to take ownership of their education and making it pertinent to their digital lifestyles, ultimately preparing them for future success.

The digital transformation has a big effect on education because it changes how students and teachers find, get, analyze, present, and share information. Technology provides novel means of captivating students, individualizing education, and broadening access to knowledge, thereby enhancing the quality and significance of education. It presents prospects for lifelong learning and skill acquisition, improving economic value and productivity. In India, digital transformation in education can help address the challenge of providing quality education to a large and diverse population, particularly in remote and underserved areas. Furthermore, it holds the potential to facilitate the acquisition of new and emerging skills that are in high demand in the digital economy. However, there are also potential challenges to consider, such as the need to ensure digital literacy and access to technology for all students and instructors, the risk of widening inequalities, and the need for effective regulation and quality control. In B-School education, digital transformation is essential to preparing students for the rapidly changing and increasingly digital workplace. To prepare students for success in the modern digital economy, it is crucial for educational programs to incorporate cutting-edge technologies like data analytics, artificial intelligence, machine learning, cloud computing, robotics, and the internet of things. This should be coupled with hands-on learning experiences to give students practical learning skills. Moreover, fostering closer partnerships between academic institutions and industry is vital to provide requisite expertise and abilities to the graduates to excel in the ever-changing environment.

To meet up the sustainable development goals, it is important to devote a great amount of attention on improving the quality of education, especially at bachelors and masters level. The Indian government has designated 2010–2020 as an innovative decade and emphasizes critical thinking and reasoning skills in education to meet global demands. Artificial intelligence (AI) offers opportunities to supplement human intelligence and revolutionize various industries. In an effort to personalize education to individual student's capabilities, educational platforms powered by AI have been designed. In higher education, AI tailors the curriculum to suit the student's level of comprehension and furnishes timely feedback on essay-based assignments. To meet current market demands, Indian institutions of higher education must adopt AI and provide students with marketable skills. AI can also aid in designing auto-upgradable curricula and in training and supporting teachers. As AI continues to make inroads into the education sector, the function of teachers will undergo a transformation. Incorporating AI into education can transform the existing educational structure and empower students with the abilities necessary to navigate the dynamic job market.

Business schools (B-schools) face several challenges in adapting to the age of AI. The pace of knowledge creation is one of the biggest obstacles because it is not keeping up with the pace of corporate transformation that AI has sparked. The conventional curriculum of B-Schools requires a substantial overhaul to prepare students with the requisite competencies to manage and lead effectively in the constantly evolving business landscape, especially in domains such as ethics, emotional intelligence, leadership, and change management, which have become even more crucial in AI-enabled workplaces. Another significant challenge is the question of the value proposition of a business degree as the essential credential that businesses need to thrive in the age of digitization. As we look ahead to the future of work, it's clear that the job landscape will demand a continual commitment to learning and development. While traditional degrees are still valued, alternative credentials such as MOOCs, bootcamps, digital badges, and executive education programs are gaining popularity as valuable tools for professional growth. Furthermore, there is a lack of resources at many B-Schools that would allow for the widespread implementation of AI technologies, and the slow pace of knowledge creation and the time it takes to train new faculty are impediments to swift action. Finally, there is a concern about the ability of business school professors to adapt and change with the pace of a fast-changing corporate environment.

The objective of this doctoral research is to examine the factors that facilitate and hinder the adoption of technology in B-Schools in universities of Punjab. The use of novel technologies in colleges and universities has accelerated due to the necessity to stay up with technical breakthroughs brought on by globalisation and the growing demand for continuous learning. Furthermore, technical progress has also been fuelled by competition between educational institutions. However, obstacles to technological progress remain within schools and universities, including traditional teaching pedagogy and limited resources. The study emphasizes the need to focus on effectively implementing and diffusing technology in teaching practices, in order to enhance the ability to educate through technology. This requires an understanding of the context of technology within the broader culture, as well as how technology is spread and adapted. Further research is necessary to gain a comprehensive understanding of educators' viewpoints and motivations for utilizing or abstaining from technology in the classroom. In addition to examining how technology affects education, the study looks into the challenges that instructors have when attempting to use technological tools, including a lack of funds, inadequate IT support and resources, a lack of training, and time restraints. In conclusion, this study emphasizes the importance of integrating modern technologies into classroom teaching as a means to enhance the education quality and reduce the disparity in academic performance.

This doctoral research intends to look into many aspects of the integration of ICT and AI into the classroom instruction used by business faculties at universities in the Punjab region. The discoveries made in this study offer significant revelations regarding the socio-economic qualities of business faculties, their awareness about AI integration in classroom instruction methods, elements influencing their inclination towards adopting technology, and obstacles faced in incorporating ICT into teaching practices. One of the primary findings of this research is that commerce and management departments tend to have a higher proportion of young faculty, while economics departments typically have a more seasoned faculty. This suggests that B-Schools should consider the strengths and experiences of different age-groups and genders in their respective fields to promote diversity and inclusion in their academic environment. Additionally, this study reveals that there is still a gender gap in certain departments and universities. It is imperative for policymakers and academic institutions to implement appropriate actions to bridge this disparity and enhance the inclusivity and diversity of their faculty.

Moreover, this study emphasizes the essential significance of the organizational culture in encouraging the incorporation of technology into teaching approaches. Creating a nurturing and optimistic organization culture (OC) can greatly influence educators' attitudes toward integrating technology into their teaching pedagogy. Therefore, it is imperative for educational policymakers and institutions to prioritize creating a nurturing culture that encourages innovation, creativity, and excellence in both teaching and research. This study also highlights the significance of educators' opinions of the value and simplicity of using technology, as well as the influence of their peers and colleagues, as critical elements that affect their choice to include technology into their teaching practises. Therefore, B-Schools should give their faculty adequate training and assistance to boost their competence and confidence in using technology effectively. This study also suggests that gender differences may affect the strategies needed to promote technology adoption among educators, indicating the need for tailored strategies for female and male educators. Additionally, this research underscores the obstacles of cognitive dissonance and difficulties in classroom management that hinder the integration of ICT in teaching methodologies. Business schools must take essential actions, such as training programs, offering sufficient infrastructure, and administrative backing, to overcome these barriers and encourage the adoption of technology in education. The study also emphasizes the significance of ongoing education and training for faculty members to acquire a comprehensive understanding of the

advantages of AI-driven instruction. Such information can improve the standard of education provided by AI-based teaching techniques.

This study presents numerous noteworthy discoveries and recommendations aimed at inspiring educational policymakers, institutions, and business faculties to effectively incorporate technology into their teaching methodologies. By implementing these insights and recommendations, it is possible to establish a more comprehensive and diverse academic setting, promote ingenuity and excellence in teaching and research, and enhance the quality of education delivery.

Keywords:

Technology, Digital literacy, Higher education, B-Schools, Universities, Sustainable development goals, Digital transformation, Artificial intelligence, Organizational culture, Self-efficacy, Behavioural Intention

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Abbreviation	Meaning
ICT	Information and communication technology
FC	Facilitating conditions
PE	Performance expectancy
SE	Self-efficacy
SI	Social influence
EE	Effort expectancy
BI	Behavioural intention
AI	Artificial intelligence
IT	Information technology
B-Schools	Business Schools
TAM	Technology acceptance model
UTAUT	Unified Theory of Acceptance and Use of Technology
Tech.	Technology
Org. culture	Organizational culture

CHAPTER-1
INTRODUCTION

Chapter overview

Since independence, India's literacy rate has grown, but it still possesses the world's largest adult population without basic literacy skills. The relationship between digital literacy and employment is dynamic and essential, and the next objective for the Indian government is to be digitally literate. Literacy and writing remediation are necessary for developing a competent and realistic labour force. Integrating digital technology into education holds promise for enhancing the quality and relevance of education, fostering lifelong learning opportunities and skill acquisition, as well as boosting economic value and productivity. AI can alter the educational realm and educate students for the ever-changing labour market, but B-Schools confront obstacles such as the rapid development of new knowledge and a shortage of resources. This chapter proposes that the focus must be on the effective adoption and distribution of technology for teaching to expand or improve the ability to educate using technology.

1.1 Education: World & Indian scenario

Education is universally recognized as a critical asset for people and communities. Education's objective is to equip the upcoming generation with the skills and knowledge necessary for the world they will inherit. It increases a person's employability by enhancing their knowledge and skill set (Madani, 2019). In the past two centuries, the world has experienced a tremendous expansion of education from the historical standpoint. Literacy is a crucial ability and an essential indicator of a population's educational attainment. The transformation from an ancient to a modern educational realm has made the Indian education system very well-known and varied among those of other countries (Tilak, 2020). Since ancient times, India’s education system has emphasized the inner and outer development of the individual, focusing on holistic growth. This included moral, physical, spiritual, and mental facets of life such as modesty, honesty, discipline, independence, and reverence for all living things.

Teaching and learning adhered to the tenets of the religious scripts, fulfilling responsibilities to oneself, one's family, and society, thereby encompassing all facets of life. India's unique education system during ancient times attracted international students as well, who brought diversity to the teaching-learning process. But, with India under British rule, the education system got replaced with an antiquated one that requires numerous revisions to this day. Though India's education system has expanded greatly since independence, covering all facets of instruction, it still falls short of meeting the needs of an evolving global marketplace (Ahluwalia, 2019).

1.2 Indian population and literacy

According to the 2011 Census, India's literacy rate increased from 64.80% in 2001 to 74.04%. According to the 2005 UNESCO Global Education Monitoring Report, India ranks 106 out of 127 nations in terms of literacy rates. But on the plus side, since India's independence, the literacy rate has increased by a factor of six. While progress from a 2001 low of 12% to a 2011 high of 74% is impressive, India still has the world's largest adult population that lacks basic literacy skills (MS & Siddiqui, 2022). According to a survey conducted by the National Statistical Office (NSO), India has an overall literacy rate of 77.77%. Literacy rates are much higher in urban regions (87.7%), but much lower in rural areas (73.7%). Regarding digital literacy, just approximately a quarter of urban families and less than one in ten rural households have access to a computer (MS & Siddiqui, 2022). There is still a long way to go before most of Indians are computer literate; now, just 56% of those aged 15–29 in urban regions and 24% in rural areas can do so. While increased spending on education has had a favorable impact on some measures of social and economic progress, India still has to do more (Habibi & Zabardast, 2020). Even while the number of people who can read is growing, many people are worried that the education they are receiving is of poor quality and too slow. Hence, substantial efforts are necessary to improve the standard of education; solely prioritizing the promotion of digital literacy is inadequate (Bejaković & Mrnjavac, 2020). To enter the workforce, many young Indians lack the literacy skills necessary. Employers report dissatisfaction with the quality of workers' literacy and a lack of necessary skills. Remedial literacy and writing instruction and increased collaboration between the government and educational institutions are essential for creating a competent and realistic labour force.

1.3 Digital literacy and employability

Gaining a quality education is crucial to realizing one's full potential as a person, creating a more just and equitable society, and advancing one's country's progress (Leal Filho *et al.*, 2019). India's persistent growth and dominance in the international arena in regards to scientific advancements, economic development, societal equity, national harmony, and cultural conservation are contingent on its capability to offer high-quality education to all its populace. The coming decade is projected to see India with the highest number of young people in the world, and the future prosperity and advancement of the country will be dependent on the quality of education that the youth receive. For the sake of the country’s progress and a sustainable future, providing all citizens with access to a high-quality education is the most productive course of action for any country (Tyagi *et al.*, 2020).

The relationship between digital literacy and employability is dynamic and vital. The business world has changed dramatically in recent years, necessitating a new viewpoint on literacy and employability skills (Mahajan *et al.*, 2022; Farrell *et al.*, 2021). Today, particularly following the pandemic, a significant number of jobs have shifted online, and educational systems are attempting to adapt to changes in order to meet present demands. Therefore, gaining digital literacy skills will undoubtedly increase students' employability, and the Indian government's next major priority for its citizens is to be digitally literate. In such a context, acquiring digital skills is equally as crucial as establishing digital infrastructure. It has direct effects on economic growth and job creation.

The distribution of information across the globe is changing rapidly. A skilled workforce, especially in computer science, data science, and management, in addition to multidisciplinary abilities across the social sciences and humanities, is in increasing demand as a result of various dramatic scientific and technological advances, such as the rise of big data, machine learning, and artificial intelligence, which endanger to automate many unskilled jobs around the world (Kamala, 2021). In fact, due to the rapidly shifting employment and global landscape, it is becoming increasingly crucial for youngsters to not just learn but also to think critically and solve real-life issues through innovation and resilience (Dishon & Gilead, 2021; Kirschner & Stoyanov, 2020). The evolution of pedagogy is necessary to make education more immersive, comprehensive, integrated, inquiry-driven, discussion-based, learner-centered, adaptable, and, of course, pleasant. Hawe and Dixon (2017) suggest that in order to bridge the gap between the existing learning outcomes and the desired level, there is a need for extensive reforms in education, from early childhood education to higher education.

1.4 Education policy in India

The education policy in India has set forth a "radical restructuring" of the education system with the goal of fostering national unity and promoting economic and cultural development. The policy aims to ensure that every citizen has access to quality education, regardless of their background. To achieve this, the education policy recommends that all children aged up to fourteen must attend school as mandated by the Indian Constitution, and it strives to improve the quality of education by enhancing the training and standards of educators. Unlike previous education policies that mainly focused on ensuring access and equity, the education policy of 2020 places equal emphasis on accountability, affordability, accessibility, and equity. The policy aims to address the unfinished tasks from the earlier National Policy on Education in 1986 and the revised version in 1992. The goal of education, as outlined in the education policy, is to produce "good humans" who have a strong ethical foundation and moral conscience, possess rational thinking, empathy, compassion, resilience, courage, scientific temperament, and creative imagination. Therefore, the policy seeks to develop citizens who can actively participate in society and contribute to its growth and development.

Developing each student's full, unique creative potential is a top priority for the education policy of 2020. It is based on the idea that students need to learn not only the "foundational" or "higher-order" cognitive skills like reading, writing, and arithmetic, but also the "soft" or "social" or "emotional" skills like cultural sensitivity, empathy, communication, leadership, and resilience. Most importantly, the educators as well as their working conditions are the major focus of the National Education Policy, 2020, because of their profound influence on the next generation of citizens. It is imperative that every effort be made to provide educators with the tools and resources necessary to perform their jobs to the highest possible standard (Aithal & Aithal, 2020). By ensuring teachers their livelihood, respect, dignity, and autonomy, as well as installing in the system fundamental methods of quality control and accountability, the new education policy aims to recruit the best talent for the teaching profession at all levels. This will help ensure that students receive an education that is of the highest possible standard.

To provide higher education students with access to courses at their convenience regardless of location, the National Mission on Education through Information and Communication Technology (NMEICT) was developed as a centrally funded scheme. The mission aims to bridge the digital gap and assist those who have been left behind by the digital revolution and the knowledge economy as a whole. To achieve this mission's goals, it is crucial to balance the creation of original content, conducting pioneering research in critical areas of education delivery, and establishing international connections to learn from other countries' experiences. To do this, a committed network of specialists from all relevant fields is required. The success of this mission is crucial for promoting interdisciplinary fields of study and sustaining India's rapid economic growth by advancing human potential and knowledge dissemination. To remain competitive with other nations, India requires a system that acknowledges and nurtures talent, along with a dedication to lifelong learning. Customized interactive learning modules are necessary to meet the unique objectives of each student (National Mission in Education Through ICT, 2020).

The National Education Policy of 2020 led to the creation of the National Educational Alliance for Technology (NEAT) by the Ministry of Education, Government of India. NEAT functions as an autonomous agency that seeks to incorporate technology in K-12 and higher education settings. The primary goal is to provide a centralized online platform that consolidates various effective technological tools for education, with a specific emphasis on meeting the requirements of students with disabilities. NEAT aims at bolstering institutional capabilities, enhancing student learning, and preparing students for the workforce with the help of technology. It also hopes to boost students' performance in higher education and give youngsters an edge in a competitive world. As per NEAT's agenda, artificial intelligence is also used to tailor each student's education to improve retention, recall, and overall skill development.

1.5 United Nations sustainable development goals (SDG's)

Education is a fundamental human right and a most important requirement for achieving sustainable development (Annan-Diab & Molinari, 2017; Kopnina, 2020). Only if all stakeholders, including businesses, commit to advancing the education goal will society be able to empower children, fight inequality, end extreme poverty, and combat climate change. Business organizations can utilize their resources and core competencies to assist governments in delivering on their promise of education for all, despite the fact that the global education needs are immense. Effective corporate leadership can facilitate the necessary investments to guarantee that every child and adult has access to exceptional educational prospects. Plans for investing in education can range from enhancing brand leadership to building a diverse pipeline of prospective employees. In many markets, the mismatch between the skills of the available labour force and job openings is a significant issue that can be mitigated through education. Businesses need to make long-term strategic investments in education that will result in a larger and more talented future workforce. Investing in quality education also fosters innovation, facilitates entry into new markets, and ensures optimal use of resources.

There are approximately 260 million students enrolled in over 1.5 million schools in India. Despite having one of the most advanced educational systems, India still has room for development. There is a split between private and public education in the Indian education system. As per the National Policy on Education, India endeavours to provide its citizens with an education by making schooling mandatory up to a certain age. In 2015, India adopted the UN SDGs for 2030, which includes SDG 4 aimed at providing "inclusive and equitable quality education" and fostering "lifelong learning opportunities for all." This goal aligns with the worldwide agenda for educational development. However, achieving the crucial targets and objectives of SDG 4 necessitates a comprehensive restructuring of the entire educational realm to foster and support learning.

1.6 Higher education: Importance and current scenario in India

Higher educational institutions have always been vital to human progress, both in terms of training society's elite and in terms of generating ground-breaking innovations in diverse fields. Higher education's primary objective is to enable students to explore their interests and grow into their potential selves. It has the capacity to contribute to growth on all scales and make important advancements in the world (Chankseliani & McCowan, 2021; Owens, 2017; Aarts *et al.*, 2020; McCowan, 2019). This is only possible if higher education institutions focus on enhancing the capacity building skills of the students through quality education, thereby fulfilling the agenda of sustainable development. Higher education was given more attention in the SDGs adopted by India in 2015. According to Sandybayev (2020), advancements in technology have led to transformations in teaching approaches, resulting in the delivery of many conventional courses through online platforms. This has led to a change in the way classroom time is used, with more emphasis on small group discussions, interactive sessions, and individual student projects.

Higher education should help a country become more enlightened, socially conscious, intelligent, and competent so that it can better lift its people out of poverty and create and execute effective solutions to its own problems. The significance of higher education goes beyond merely creating employment opportunities for individuals, as it should also play a pivotal role in supporting a country's knowledge creation and innovation infrastructure, leading to substantial economic growth. Consequently, a good higher education realm is crucial to fostering a more prosperous, culturally rich, productive, and progressive nation, promoting harmony among its citizens.

India's higher education realm must undergo a timely and comprehensive overhaul, revitalization, and renewal to meet the needs of a knowledge-driven society and economy. This revolution is distinguished by a growing number of job opportunities for a creative, interdisciplinary, and highly qualified workforce (Jena, 2020; Hota & Sarangi, 2019). Considering the demands of the modern world, it is clear that a successful higher education program must foster the growth of moral, thoughtful, and original citizens. In addition to developing the person's character, ethical and constitutional values, intellectual curiosity, scientific temperament, creativity, spirit of service, and 21st century capabilities across a range of disciplines, it must allow the student to pursue in-depth study of one or more areas of interest. This encompasses not only academic disciplines but also the arts, humanities, languages, and professional, technical, and vocational skillsets. The objective of quality higher education is to equip students with the knowledge, skills, and attitudes essential for a successful personal and professional life, as well as for making a meaningful contribution to society. By providing students with the necessary tools, higher education can enable them to pursue fulfilling careers, attain financial independence, and lead fulfilling lives.

The Department of Higher Education, under India's Ministry of Education, is responsible for formulating policies and strategies aimed at enhancing the infrastructure at higher education level. Its responsibilities include ensuring the development of high-quality colleges, universities, and other institutions that facilitate improved access to and quality of higher education, following a systematic approach to development. Even after 76 years of independence, India is far from achieving universal literacy. There are a number of issues plaguing India's higher education realm at the moment, including: i) the vast majority of institutions are commercial enterprises in which little or no education takes place; ii) poor learning outcomes and development of cognitive skills of students; iii) insufficient access to higher education, particularly in economically disadvantaged areas (iv); streaming of students into narrow areas of study (v); lack of research (vi); lack of teacher and institutional autonomy to innovate and excel (vii); and lack of diversity (Ministry of Human Resource Development, Government of India, 2020). Positively, India is utilizing higher education as a potent instrument to construct a knowledge-based information society of the 21st century. In both quantitative and qualitative terms, the "higher education" scenario has significantly improved. Professionals from India are regarded as among the best in the world and are in high demand. This demonstrates the inherent power of the Indian educational realm.

1.7 B-School education in India

The system of education in India underwent a dramatic transformation in the 21st century. The liberalization, privatization, and globalization (LPG) processes have not only paved the way for more modern, professionally-oriented alternatives to the old ways of doing things, but they have also made available new types of programs in response to changes in the economy and the needs of various industries. Some fields, including B-School education, have been given new life as a result of the modern era's developments. In the past, B-School education mainly focused on finance, marketing, and human resources. However, with the advent of modern management education, the functional areas of management have expanded to encompass a broad spectrum of other fields, such as blockchain, operations, business analytics, product management, IT, international business, supply chain management, agribusiness management, retail, and numerous others. Because of the increasing need for educated management graduates, this field of study in India has shown consistent growth in recent years. As a result, the private sector has entered the Indian B-School education landscape and invested enormous funds to meet the rising demand for management education (Ravi *et al.*, 2019). In the last decade, there has been a remarkable surge in the establishment of fresh management institutions throughout the nation. These institutions are mainly owned by private entities and provide management courses covering diverse functional domains, which has naturally led to apprehensions regarding the standard of education dispensed by them.

Today, managers are in high demand across all economic sectors. Globalization and technical advancements have made it challenging for firms to survive in the global marketplace. Consequently, the significance of B-School education has multiplied significantly. The demand for management professionals in India will surge in the upcoming years, necessitating a large supply of qualified individuals every year. However, it is a cause for concern whether the demand matches the skillset of management graduates. With the changing global market landscape, quality has evolved into an absolute necessity in management education. To make India the intellectual capital of the world, it is necessary to foster a dynamic environment that encourages the development of high-quality B-School education institutes and to revitalize B-School education. Considering the gradual recovery of the country from the impacts of the COVID pandemic, it is crucial to reassess the role of professional managers and the skill set required for them to thrive in a dynamic, intricate, and unpredictable global landscape. B-schools need to expand their curriculum to include more than just an instinctive grasp of management. They must cultivate original minds that aren't afraid to take risks in the business world, where they can solve critical problems, create new things, and learn from their mistakes. They will need to be equipped with the technical and adaptive abilities necessary to deal with the issues of modern-day business world.

Businesses reinvent themselves in light of the emergence of new economic models due to the changing global scenario. They need a new breed of company leaders who are also socially visible, environmentally conscious, empathetic, and intellectually vivacious to run and steer these ecosystems. To address profitability along with sustainability issues, faculty in B-Schools need to groom competitive and talented professionals through cutting edge innovative pedagogies (Shankar, 2021). Newer approaches of case teaching, design thinking and experiential learning is the need of business curriculum. Internships that give students valuable real-world experiences and live projects that provide deeper insights into the workings of companies are a requirement of every business school. A new breed of business executives who can feel, think, and act is needed to navigate the evolving global order. Leaders are needed who are comfortable leading from both their strengths and weaknesses.

1.8 Advancements in technology

Through the ages, human civilization has been influenced by technological innovations, applications, and advancements, which have gradually transformed our lives. As technology has become increasingly important to the health and development of societies, it has also influenced changes in the composition and goals of human communities. Human societies and technology have become inseparable because technological systems mirror the essential requirements of a population. Technology drives innovation and new uses for existing technologies to better serve human needs. The primary purpose of technology is to unite instruments that promote development, utilization, and information exchange apart from simplification of tasks and resolution of human problems. Technology refers to the assemblage of scientific knowledge, expertise, practice, methods, equipment, and approaches employed to fabricate commodities and services, devise novel entities, and achieve specific aims, ambitions, and aspirations, resulting in a metamorphosis of the life of individuals, society, and the country. Thus, the world is constantly surrounded by technology as it is used to solve a variety of problems. From the Stone Age to roughly 100 years ago, technology progressed slowly; however, in a relatively brief period of time, it has improved and been modernized on a massive scale. Artificial intelligence, robotics, geotargeting, automation, and other information technology advancements specifically pave the way for further technological evolution. Technology is rapidly evolving, and it has influenced how people learn, communicate, and think. It also contributes to society and influences daily interactions between individuals. Learning is one aspect of technology that has had a significant impact on society. It has made learning more interactive and collaborative, which helps people engage more effectively with the difficult material they are attempting to learn (McGrew, 2020). With the advent of the internet, information is accessible twenty-four hours a day, and virtually anything is available online. India is becoming a significant player in the digital economy. The volume and growth of India's digital economy currently surpass those of most other nations based on a variety of key criteria, such as internet connections and app downloads. Government and the private sector are pushing swiftly to expand high-speed connectivity across the nation and to offer the hardware and services necessary to bring Indian consumers and companies online.

1.9 Technology in the field of education

In the last two decades, there has been an extensive growth of computing and educational technology, leading to a considerable influence on various sectors, including the field of education. Technology is now crucial to maintaining civilization, so its incorporation into educational settings is necessary. When it comes to cutting-edge technologies, India is unmatched on a global scale. The Digital India initiative has spurred India to evolve into a completely digitalized society and a knowledge-based economy at a rapid pace. Where education plays a very important role in this transition phase, technology also significantly contributes to improving pedagogical techniques and students' academic performance. This suggests that the connection between education and technology is mutually beneficial. The ever-increasing capabilities of computers and other forms of technology have improved and streamlined many aspects of human existence. As a result, several nations throughout the world have prioritized equipping their educational institutions with technological resources to supplement more conventional methods of instruction, in order to keep up with the growing importance of incorporating computer technology into school systems.

In general, colleges and universities have been quick to accept new technology, frequently before its pedagogical efficacy has been shown. Throughout its history, higher education (HE) has experimented with technology innovations as differently as it has with the blackboard and the personal computer. Some technologies have become an essential component of HE operations. Technology possesses the potential to revolutionize the traditional approach of imparting education and acquiring knowledge. It can abolish the spatial and temporal obstacles to education and greatly expand access to lifelong learning. No longer are students required to assemble in the same location at the same time to get instruction from an instructor. The contemporary technologies possess the capability to substantially modify the outlook towards HE institutions. A higher education institution is not always a brick-and-mortar establishment with lecture halls and a campus where students pursue advanced education. The major technologies altering HE are computers and telecommunications. Electronic mail, fax machines, the World Wide Web, digital content, and commercially generated simulations and courseware are transforming the daily operations and broadening the missions of educational institutions due to advancements in each of these fields.

The utilization of online learning and simulation technologies such as augmented reality and artificial intelligence, facilitated by the internet and diverse computer programs, inspires a greater participation of learners in the educational process. In addition to giving students access to an abundance of online materials, technology also serves to facilitate their education. Technology integration in the classroom is already being used by most schools and universities. Drent and Meelissen's (2008) study suggests that the integration of technological instruments in the classroom can exert a noteworthy influence on student attainment by expediting the learning procedure and consequently leading to substantial enhancements in the acquisition of vital proficiencies such as problem-solving and critical thinking abilities. Therefore, educators ought to incorporate technology in their pedagogical practices. Moreover, they assert that technology in the classroom should not be regarded as a separate issue, but rather as a complement to traditional modes of instruction to promote constructive learning atmospheres.

Educators continually strive to individualize student learning. On the route to personalizing education, technology empowers students by granting them control over how they study, making education relevant to their digital lives, and preparing them for the future. Students are motivated to become problem solvers, critical thinkers, collaborators, and creators by technology and access to resources beyond the classroom walls. Students acquire a lifetime passion for studying in classrooms where technology has been successfully integrated. Access to real-time student data, longitudinal statistics, apps, and more can help them reach new heights. Technology can assist educators in developing blended learning environments and utilizing digital tools for formative and summative evaluations, thereby introducing new learning and teaching pedagogy into classrooms. Incorporating technology into the classroom and providing students with the appropriate devices helps them acquire the career and technical skills necessary for success in today's and tomorrow's workforce.

1.10 Digital transformation in the Indian education sector

With over 750 million internet users, a multitude of rapidly expanding e-platforms, and an ever-increasing digital first audience, the widespread impact of technology in India cannot be denied. It has been acknowledged as a crucial catalyst for change across sectors, including education, which has undergone a paradigm shift in the past few years. The pandemic accelerated the reliance on technology, making education more mobile and quality education accessible to remote regions of the country. Students and instructors now collect, access, analyze, present, and transfer data differently. Henceforth, this transformation will be essential to guaranteeing education for all, since digital technologies have the capacity to democratize classroom learning and personalize knowledge intake according to the learner's skill level. Having grown up surrounded by technology, Generation Z is rapidly adopting online learning today. Globally, tech-based solutions constitute an integral component of modern education delivery. Emerging technologies are anticipated to solve common classroom difficulties such as student participation and engagement, data tracking, and boosting student achievement.

As the demand for competencies in novel digital technologies (such as blockchain, artificial intelligence, machine learning, virtual reality, the Internet of Things, etc.) increases, there will also be a surge in the requirement for sophisticated cognitive, social, and emotional proficiencies, including creativity, unstructured problem-solving, team collaboration, and effective communication. Currently, machines are incapable of mastering these abilities. As technology improves and advances, humans will be required to continually acquire and relearn employable skills for the duration of their lives. India will need to build scalable education and training programs that are both affordable and effective, not only for fresh job market entrants but also for midcareer professionals. A study by Kaka *et al.* (2021) analyzed the potential economic value of digital technologies in the education industry by identifying transformational digital opportunities or application sets with quantifiable economic value. Facilitative government policies and programs could inspire entrepreneurs, educational institutions, and IT companies to innovate and assist India's economy and society in integrating new digital technologies to their fullest extent.

1.11 Classroom instructional technologies

Edtech, or educational technology, refers to the integration of information and communication technology resources in the classroom, aimed at enhancing student engagement, involvement, and personalization of teaching. Many aspects of education are being altered by the proliferation of edtech tools. Examples of edtech that can facilitate student engagement through play include robots that help with classroom tasks, virtual reality lectures, and gamified classroom exercises. And it is lauded that edtech Internet of Things (IoT) devices can turn any space, such as a student's home, the school bus, or even the outdoors, into a digital classroom. Teachers are getting help from all over, including machine learning and blockchain technology, to grade tests and ensure that pupils do their homework. Students of all ages now have access to more learning opportunities than ever before, and these new tools encourage teamwork and diversity in the classroom. Now a days, students are learning to work together more effectively with the help of tablets and cloud-based applications in the classroom. Learners can work together to find solutions to challenges with the help of tablets preloaded with educational games and online classes. Meanwhile, students can submit their assignments to the cloud, have a digital discussion about their thoughts, and get aid from their peers. Technology in education allows teachers to give each pupil a unique curriculum. This strategy was developed with the intent of tailoring instruction to each individual student's set of talents, aptitudes, and passions. Since students can pause and rewind lectures, video content tools allow them to learn at their own pace and ensure that they fully comprehend subjects. To better assist students who struggled with a particular topic in class, educators can now use data analytics to identify those learners and tailor their instruction accordingly.

1.12 Technology in B-Schools

The quality of typical Indian B-Schools varies widely, but they need to improve with the changing times to maintain their credibility in the higher education landscape. With the country's economy moving into the digital age, Indian businesses are also undergoing changes. Management theory and practices are changing to accommodate the emergence of cutting-edge tools and methods for conducting business. Production and consumption are becoming increasingly reliant on digital technology; therefore, Indian managers need to learn to incorporate data and machine intelligence into their strategic planning and operational decisions. There is a significant skills gap between what is required for effective digital management and what is available. In fact, the gap between academia and business is widening as a result of the two sectors' divergent rates of development. Professionals rarely make the transition from the business world to the academic world to educate students, and even fewer educators actively seek out opportunities to collaborate with businesses and get real-world business experience. After graduation from a business school, most students only have a theoretical understanding of the field, so they have a steep learning curve ahead of them before they can start making decisions on their own. Although a few progressive B-Schools have adopted strategies to prepare their students to effectively lead in today's ever-evolving digital work environment, most students still encounter limited possibilities to acquire hands-on expertise in managing advanced technologies. As data, cloud computing, artificial intelligence, robotics, the Internet of Things, and similar technologies are relatively new, there are scarce Indian case studies that can be utilized to standardize digital age management instruction.

Universities have a profound impact on both the progress of HE and the professional growth of students. Raising the level of education requires modernizing pedagogical methods, infrastructure, intellectual assets, and teachers of high calibre. It was inevitable that India's management classrooms would be transformed by the surge of technological innovation. The widespread adoption of technological aids to facilitate education and sustain the learning-teaching dynamic further solidified the shift away from the more traditional business school models. While there are some excellent B-

Schools in India, the quality of most B-Schools needs to greatly improve considering the changing dynamics of the business world. Without a shadow of a doubt, a solid foundation in management theory and practice is essential for thriving in today's increasingly digital world.

There is a significant gap between what is needed and what is currently available in the field of management. In fact, the gap between academia and business is widening as a result of the two sectors' divergent rates of development. The transfer of knowledge and experience between the business world and universities remains low. As a result of technological advancements, new teaching pedagogy need to be tested and developed. Faster knowledge retrieval, the addition of digital content in novel formats, the reduction of time-consuming chores, flipped learning approaches, and other uses of education technology are required to increase the engagement quotient. Education technology allows for deeper exploration, making lessons engaging and enlightening for the technologically savvy millennial generation. Students who are shy or reserved in a more traditional classroom setting may feel more comfortable speaking up and contributing while using educational technology. In addition to progress and feedback mapping, the online education platforms enable educators to regularly collect real-time student feedback on assignments and subject comprehension, all of which contribute to a more engaging and productive engagement and learning environment.

Despite the advantages of edtech far outweighing the disadvantages, there is still scope for enhancing the customization of the platform to cater to the individual requirements of each learner. Additionally, a significant gap exists between urban and rural India in terms of access to digital infrastructure. The government, educational institutions, and technology suppliers all have an interest in resolving the issue of the high cost of initial gear setup, which is a problem in addition to the lack of affordable and conveniently accessible bandwidth. Decisions made using automation technology must adhere to strict rules and logic, leaving little room for human judgment. The management curriculum at B-schools should incorporate this consideration. Young Indian managers need to adapt to the digital economy by learning to use the latest in business technology, processes, and structures. For Indian businesses to be successful in the modern economy, the country's management education realm needs a major overhaul.

1.13 Artificial intelligence

The Indian government has designated 2010–2020 as an innovative decade. To meet the requirements of globalization, critical thinking, reasoning and problem solving skills are required. As students are very inquisitive, imaginative, and capable of learning a great deal when they first start school, it is only at the elementary level that these talents can be taught. If young learners are exposed to ICT (inclusive of advanced technologies) during the initial phases of their education, it will encourage them to acquire cognitive problem-solving abilities. Furthermore, youngsters tend to remember what they have learned through audio-visual means for a longer duration.

The advent of artificial intelligence is on the cusp of a global revolution, as intelligent machines with the ability to perform high-level cognitive processes like problem-solving, learning, decision-making, and perception, along with advancements in data collection and analytics, offer opportunities to enhance human intelligence and transform the way we live and work. Artificial intelligence pertains to machines that possess the ability to mimic human intelligence and behavior, exhibiting certain human-like attributes such as learning, problem-solving, and critical thinking capabilities. The ultimate goal of AI is to enable rational decision-making and action execution that achieves optimal outcomes. AI systems typically exhibit at least some of the following characteristics of human intelligence: planning, learning, reasoning, problem solving, knowledge representation, perception, motion, and manipulation, as well as, to a lesser degree, social intelligence and creativity. A multidisciplinary approach to mathematics, computer science, languages, psychology, and more is applicable to numerous areas and industries. Companies that desire to extract value from data by automating and streamlining processes or generating actionable insights must implement artificial intelligence systems. Businesses can take advantage of machine learning-powered systems that analyze vast amounts of data, revealing patterns and insights that would be difficult for an individual to identify on their own. This allows for more focused and customized communication, the prediction of important care events, and the detection of possible fraudulent transactions, among other benefits.

1.14 Artificial intelligence in the field of education

For more than three decades, researchers have extensively studied the implementation of artificial intelligence in the field of education. Artificial intelligence provides support for diverse learning settings, encompassing conventional classrooms, the corporate realm, households, and lifelong learning endeavors The field of AI involves the integration of various disciplines, such as education, engineering, psychology, etc. to create flexible learning environments. These digital learning environments adapt teaching and learning to the capacities of individual students, hence encouraging the development of AI-based learning tools that are adaptable, personalized, engaging, and effective. AI-enhanced educational platforms such as Code.org, Khan Academy, AltSchool, Teach for India, and Aspiring Minds are widely recognized for their usefulness in achieving learning outcomes.

AI has initiated the evolution of the learning process and is starting to question humanity's traditional knowledge and skills in the field of HE. It personalizes learning by adapting the instructional content to each student's level of comprehension. Data analytics modifies the learning programs by enabling educators to examine the performance and learning style of each student, and by continuously adjusting the learning content based on the student's development. Additionally, machine learning can assist with providing rapid feedback on essay-based projects. Globally, academia is implementing and utilizing AI in administration, learning, tutoring, and grading. Global education realm has been altered by the combination of artificial intelligence and creative learning processes. China has made substantial investments in its education sector, following investments in the medical and automobile industries, due to the sector's potential for growth. India, being one of the world's foremost emerging nations, is also implementing AI in the educational sector. To attain its true potential, India's education realm must evolve at a more rapid rate and undergo more intensive efforts. The ever-widening gap between academics and industry has produced a generation of students who are unquestionably talented and diligent, but lack the necessary skill set for employment.

Cloud computing, machine learning, AI, and robots are some of the most important work areas that should be prioritized immediately. The Indian higher education realm is in severe need of artificial intelligence, since it will result in a total overhaul and provide the students with the requisite skill set to meet current market demands. Institutions of HE should adopt this revolutionary technology in order to equip students with the ever-changing marketable abilities. AI can assist educators in designing auto-upgradable research-academia and industry-academia curricula for improved student learning, training, and exposure (Sandu & Gide, 2019). Teacher knowledge is crucial to student achievement, but high-quality continuing teacher development is expensive. AI-powered systems can assist in the professional development of teachers, and they can be customized to meet the specific needs of each teacher. Intelligent support for teachers can also alleviate stress and reduce workload, which may help address the issue of teacher retention. The assistant might significantly cut the amount of time teachers spend grading outside the classroom. In the classroom, the teacher could utilize the aide to provide one-on-one tutoring to a group of students who are struggling to grasp the topics.

In the upcoming stage of AI in education, teachers are crucial in deciding how to best utilize the various AI resources available. To make informed decisions about new AI products, teachers need a deep understanding of the capabilities of AI systems in education, which will also help develop their research skills to interpret the data provided by AI systems. As the classroom evolves, so will the role of the teacher in artificial intelligence, and this is an exciting prospect.

1.15 Artificial intelligence as an imperative in B-Schools

As AI and related technologies have brought a revolutionary change in job roles, traditional B-Schools' curricula need a massive revision to equip students with the abilities necessary to manage and lead in the dynamics of the business world. Roles boosted by AI necessitate enhanced abilities in ethics, emotional intelligence, leadership, and change management. The traditional rate of knowledge generation cannot keep up with the rate of corporate transformation brought about by AI. As organizations enhance their ability to provide employees with focused, relevant business topics at scale, the value proposition of a business degree is questioned. Moreover, it is essential for B-Schools to create inventive pedagogical approaches that incorporate artificial intelligence to offer students enhanced interactive learning opportunities and prompt personalized feedback. AI enhances the learning experience of the students, streamlines administrative processes, and provides economies of scale. It has the potential to enhance the student experience while reducing operational costs by facilitating better identification of potential students, facilitating the creation of diverse and well-rounded classrooms, and facilitating improved academic and career guidance.

The transformative power of AI is a significant challenge as it can fundamentally alter business practices, industry norms, competitive landscapes, and ultimately the curriculum of B-Schools. The curriculum in B-Schools is changing as a result of this shift, but more crucially, the relevance of a business degree as the essential credential that businesses need to thrive in the age of digitization is being called into doubt. In the future, job requirements will demand continuous learning and education, making a degree a collection of past knowledge and skills. As a result, there may be a rise in the demand for non-degree credentials such as digital badges, certificates earned through massive open online courses (MOOCs), executive education, and bootcamps.

B-Schools must take advantage of the more sustained attention of their students and their decades of experience to develop programs that offer students the opportunity to thoughtfully consider the ethical, moral, and environmental consequences of AI-augmented business practices, while corporations and platform providers work quickly to develop courses in new technologies and business practices. Because of their unique position, B-Schools need to place a greater emphasis on group projects and practical training that simulate real-world scenarios and obstacles, where the most profitable answer is not always the best. Now a days, the students aspiring to pursue a business degree expect a strong interest in programs that offer training in areas like ethics, data protection and security, distributed leadership, managing innovation, and artificial intelligence governance. Most of the B-Schools recognize that updating their business curriculum to match the present and future realities of AI-augmented work is an essential first step. To stay relevant and mitigate the potential threat that AI applications pose, students require both theoretical and practical experience with AI as well as innovative, human-focused skills.

There is a lack of resources at many B-Schools that would allow for the widespread implementation of AI technologies. While there is a general tendency for B-Schools to create or update their curricula to better prepare their students for an AI-enabled workplace, the slow pace of knowledge creation and the time it takes to train new faculty are impediments to swift action. However, businesses and service providers are moving much more quickly to develop and use new AI technologies that will enhance and validate the learning and development of abilities. Perhaps the biggest danger that AI currently poses to B-School education is this disconnection or gap in adoption. The language of corporate human resources, to "reskill" and "upskill" talent, has been a rapidly approaching effect of AI for a while. Because university professors teach students not just for today but for a career that will last for decades, they may be among the first to need to learn new skills (Stine *et al.* 2019). The ability of business school professors to adapt and change with the pace of a fast-changing corporate environment is one of the most commonly expressed concerns. If only a few specialized classes needed AI skills, this would be less of a worry. But if AI is to be used across the curriculum, it is important to be able to transform the whole faculty.

1.16 AI-based classroom instructional tools

The provision of tutoring services and the development of individualised educational aides to help students with their homework and assignments are both made possible by artificial intelligence. Students can get personalised and rapid feedback from a variety of AI-driven tools and systems, as well as support from their instructor for any questions they might have. Additionally, even in the absence of direct teacher involvement, voice assistants like Amazon Alexa, Apple Siri, Microsoft Cortana, and comparable technologies encourage student engagement with educational resources. These voice assistants are useful in both academic and non-academic situations, facilitating conversation and a lively learning atmosphere in the classroom. This method breaks up the usual monotony associated with standard teaching pedagogy and adds interest to the learning process. It is expected that the use of this technology will continue to grow in the coming years.

Educators have long been striving to tailor learning to the unique needs of individual students. However, with the help of artificial intelligence technology, high-quality education can now be made accessible to India's multilingual population (NITI Aayog, 2018). The use of AI in personalized learning offers a higher level of inclusiveness by making global educational institutions accessible to everyone. An example of this is Presentation Translator, a digital tool that uses speech recognition to generate real-time subtitles for teachers' presentations. This feature benefits learners who require a slower pace when studying. In the field of B-Schools, there is an increasing emphasis on foreign language proficiency to provide students with a global outlook. Language learning apps like Mondly, Andy, Duolingo, and others incorporate chatbots that tailors the language learning experience. Additionally, intelligent tutoring systems are actively being developed to challenge students, address their knowledge gaps, and guide them towards new areas of study when necessary. Additionally, AI provides personalized smart content to enhance microlearning and skill mapping (Rangaiah, 2021). In terms of placement, AI-based programs presently conduct remote interviews to assess students' linguistic, emotional, and analytical abilities. Teachers can now use learning analytics to remotely proctor exams, grade assignments, and assess students' learning levels.

1.17 Forces facilitating and hindering technology use

The rapid advancement of globalization and the consequent reshaping of the business world are among the powerful factors driving the adoption of new technologies in HE. This trend has also opened up new possibilities for educational institutions to expand their reach beyond international borders. With advanced communication technology, institutions of HE are no longer restricted to the student markets or educational resources in their regional locations. Similarly, the increasing desire for lifelong learning opportunities to keep up with social, economic, and technical changes drives the need for accessible alternatives to traditional real-time, campus-based training. Furthermore, competition among HE establishments fosters technological progress within the academic realm. Many organizations actively engage in a technical "arms race" that necessitates the adoption of new technological advancements as soon as they become available in order to avoid falling behind competitors.

The global pursuit of excellence in HE has become a priority for countries worldwide, especially in developing nations. As the expansion of HE and globalization of economic activities continue to shape the context, education has gained national significance and an international dimension. Developing nations face mounting pressure to provide HE of a standard that meets national and international benchmarks to keep up with the fast-paced global changes. As a result, many developing nations have established national quality assurance mechanisms, including India and China, and many more are working on developing an appropriate strategy. However, this will be difficult in locations with limited resources. There are numerous hurdles to technological innovation within schools and universities. Many instructors are reluctant to adopt alternative educational methodologies employing the computer or telecommunications devices due to academic traditions such as the faculty-centered lecture. Many institutions with limited resources cannot easily embrace a number of technology applications due to their high cost. Before technology became so crucial to institutional operations, many institutions compensated for new or better technologies using budget surpluses. Now that technology is a vital and ongoing investment, most of the institutions must find additional funding to fulfill their growing need for technological resources. Another barrier preventing the widespread adoption of technology in colleges and universities is the lack of resources to assist teachers and staff in learning how to fully leverage technology. According to Oye *et al.* (2011), technology-enabled teaching and learning face a number of challenges, including inadequate infrastructure facilities and training, teachers' insufficient ICT skills, time constraints due to heavy workloads, limited knowledge of ICT, and varying levels of individual interest.

The mere adoption of educational technology by teachers does not guarantee successful integration or improved education standards. Rather than debating the use of technology in instruction, the focus should be on how to effectively implement and spread the use of technology to enhance teaching capacity. Institutions that incorporate technology in their curricula should shift their attention to understanding the larger cultural context of technology and education, and identify the necessary adaptations. It is essential to conduct research to gain insight into the perspectives of educators and their reasons for using or not using technology in the classroom.

There has been a growing push by educational institutions to include IT in classroom instruction, yet previous research shows that teachers are resistant to adopting these methods. There is a need to investigate why some academic institutions are quick to adopt innovative uses of technology in the classroom while others are slow to do so. Identifying the factors that impact instructors' adoption of technological aids is crucial (Moser, 2007). To fully understand how technology can be effectively used in HE classrooms, it is important to recognize the impact that obstacles have on its adoption. Researchers, including Emre (2019), Hur *et al.* (2016), Nikolopoulou and Gialamas (2015), and Hechter and Vermette (2013), have identified both internal and external barriers to the integration of technology in teaching, such as inadequate institutional funding, limited IT support and equipment, insufficient training, instructors' inability, and time constraints.

Numerous studies have been conducted to explore the effects of technology in educational environments. Morgan and Ritter (2002) discovered that a technology-based curriculum boosts student performance in the classroom and changes students' attitudes positively when technology is employed as a learning instrument. According to the findings of their investigation, Smaldino *et al.* (2008) concluded that the implementation of technological tools had a beneficial impact on students. As a result, there was an increase in the use of activities that were oriented toward the students, as well as an increase in attention to the lesson and interest in the topics being covered. According to Islam and Gronlund (2016), who conducted a literature review on the integration of computer technologies in schools, instructors benefit from instructional technologies in terms of collaboration, flexibility, and professional growth.

1.18 Rationale of study

Education is a crucial element for the growth and advancement of any economy, providing a competitive edge. Hence, it is vital to enhance the quality of education by integrating the latest technologies into classroom instruction to keep pace with rapid technological advancements. India, with the second-largest population globally, is currently grappling with various educational challenges, such as inadequate education standards and low placement rates. There is a little understanding of how technology is implemented and used in Indian educational institutions, even though policymakers frequently anticipate that ICT will polish the young minds of students through new learning procedures. The achievement gap that exists between those who achieve the most and those who achieve the least presents a challenge that must be confronted daily by educators, school leaders, administrators, and government officials. Experts in the field of education are of the opinion that India’s current educational realm requires a new technological intervention in order to close this achievement gap. If disruptive technologies such as artificial intelligence (AI) were implemented in Indian classrooms, the country's education realm would become more accessible and inclusive.

Because students do not actively participate in traditional lectures, traditional classroom instruction methods have been unable to produce an effective learning environment for many students. Traditional methods of teaching are mostly responsible for this failure. Participation and effort on the part of the student are essential components of active learning, which incorporates all three stages of the learning process—namely, input, actions, and feedback. Students' higher cognitive processes and their capacity for critical thinking are stimulated when learning is done effectively. In recent years, there has been a significant change in the way curriculum is approached, with a greater emphasis on student-centered learning and the teacher's role as a facilitator rather than the primary source of information. In this context, it is important for educators to consider the individual needs, abilities, interests, and learning styles of each student. While the teacher remains a crucial part of the education process, there has also been an increased use of ICT tools to supplement and enhance teaching and learning.

India has a vested interest in the advancement of artificial intelligence (AI) due to its position as the world's fastest-growing economy and the second-most populous country. In acknowledgment of the potential for AI to revolutionize economies, the Hon'ble Finance Minister of India stated in his 2018-2019 budget speech the importance of strategically approaching AI and tasked NITI Aayog, the government's "think tank," with creating the National Program on AI to provide guidance for research and development in emerging technologies. In its AI strategy paper, NITI Aayog (2018) examined several industries that would be affected by it. The document's overarching purpose was to foster an attitude of openness to learning from the world's leading AI researchers and developers. Low awareness is cited as the primary cause for the lack of adoption of AI in India in a discussion paper published by NITI Aayog (2018). Because teachers have such a profound impact on their students' development of expertise, it's crucial that they be self-aware about the extent to which they are familiar with cutting-edge tools like artificial intelligence (Karchmer *et al.*, 2005). Considerable attention must also be paid to assessing the factors that account for their preparedness to implement it in the classroom. Many for-profit educational institutions hope to reap the rewards of AI by teaching their students the kinds of expertise that will be in high demand in an increasingly automated economy. The utilization of artificial intelligence (AI) in the Indian education industry has the potential to resolve quality concerns, overcome barriers, and enhance the learning experience through virtual mentoring, as stated by Srivastava (2018), Arlitsch and Newell (2017), and Jaffer *et al.* (2007). As a result, this study aims to evaluate the readiness of business professors to incorporate AI into their teaching methodologies and provide recommendations for policymakers to consider.

1.19 Research questions

The research questions are formulated to investigate different facets associated with the utilization of ICT in educational practices among business professors at universities located in the Punjab region. Through these research questions, it is expected that multiple insights can be gained that can inform universities in Punjab on how to develop effective strategies for incorporating ICT and AI into classroom instruction, ultimately enhancing the quality of education, and preparing students for success in the ever-changing global workforce.

- What are the socio-economic characteristics of business faculties in universities of Punjab?
- What is the frequency of ICT usage by business faculties in their classroom instruction in universities of Punjab?
- What factors influence the BI of business faculties towards the adoption of ICT in classroom instruction in universities of Punjab?
- What are the perceived barriers to integrating ICT in classroom instruction among business faculties in universities of Punjab?
- To what extent are business faculties in Punjab universities aware of the integration of artificial intelligence into their teaching practices?

1.20 Application of the study

The incorporation of ICT has become crucial in HE, given its many advantages in teaching and learning. In Punjab, there is a rising inclination towards utilizing ICT in classroom instruction, particularly in business faculties within universities. Nevertheless, there is inadequate research on the acceptance and assimilation of ICT in classroom instruction by business faculties in universities located in Punjab. The results of this study can be applied in various real-world settings, such as:

1) **Curriculum development:** The study's results can aid curriculum designers in developing and executing suitable training courses to improve the ICT capabilities of business faculties at universities. This, in turn, will assist in the incorporation of ICT in classroom instruction.

2) **Professional development:** The research outcomes can aid decision-makers and universities in developing opportunities for faculty' professional growth. Through organizing training sessions and workshops, educators can acquire proficiency in utilizing diverse ICT tools to improve their teaching skills.

3) **Technology integration:** Based on the identified barriers to ICT adoption, HE institutions can create programs and policies that promote the integration of ICT into classroom instruction. For example, universities can provide incentives to faculty who integrate ICT in their teaching or provide them with necessary equipment and technical support.

4) **Artificial intelligence integration:** The outcomes of the study could be utilized to develop training programs and awareness-raising campaigns for business faculty, with the goal of improving their understanding of the advantages of incorporating AI in teaching practices and how to competently use AI tools.

5) **Policy development:** The results of the study can be used to inform policymaking and funding decisions related to tech. integration in HE. Policymakers can use the findings to understand the barriers and facilitators of ICT adoption and develop policies that incentivize universities to invest in ICT infrastructure and faculty development.

1.21 Chapter summary

Education is a fundamental asset for individuals and communities, and its importance is globally recognized. India's education realm, which emphasizes holistic growth, needs to be revamped to meet the needs of an evolving global market. While India has made significant progress in increasing literacy rates, there is still a long way to go in terms of digital literacy. The incorporation of technology into education is crucial for the country to keep pace with a rapidly changing world. Digital transformation can help address the challenge of providing quality education to a large and diverse population, but it also presents challenges that need to be addressed, such as ensuring digital literacy and access to technology for all. In today's rapidly changing business environment, incorporating digital literacy in B-School education is crucial to prepare students for success. B-Schools need to adapt their curricula to ensure students have the necessary skills and knowledge to thrive in a digital economy. Identifying factors that facilitate or hinder technology adoption by business faculty is crucial to developing effective strategies to promote tech. integration in B-School education. This research can also provide insights into the challenges and obstacles that must be addressed to facilitate technology adoption and integration in B-Schools. With the right policies and initiatives, India can achieve its goal of providing equitable, inclusive, and high-quality education that fosters lifelong learning and contributes to human progress, innovation, and economic growth.

1.22 Structure of the study

The first chapter of the thesis introduces the study and provides background information on the research topic. It includes the rationale, application, and research questions, setting the stage for the rest of the thesis. The subsequent chapter presents a literature review that comprehensively assesses the existing literature on the research topic, discussing the main theories, concepts, and studies relevant to the research problem. The following chapters detail the research methods used, including the study design, data collection procedures, and data analysis techniques. The next five chapters report the results of the study, including any statistical analyses, tables, and figures, and interpret the results in relation to the research objectives and questions. The chapter concludes with a summary of the main findings and their implications for future research. The final chapter summarizes the key findings, restates the research objectives and questions, highlights the limitations of the study, and makes recommendations for future research. The last section of the thesis is a comprehensive bibliography listing all the sources cited in the research.

CHAPTER-2
REVIEW OF LITERATURE

Chapter overview

Education is no longer a one-time event in today's competitive and interconnected world, but a lifelong process. To keep up with the competition, technology has been integrated into education, especially with the emergence of artificial intelligence (AI). Technology has become a valuable tool for the education sector and is also being used for training in other industries. This chapter aims to provide a thorough review of previous research on the adoption of technology in HE, with a particular focus on the use of AI. It discusses different technology adoption models in teaching and the types of technologies used by business school teachers. The chapter also examines the challenges that educators face when incorporating technology into their teaching and how these obstacles can affect the success of technology adoption in HE. The purpose of this chapter is to offer a comprehensive overview of the current state of technology adoption in HE and the various factors that affect its success. This information will serve as a valuable resource for educators, administrators, and researchers who are interested in tech. integration in education.

2.1 Information and communication technology

The term information and communication technology (ICT) is used to describe a wide variety of tools for digitally managing data and transferring it between locations. Computers, the World Wide Web, telecommunications, and multimedia are all examples of ICT. Its ubiquitous use has reshaped our daily lives and the ways we interact with one another (Kontostavlou & Drigas, 2019). Business communication and collaboration have been boosted by ICT, leading to more productive and efficient operations. Instances like electronic mail, instant messaging, and video conferencing have simplified cross-office communication and collaboration. In addition, advancements in cloud computing and other digital technologies have enhanced data storage and administration, simplifying the process by which firms gain access to and utilize vital data. In the entertainment industry, ICT has enabled new and exciting access to and enjoyment of media content. The internet and digital technology have made it easier for people to access music, movies, and other types of entertainment from anywhere in the world. Media consumption and enjoyment have been revolutionized by online streaming services.

The integration of ICT into various aspects of society has had a profound impact, which can be observed in various areas. These areas include education, healthcare, business, politics, the economy, digital skills, cybersecurity, and economic growth. In education, ICT has greatly augmented the accessibility and quality of education by providing various online learning tools and resources (Raja & Lakshmi Priya, 2022). This has also resulted in a heightened demand for individuals with digital proficiency. In healthcare, ICT has facilitated greater access to medical information and services, leading to improved patient outcomes through the implementation of electronic health records and telemedicine. The incorporation of ICT into the business sector has revolutionized conventional business methods, leading to higher productivity, smarter decision-making, and broader market outreach, utilizing tools like cloud computing, data analytics, and mobile apps. It has also been a vital part of politics by shaping political discussions and encouraging civic involvement through social media, while enhancing government transparency and accountability through digital platforms and systems. Additionally, the extensive acceptance of ICT has greatly impacted the economy, contributing to economic growth and competitiveness in digital services and e-commerce (Jehangir *et al.*, 2011).

2.2 ICT in the field of education

ICT has revolutionized the field of education, altering the manner in which teachers deliver knowledge and students acquire it. E-learning has made education more accessible and easier for students, enabling them to study at their own speed from any location (Cheok *et al.*, 2017). According to Sayaf *et al.* (2022), the introduction of advanced technology, including laptops, tablets, projectors, smartboards, etc. in digital classrooms has provided students with an engaging and dynamic educational setting.

Learning management systems (LMS) have facilitated the management of classrooms and the organization of students (Sharifov & Mustafa, 2020). ICT has also facilitated collaborative learning, allowing students to work on projects together regardless of their location. In addition, the internet offers students access to a great deal of material, which makes study and education more efficient (Hernández-Sellés *et al.*, 2019). The research conducted by Alberola-Mulet *et al.* (2021) and Oke & Fernandes (2020) demonstrates that the integration of ICT has played a crucial role in enhancing the effectiveness and utility of the teaching process, resulting in a substantial revolution within the realm of education. It has had a significant impact on society, enabling new and enhanced ways for individuals to connect, communicate, and obtain information. According to Kohl *et al.* (2021), the continuous advancement and broader implementation of ICT hold the potential for further advantages and opportunities in the future. The integration of ICT in education offers a remarkable capacity to facilitate teaching and learning, even in unforeseen circumstances. Research conducted by Caprara & Caprara (2021) and Dintoe (2019) has highlighted the importance of utilizing ICT in teaching and persuasive communication to effectively convey fundamental concepts and foster a deep personal understanding of ICT. The significance of ICT surpasses its practical application in educational pedagogies and its underlying rationale. Undoubtedly, ICT is extensively employed in the education sector for various purposes, including fostering student motivation for learning (Alyahyan & Düştegör, 2020; Alshahrani, 2017), enhancing instructional practices for both teachers and learners (Kulal & Nayak, 2020), advancing the overall quality of teaching (Churchill *et al.*, 2020), and facilitating student collaboration and engagement in lessons (Cinganotto & Cuccurullo, 2019). These facts underscore the indispensable role of educational technology within the modern learning environment.

With so many positive outcomes for students, faculty, and administration, it's clear that ICT has a place in the classroom (Zee & Koomen, 2016). Unfortunately, assessing the quality of education still poses a challenge due to the lack of universally recognized standards. However, the prudent use of ICTs in the classroom can result in a significant improvement in the quality of education. The goal of education is to impart knowledge and skills to students, while learning involves acquiring these abilities and becoming proficient in applying them. In a country such as India, with a substantial population, it is crucial to adopt efficient methods for educational outreach (Mathivanan *et al.*, 2021).

Traditional lecture-style teaching has proven to be ineffective for a considerable number of students, leading to low levels of student participation. However, the effectiveness of active learning approaches, which encourage students to actively engage in the learning process, has been demonstrated in promoting analytical thinking, problem solving and other higher-order cognitive abilities. In recent times, there has been a transformation in the role of the teacher, transitioning from being a mere provider of information to that of a facilitator in a learner-centered educational environment. The instructor's responsibility is to facilitate the learning process, with the emphasis being placed on the students' needs, abilities, interests, and learning styles. This shift places a greater emphasis on student responsibility and accountability in their education. In traditional classrooms, the teacher plays a central role, while in ICT-based classrooms, various ICT tools are utilized to complement the teacher and enhance student learning. According to Ifinedo & Kankaanranta (2021), the teacher assumes the role of a facilitator who guides students in utilizing technology, ensuring that they have a comprehensive and captivating educational journey.

2.3 Stakeholder benefits from ICT integration in the field of education

The integration of ICT in education offers numerous benefits to individuals and organizations. For learners, the utilization of ICT grants them access to a wide range of educational resources and interactive learning opportunities, resulting in enhanced creativity, critical thinking, and problem-solving abilities (González-Pérez & Ramírez-Montoya, 2022; Bishnoi, 2020; Matthee & Turpin, 2019). Educators also benefit from the incorporation of ICT as it encourages the adoption of inventive teaching methods, simplifies administrative responsibilities, and facilitates personalized learning experiences for each student (Dakhi *et al.*, 2020; Baharin *et al.*, 2018; Mirzajani *et al.*, 2016). For educational institutions, the integration of ICT enhances the quality of education, operational efficiency, and enrollment rates (Dong *et al.*, 2020; Malik, 2018; Vijaya Sunder, 2016). At the national level, ICT incorporation in education drives economic growth by providing a skilled workforce and boosting the economy's competitiveness (Tóth *et al.*, 2019; Aleksejeva, 2016). Moreover, it fosters inclusivity and equity by giving access to education for underrepresented and marginalized groups. All in all, incorporating ICT in education offers numerous advantages for all parties involved.

The implementation of smartboards in the classroom has numerous benefits, such as aiding in lesson planning, promoting collaborative work among students, and enhancing their cognitive skills (Zhang *et al.*, 2019). An ability to think critically and rationally is essential for creative problem solving. The increased accessibility of educational materials and exemplary teaching methods through ICT can contribute to enhanced teaching practices. By harnessing ICTs, digital resources like online libraries can be established, offering convenient and unrestricted access to academic materials for students, faculty, and professionals (Bhattacharya and Sharma, 2007). Campuses with these features facilitate communication among scholars and the exchange of published research. ICT also enables academic institutions to reach out to underprivileged individuals and enter new worldwide educational marketplaces. Thus, ICT-enabled education would eventually lead to education democratization. According to Chetty (2018), ICT has the potential in fostering effective educational practices, especially in developing countries like India and it can play a significant role in narrowing the digital divide.

Incorporating ICT into the educational setting can support the cultivation of advanced abilities like problem-solving and collaborative teamwork, which are crucial for addressing real-life problems (Lynch *et al.*, 2021; Widana, 2020; Zhu *et al.*, 2016). The students' view of the world and their ability to comprehend it are both enhanced. E-learning promotes greater interaction and engagement, challenging the belief that traditional in-person education is inherently superior (Bouchrika *et al.*, 2021; Hussain *et al.*, 2018). The web and the internet are the primary ICTs used to spread education via e-learning. E-portfolios, cyberinfrastructures, digital libraries, and online learning object repositories are among the components. All these components work together to build a digital identity for the student, connect all stakeholders in education, and also make inter-disciplinary research easier (Hilty & Aebischer, 2015). Drent & Meelissen (2008) found that both instructors and learners are stimulated by the use of ICT, based on the experiences of early innovators in the education sector. Similarly, Winter *et al.* (2021) highlighted that ICT has the potential to enhance teaching, administration, performance, and the acquisition of relevant skills in underprivileged populations. It also improves the quality of education by facilitating self-paced learning, problem-solving, real-time feedback, learning analytics, critical thinking along with collaboration, and experiential learning (Dave, 2019; Noor-Ul-Amin, 2013). Moreover, ICTs serve as a platform for sharing of ideas and expertise, which can be utilized to enhance program delivery by replicating best practices (Lim *et al.*, 2019; Sife *et al.*, 2007). The possibility of real-time engagement in all parts of the educational system, such as teaching, collaboration, discussions, and so on, holds great promise for the future.

Evidence from real-world experience suggests that investing in an ICT experience contributes primarily to increased human and knowledge capital, which benefits the industry as well. Employers benefit from the expanded knowledge and skills of employees without having to release them for extended periods of time. Furthermore, investment in ICT is a more effective tool for overall societal growth (Sein & Harindranath, 2004). In a study, Tan *et al.* (2021) found that technology can drive innovation in classroom instruction methods, curriculum design, and assessment to facilitate the knowledge creation process. Through collaboration between teachers and students, new information can be generated by planning learning activities and building on each other's ideas. Moreover, technology enables better monitoring of students' understanding and readiness for lifelong learning and participation in the knowledge-based society (Haleem *et al.*, 2022; Taranto & Buchanan, 2020).

E-learning enables online instruction, discussion, and evaluation. It can also help with the creation of hypothetical situations that would be extremely unusual to encounter in real life (Sahoo, 2022; Behera, 2013). When it comes to keeping track of students' development across space, time, and activity types, ICT can be an invaluable tool. According to So and Kim (2009), data collection in ICT-based education is more likely to be accurate and efficient, and it is simpler to analyze and comprehend results across all grade levels. The use of ICT allows for the shifting of roles and duties onto students' shoulders, allowing them to become more autonomous and responsible for their own learning. Students' self-esteem and confidence are boosted as a result of this type of instruction through information and communication technologies (Moldagali *et al.*, 2022).

The modern world has a wide variety of ICT instruments that can be used for the development and dissemination of knowledge. Radio, television, the World Wide Web, mobile phones, desktop computers, notebooks, portable computers, and tablets are all examples of tools. Different ICT tools have different implications for classroom instruction. Both educators and learners can reap the advantages of these devices, which are applicable in diverse educational environments. The purpose of educational ICT tools is not to train teachers to become experts in ICT; rather, they are meant to help teachers use ICT to improve their students' educational experiences. The utilization of ICT resources by educators leads to progress in student learning in several essential areas, including content, curriculum, instruction, and assessment, as indicated by reports from Bragg *et al.* (2021) and Stec *et al.* (2020).

2.4 ICT in B-School education

The quality of a country's B-School education realm is crucial to its progress. Access to ICT resources is crucial for learners to fully harness their capabilities in B-School education courses (Goralski & Tan, 2020), as it holds a vital position in national development. The advent of the digital era has introduced substantial transformations in the realm of ICT, necessitating a shift in the way we address its associated challenges. Access to appropriate ICT resources is crucial for ensuring effective teaching and learning in HE, particularly in vocational and technical education, such as B-School education. This education is essential for equipping the youth to create a better future for themselves and society, both economically and socially (Felicia, 2021; Sheikh, 2017). According to Friedland & Jain (2022) and GP (2021), B-School education can impart the information, expertise, and ethos that shape the formation of practices and beliefs, which can have an effect on the achievement of educational objectives. Jimoh & Umoru (2020) consider B-School education a collection of classes focused on learning and practicing the right ethics in order to ensure one's own and society's continued well-being. The goal of education in the business field should be to help students grow in their ability to analyze and evaluate their surroundings. The implementation of a B-School education program is credited with equipping students with marketable abilities in areas such as accounting, distribution, and technology (Nwosu & Amahi, 2019).

ICT is playing a critical role in B-Schools' education, preparing students for the digital demands of the modern business world (Goi, 2019). It is integrated into various aspects of B-School education, such as e-learning, data analysis, project management, and digital marketing. The delivery of B-School education has been transformed by the advent of online learning platforms, video conferencing, and other digital tools, enabling students to remotely access course materials and engage with their peers and instructors (Singh *et al.*, 2021). In addition, students are taught to analyze large data sets using software tools like Microsoft Excel, SAS, and R (Tiahrt *et al.*, 2022; Stanton & Stanton, 2020) and are introduced to project management tools like Asana, Trello, and Slack to help them manage projects and work collaboratively in virtual teams (Lapina & Prakasha, 2022; Loomis, 2016). Digital marketing is also a key component of B-School education, where students learn about search engine optimization (SEO), pay-per-click advertising, and social media marketing. Ratheeswari (2018) highlights that the incorporation of ICTs in B-School education cultivates the development of essential skills such as critical thinking, technical proficiency, and problem-solving capabilities, which are fundamental for attaining success in the business sector. Moreover, the following viewpoints provide additional insights into the integration of ICTs in business education:

a) **Personalized learning:** By utilizing ICTs, students can benefit from a personalized learning experience that is customized according to their specific needs and preferences. For example, e-learning platforms can track a student's progress and provide personalized feedback and recommendations based on their strengths and weaknesses. This can lead to a more effective learning experience and improved student outcomes (Zhang *et al.*, 2020).

b) **Increased accessibility:** ICTs can make B-School education more accessible to a wider range of students. Online courses, for example, can be taken by students from anywhere in the world, and video conferencing tools can bring students and instructors together from different locations. This can help to break down traditional barriers to education and make B-School education more inclusive (Sandybayev, 2020).

c) **Improved collaboration:** ICTs can facilitate collaboration between students and instructors in B-Schools. The utilization of online discussion boards and video conferencing platforms enables students and instructors to engage and collaborate irrespective of their geographical locations. This fosters the development of a cohesive and supportive student community (Das, 2019).

d) **Enhanced employability:** Integrating ICTs in business school education can enhance graduates' employability prospects. By teaching students, the latest tools and technologies, B-Schools can equip their graduates with the skills that are in demand by employers. This can help graduates stand out in a competitive job market (Wu *et al.*, 2016).

e) **Interactive and engaging:** ICTs can make B-School education more interactive and engaging (Peterková *et al.*, 2022). For example, e-learning platforms can use multimedia tools like videos, animations, and interactive quizzes to bring course material to life and keep students engaged. This can improve student motivation and lead to better learning outcomes.

In summary, incorporating ICTs in B-School education has the ability to transform the traditional method of teaching in B-Schools. The incorporation of contemporary technologies offers students a more interactive and effective learning experience, leading to enhanced academic outcomes and expanded educational possibilities (Haßler *et al.*, 2016). Emerging technologies are bringing about rapid change, which is having a significant impact on work and education globally. These advancements are posing a challenge to traditional methods of learning and teaching, including the way B-School education is delivered (Crittenden *et al.*, 2019). Information technology is a very important field of study in and of itself, but it is also having a big effect on all other fields (Nyenwe and Ishikaku, 2012). Easy communication around the world gives people instant access to a huge amount of information, which tests their ability to understand and evaluate it (Afari-Kumah & Tanye, 2009). According to recent research conducted by Guillén-Gámez *et al.* (2020) and Rodriguez-Segura *et al.* (2020), the utilization of ICT in the classroom is now an essential aspect of teachers' development of ICT pedagogical skills. The successful integration of ICT relies heavily on teachers' attitudes, as their willingness to use technology in the classroom significantly influences its effectiveness (Eksail & Afari, 2020). Various factors contribute to the effective incorporation of technology in education, with the most crucial one being teachers' capability and willingness to customize instructional technology activities to suit the needs of students (Hong *et al.*, 2021; Mundy *et al.*, 2012). The use of ICT in education emphasizes the self-assurance, collaboration, and cooperation of educators. Marshal's (2002) study on the impact of technology on students' learning discovered that when teachers integrate ICT in the classroom, students' active learning abilities improve.

2.5 ICT tools in B-School education

The integration of technology in B-Schools has transformed the classroom instruction methods, providing new and innovative tools that enhance the students' learning experiences. Emerging technologies present a myriad of opportunities for educational settings, as highlighted by Chernikova *et al.* (2020). With the proliferation of mobile devices, these methodologies are gaining popularity and hold the potential to enhance the diversity and effectiveness of learning environments while nurturing crucial skills required in today's knowledge-driven society. The integration of new technologies into teacher training programs has become an important aspect of preparing educators to transition into a knowledge society focused on cultivating technological proficiency

(Tondeur *et al.*, 2019). As a B-School education teacher, it is crucial to incorporate the latest ICT tools to deliver high-quality education. Various ICT tools such as learning management systems (LMS), video conferencing tools, collaboration and communication platforms, assessment and evaluation tools, and e-portfolio platforms can significantly enhance the teaching and learning experience. These tools provide educators with the ability to create and deliver engaging online courses, track student progress, assess students' learning, communicate with students, and provide efficient feedback (Jaiswal, 2020; Khan *et al.*, 2017). LMSs provide a platform to create and deliver engaging online courses and track student progress, saving time and enhancing the learning experience. Video conferencing tools, such as Skype, WebEx, and Google Meet, allow for virtual classes and meetings, offering students a flexible and convenient learning experience and enabling educators to reach a wider audience (Umar, 2020). The employment of collaboration and communication platforms, like Slack and Microsoft Teams, can ease communication between instructors and students and among instructors themselves, simplifying course administration and amplifying the quality of education (Menzies & Zarb, 2020). Tools used for assessing and evaluating student work, like Turnitin and Gradescope, can provide a convenient and productive method for evaluating coursework and giving feedback, ultimately saving time and improving the learning experience (Srinivasa *et al.*, 2022; Yildirim *et al.*, 2021; Ahmad *et al.*, 2020). E-portfolio platforms, such as Google Sites and WordPress, allow students to showcase their work and demonstrate their skills and achievements to potential employers, providing educators with valuable insights into student learning and growth (Chang & Kabilan, 2022; Daud, 2022).

In addition to the previously mentioned ICT tools, there are other tools that can be valuable for educators in the field of B-School education. Presentation tools, such as PowerPoint and Prezi, provide the ability to create visually appealing and engaging presentations, enhancing the learning experience for students (Ustun, 2019; Strasser, 2014). Screencasting tools, such as Camtasia and Loom, enable educators to record and share video tutorials, providing students with clear and concise explanations of complex concepts (Thompson, 2012). Interactive whiteboard tools, such as SmartBoard and Promethean, allow for interactive lessons that engage students and encourage participation (Hur & Suh, 2012; Slay *et al.*, 2008). Also, virtual reality and augmented reality technologies, offer interactive learning experiences that enhance students' comprehension of complex topics, providing an immersive learning environment (Maebell & Lawrence, 2021). The utilization of ICT tools equips educators with an abundance of resources to establish a captivating and immersive learning environment for their students. Moreover, it enables them to stay at the forefront of the perpetually advancing field of business education.

Mobile apps can also be valuable for educators in B-School education. Apps such as Quizlet and Kahoot! provide engaging and interactive ways for students to learn and review material, making studying more enjoyable and effective (Alawadhi & Abu-Ayyash, 2021; Wang & Tahir, 2020; Zhao, 2019). Online survey tools, such as SurveyMonkey and Google Forms, allow educators to gather feedback and assess student understanding, providing valuable insights into the learning process (Serrano *et al.*, 2019). Project management tools, such as Asana and Trello, help educators manage complex projects and collaborate with students and colleagues, streamlining course management and improving the learning experience (Shchetynina *et al.*, 2022). Digital mind-mapping tools, such as XMind and MindNode, provide students with a visual representation of complex ideas and concepts, promoting creativity and critical thinking (Rosba *et al.*, 2021). ICT tools offer educators various means to establish an interactive and captivating learning environment, as well as to keep up with the rapidly changing landscape of B-School education. In the present-day scenario, the incorporation of ICT tools into B-School education is a critical facet of contemporary teaching and learning, and it is imperative for instructors to remain informed about the latest tools and technologies.

In order to elevate their teaching methods and enhance student learning outcomes, educators within the domain of business education should contemplate the integration of supplementary ICT tools. Learning Analytics, Coursera Insights, and Blackboard Analytics are examples of such tools that can provide valuable insights into student behavior and learning outcomes, helping educators make informed decisions (Hooda & Rana, 2020; Dipace *et al.*, 2019; Colvin *et al.*, 2016). Gamification tools, such as

Classcraft and Gamify, offer the opportunity to incorporate elements of game design into the educational experience, making learning more engaging and enjoyable for students (Krishnan *et al.*, 2021; Alsawaier *et al.*, 2018). Moreover, the incorporation of social media platforms such as Twitter and LinkedIn allows educators to establish connections with their peers and students, facilitate the exchange of resources and ideas, and stay informed about the latest developments and trends in the field of business education (Oguguo *et al.*, 2020; Carpenter & Krutka, 2015). Using these ICT tools can boost the learning process for students and help educators remain at the forefront of the constantly changing world of B-School education.

2.6 Artificial intelligence

In order to take advantage of emerging digital markets, businesses must undergo a digital transformation, which entails a series of steps and checkpoints designed to enable them to develop novel business models and methods of operation. Many businesses seek digital transformation as a means to both disrupt the market and protect themselves from disruption. Integrating AI into strategic procedures and landmarks is a necessary step on the road to digital transformation. On this path, they digitize assets, automate processes based on those assets (a process called digitalization), and finally, invent brand new methods to do business.

The term "artificial intelligence" pertains to the capability of machines, predominantly computers, to imitate human intelligence. It encompasses the capacity of a digital computer to exhibit behaviors commonly attributed to intelligent beings (Chassignol *et al.*, 2018; Akgun & Greenhow, 2021). This term is commonly used to refer to the endeavour of developing systems that possess cognitive abilities resembling those of humans, such as the ability to reason, understand, generalize, and learn from past experiences, as noted by several researchers (Collins *et al.*, 2021; Wang, 2019; Zhu *et al.*, 2020; Pedro *et al.*, 2019). Since the emergence of the digital computer, it has been demonstrated that computers can be effectively programmed to perform complex tasks. However, despite continuous advancements in computer processing speed and memory capacity, there are currently no programs that can rival human adaptability across diverse domains. Nevertheless, AI has found application in various fields, including medical sciences, engineering, education, voice recognition, etc. In certain specific tasks, AI has achieved performance levels on par with those of specialized human experts. Machine learning, a subfield of AI, focuses on the notion that machines can acquire new information and improve themselves without direct human intervention. This form of autonomous learning is made possible through deep learning methods, which enable computers to learn from vast quantities of unstructured data (Kuleto *et al.*, 2021).

Moving towards complete digitalization, the utilization of digital data to automate operations enhanced by AI is a significant stride. To fully exploit the potential of AI, businesses should focus on automating operations that involve human-driven processes such as perceiving, thinking, and sensing (Jarrahi, 2018). Automating these systems frees up employees to concentrate on more strategic endeavours, such as coming up with novel solutions to problems facing the organization or finding ways to improve existing ones. Digitalization represents a crucial turning point for businesses in terms of conserving time, energy, and human resources. By incorporating AI into existing process automation endeavours, higher levels of efficiency can be achieved.

2.7 Need for AI awareness

When it comes to assisting businesses with their digital transformation, AI is a crucial component. It's important for businesses to be prepared to create, roll out, and integrate AI-based technologies (Chatterjee, 2020; Renz & Hilbig, 2020). Awareness of the features of AI-based systems and technologies and the ability to control them are both part of this preparedness. AI-based systems operate on a probabilistic basis. Unlike many current technical solutions, this one doesn't rely on a set of established, stated rules that are compiled into an application in order to determine how "business logic" should function. By their very nature, probabilistic systems demand that businesses be familiar with concepts like data science-driven experimentation and modifications to ownership processes. The maturity of an organization, including its strategy, culture, organizational structure, and fundamental capabilities, is necessary for the safe ownership of an AI-based system (Enholm *et al.*, 2021; Shneiderman, 2020). The goal of AI, which is a subfield of computer science, is to develop perceptive, rational, and helpful computer systems to aid humans in their daily lives. The goal of AI research and development is to develop computer systems with intelligence and learning skills similar to those of humans. When businesses spend money on AI, they want to develop websites, mobile apps, and other digital products that use cognitive abilities like vision, speech, and natural language comprehension to simulate human cognition. The incorporation of these human-like qualities is how AI is empowering businesses to build smart, rapid, and useful digital experiences for customers.

There are many different subfields within the fast-expanding subject of AI. The domain of AI known as ML focuses on the development of "programs" that can acquire new skills by observing and mimicking the behaviors of humans. In machine learning, the emphasis is on using algorithms and data to develop a computer that learns from patterns rather than having people use programming languages to clearly and declaratively explain and specify rules for execution (Zhou *et al.*, 2017). Classification, suggestion, prediction, categorization, and segmentation are all examples of such abilities. Industries as diverse as healthcare, banking, energy, and retail are seeing significant improvements because of the implementation of AI. However, the education sector stands out as an area with immense possibilities for the integration of AI technologies. The application of AI in the field of HE offers a wide array of both promising and complex opportunities, as evidenced by the research conducted by Ahmad (2020), Selwyn & Gašević (2020), and Popenici & Kerr (2017).

2.8 AI in the field of education

The rise of AI over time has had a profound influence on how individuals perform their routine tasks. As highlighted in the studies conducted by Ouyang & Jiao (2021), Jaiswal & Arun (2021), and Kolbjørnsrud *et al.* (2016), AI is driving a transformative change within the education industry, revolutionizing the dynamic relationship between student learning, the subject matter, and the tools that facilitate engagement with the subject matter, much like its influence in various other domains. The emergence of AI has resulted in the discovery of valuable insights into enhancing the learning experience, personalizing it to students' needs, providing more information for decision-making, and overcoming challenges posed by conventional teaching approaches and the complexities of the educational system, as suggested by Ferri *et al.* (2020). AI has the capacity to address these challenges and improve the course learning outcomes for the students. Schools, governments, foundations, and businesses have all been thinking about AI's potential impact on teaching and learning for the past decade.

AI in the classroom serves primarily in one of three main roles: (i) supporting individual students (Chen *et al.*, 2023), (ii) assisting the entire class (Timms, 2016); and (iii) assisting entire cohorts of students (Page & Gehlbach, 2017). At the individual learner level, more emphasis is placed on tailoring instructional strategies to that learner's unique profile. The upshot of these efforts is a kind of software known as "Intelligent Tutoring Systems (ITSs)" that has proven to be just as successful as human instructors (Wang *et al.*, 2015; Bagheri, 2015; Cheung *et al.*, 2003). In contrast, within the classroom setting, AI is intended to support teachers in managing student groups rather than focusing solely on individual students. According to Niemi *et al.* (2022), AI has the potential to enhance the overall teaching and learning experience in classrooms through a collaborative relationship between humans and technology. This collaboration can manifest in several ways, including tutoring, grading, and VR-based learning, which are three significant applications of AI in education. With the goal of fine-tuning the learning system based on the successes and failures of individual students, AI is being applied at the cohort level. Key uses at the cohort level include spotting at-risk students, tracking their preferences and habits, gauging their academic progress, and predicting whether or not they will drop out (Sghir *et al.*, 2022). In a fully personalized classroom, each student receives instruction that is specifically designed to meet his or her individual strengths and weaknesses. If this were to happen, it may have a dramatic effect on students' motivation and retention rates. It may also help educators get insight into their students' unique learning styles, allowing them to tailor their lessons more precisely. An example of this is as follows: AI-based learning systems would provide professors with insights about their students' learning preferences, strengths, and weaknesses, as well as recommendations for how to best tailor their instruction to each student's unique learning needs (Khosravi *et al.*, 2022; Jaiswal & Arun, 2021; Burbules *et al.*, 2020). For instance, some students may need tutoring or additional support because they are having trouble with their studies. On the contrary, some students may be progressing so quickly that they are no longer being adequately challenged and could benefit from more advanced course materials or rigorous homework. In both of these made-up scenarios, students benefit from the use of AI learning systems, which help them realize their full academic potential and, in some cases, keep them from dropping out of school altogether.

Due to the proliferation of accessible smart devices and online course material, technology's influence in the classroom is more pervasive than ever before. As a result of its rapid development, many forms of AI are finding their way into classrooms, each with the potential to significantly improve the educational experience for students. The following are just a few examples of AI-powered technologies that are now having a profound impact on the educational landscape and will continue to do so in the future:

2.8.1 Virtual facilitators and learning environments

Virtual learning, as defined by Toven-Lindsey *et al.* (2015), refers to the process of acquiring knowledge outside the conventional classroom setting or by incorporating resources beyond the traditional educational context. This approach to learning entails leveraging virtual spaces to facilitate interaction between students, teachers, and classmates from different schools, enabling seamless collaboration and knowledge sharing. It takes place in several ways:

i. **E-learning:** It refers to a type of education where students access educational materials through a computer or server, rather than a human instructor (Benta *et al.*, 2015). In numerous cases, this technology can personalize the learning experience by adapting the lessons to the pace and style of each individual learner.

ii. **Internet-based learning:** It is a type of learning that is quite similar to computer-based education; the main difference is that the educational software is hosted on a remote server and is accessed via the Internet (Gegenfurtner & Ebner, 2019).

iii. **Remote teacher:** In this type of learning, a teacher provides online instruction to a student without being in the same room as them, a method known as "remote instructor online". Online video, instant messaging, online forums, e-mail, etc. are just a few of the ways in which the teacher can communicate with the student (Ironsi, 2021; Vergne *et al.*, 2020).

iv. **Blended learning:** This type of learning blends in-person, teacher-led classes with virtual classrooms in which students learn from teachers located anywhere in the world using computers and the Internet. There are two main sources of education: the conventional classroom teacher and some type of online learning (Dziuban *et al.*, 2018).

2.8.2 Facilitated virtual learning

It is a form of online learning where a person called a "facilitator" works together with a computer, the Internet, or a remote teacher. The role of this facilitator is not to assume control over the student's education but rather to collaborate with the teacher in order to support the student's success. Whether the teacher is present in the same physical space as the student or connected from a distant location through the Internet or other electronic means, the facilitator works in tandem with them (Govindarajan & Srivastava, 2020).

A VLE, or virtual learning environment, is a collection of online resources used to supplement traditional classroom instruction. VLEs typically contain features such as electronic communication (email, blogs, chats), student tracking, online support for both teachers and students, and Internet access to educational materials. Both teachers and students can have accounts in virtual learning environments. The teacher's view is identical to that of a student, but the teacher also has the ability to add to or alter lessons and view data on how well students are doing. Blackboard, Lotus Learning Space, and EdApp are just a few examples of commercially accessible VLE software systems (Alokluk, 2018). It's possible that virtual classrooms are the only other unique examples of VLEs, along with these software programs. Learning takes place in a "virtual classroom," which can be either web-based and accessed through a portal or software-based and requires downloading an executable file. A student in a virtual classroom, much like a student in a traditional classroom, receives teaching on real time basis (Manegre & Sabiri, 2022).

2.8.3 Intelligent tutoring systems (ITS)

These are computer programs which are designed to replace human teachers by giving students individualized lessons and feedback in a self-paced environment (Castro, 2019). ITSs are gaining popularity because of the individualized instruction they can deliver. Using deep learning algorithms, the devices may advise users on how to best organize their study time. These systems are computer-based learning environments that aid students in acquiring and applying knowledge and skills through the use of adaptive algorithms that respond to individual learners' needs and enact more abstract concepts of learning in practice. These systems deliver lessons in a manner indistinguishable from those delivered by a human tutor (Kulik & Fletcher, 2016). Intelligent tutoring systems powered by AI make it possible to design individualized courses and provide students with immediate feedback and guidance. These systems encourage participation since they employ AI tutors capable of working in conjunction with students, holding in-depth, two-way conversations, and modifying their approach to the discourse based on what is being discussed at any given moment (Arvidsson & Kuhn, 2021). AI tutors are proving to be a lot more interesting and fun to work with than the standard menu-based AI bots, both for human instructors and students.

Artificially intelligent tutors can provide personalized, motivating feedback, track the emotional connection between learning and performance, and provide moral support when it's needed (Ouyang *et al.*, 2022). Students will benefit from this since they will receive feedback tailored to their individual learning preferences, pace, and requirements. Intelligent teaching solutions powered by AI not only provide individual feedback but also facilitate learning through a number of distinct channels. Artificially intelligent teaching systems provide not only text and video but also multimedia, simulations, and even games in addition to the traditional learning tools found online (Cheng *et al.*, 2009). AI tutors can tailor their instruction to each individual student by presenting material, tasks, and scenarios in a variety of ways. Artificially intelligent tutors have the distinct advantage of being able to monitor each individual pupil in greater detail than any human educator could. This implies their feelings, development, and preferred method of instruction will be taken into account in every engagement. The AI tutor has the capability to observe the progress of the student and offer prompt feedback, assisting the student in comprehending their level of understanding and application of the subject matter in practical situations (Lane & Johnson, 2009). Human educators tend to solely emphasize a single approach to a given issue. Artificially intelligent teachers, however, can adapt to new approaches and memorize them for future use. Consequently, educators will have the ability to guide students in the holistic process of problem-solving instead of simply offering sequential instructions.

2.8.4 Data analytics softwares

There has been a long-term shift in the bottom line as a result of analytics. Now that more businesses have mastered analytics, they are digging deeper into their data in search of even more opportunities to save costs, differentiate themselves from the competition, and enhance profits. Companies seek a more all-encompassing analytics strategy to realize their goals, which is why they are exploring the potential of machine learning and AI. First, they must acquire the knowledge necessary to implement current machine learning methods into their existing data architecture. Many people are looking to businesses that have started the implementation process effectively as a source of guidance.

AI analytics is the result of applying today's advanced AI and ML tools to the labour-intensive and time-consuming task of data analysis. Using AI analytics software such as Tableau, Python, Power BI, etc., AI can expand its data analysis capabilities beyond traditional structured data sources. AI-based data analytics software uses machine learning algorithms to constantly monitor and analyze huge amounts of data, automating the time-consuming work normally done by a data analyst. Analytics involves the identification, interpretation, and communication of significant data patterns, while business analytics entails the application of this process to address business inquiries, make predictions, uncover novel connections, and ultimately enhance decision-making (Bienkowski *et al.*, 2012). Essentially, analytics involves extracting valuable insights from raw data by employing analytical techniques to uncover meaningful patterns within the data.

Data analytics describes tools that analyze data for insights. It's important to note that the role may change depending on the technology employed. Descriptive analytics, for instance, can examine data to describe what's happening, whereas predictive analytics, by contrast, can anticipate future events on the basis of present ones. In addition, data analytics is not a unified offering. The ecosystem is full of tools for everything from simple descriptive analytics and business intelligence to complex tasks like data mining, forecasting, and pattern matching. Traditional software always needs human intervention. Conversely, human input is not always necessary when using machine-learning AI software. In order for AI systems to learn, it is necessary to "feed" them with labeled samples of text, also known as training data. They effectively utilize data that has been manually annotated to learn to interpret data on their own. Software driven by AI can automatically evaluate data from any source and provide useful insights (Kuleto *et al.*, 2021). Particularly illuminating, AI analysis of customer data can inform product strategy, boost employee efficiency, and reveal the successes and failures of a company's operations.

Open, unstructured text data can be read by software such as Tableau, Microsoft Power BI, R programming, Python, etc., which then provides qualitative results. The software uses text analysis to identify emotions and topics in the data as well as relevant keywords, names, and technical details. Textual analysis provides insight into not just what is happening but also its motivations. Opinion mining and sentiment analysis, both aided by such software, automatically classify text according to the intensity of the authors' feelings about a certain topic (positive, negative, or neutral). It can process massive amounts of text data from virtually any source, allowing it to identify the author's intent and mood. In addition to text classification, these softwares also provide a number of other useful data-analysis capabilities, such as topic labeling, which examines a text for a central theme or topic and then classifies it accordingly. Text extraction is another form of AI text analysis that can be used to extract useful information from texts in order to spot developing patterns. Data analysis using AI can handle not just quantitative data for diagnostic purposes but also qualitative data for predictive, diagnostic, and prescriptive assessments (Kakatkar *et al.*, 2020).

2.8.5 Simulations

Many new AI-based applications have already been put into practice in a variety of classrooms, including learning analytics (Romero & Ventura, 2020) and simulation-based learning (Duncan *et al.*, 2012). Simulations are highly recommended and employed to deliver an active and adaptive learning experience among various AI-based educational tools (Chen *et al.*, 2022; Brown, 1999). It encompasses of various technologies, including virtual reality, computer-based simulation systems, augmented reality, mixed reality, etc. (Hwang *et al.*, 2022). Interactive learning tools in the form of digital environments that replicate real-world processes or events can be utilized to enable students to test their hypotheses regarding the impact of input factors on expected outcomes (Tokarieva *et al.*, 2019). Simulation-based learning leverages AI techniques to facilitate active learning and decision-making with human-like interactions. Within this context, learners actively engage in communication and interaction within immersive environments to solve problems presented in simulations, which aim to authentically recreate real-world events or conditions (Papanastasiou *et al.*, 2019). To summarize, simulation-based learning involves a virtual learning environment that replicates realistic and authentic real-world events or learning scenarios to address problems. Engaging in learning within a simulated environment offers students a cost-effective opportunity to enhance their understanding, creativity and problem-solving skills.

Innovative and engaging, management simulations immerse students in a digital environment in which they may investigate and debate real-world management challenges faced by businesses of all sizes. A more hands-on approach to understanding complicated systems is provided by such games. Compared to passive learning methods like listening to a lecture or discussing a case study, this approach has a much greater influence on learners. Students who take part in a simulation can experience firsthand what it's like to balance multiple goals and deal with an overwhelming amount of information in real time (Brazhkin & Zimmerman, 2019). Computer simulations like these are proving to be cost-efficient and effective solutions, making the learning process vibrant and experiential, just as B-Schools are looking for newer ways to innovate on their existing teaching methodologies to keep up with the rapidly evolving business world. Thus, computer-simulated scenarios are being incorporated into the curriculum to provide students with doses of real-world circumstances to enhance their analytical skills. These scenarios cover a variety of business-related topics, including marketing, finance, and strategy.

2.8.6 Voice assistants

Voice recognition technology has other potential benefits besides automation and efficiency. It's also a great tool for bringing the relationship between educators and students into the 21st century. With its human-like speech features, Alexa is the ideal tool a teacher can employ to bring a more human element to the classroom (Al Shamsi *et al.*, 2022; Şerban & Todericiu, 2020; Hales *et al.*, 2019). It can change its tone of voice to show different emotions. Voice assistants make it simpler for students to follow directions and interact with technology. When used in the classroom, voice assistants can be used to get around some of the problems caused by other types of technology. Having a voice assistant do the reading out loud allows for a more personal connection between teacher and student. In addition to facilitating productivity, voice technology devices are valuable resources for information gathering and storage. Teachers can keep track of students' attendance, classroom involvement, and more all with one convenient tablet. When it's time for evaluations, it provides easy access to this information for analysis. The use of AI in these tools allows for a more precise evaluation of students' overall conduct throughout the course of the year by reducing the likelihood of human error and prejudice (Mou, 2019).

Voice search has the potential to become a game changer for students' education. In order to learn more about a topic or have their questions answered, students frequently need to devote significant study time to research (Sáiz-Manzanares *et al.*, 2020). They sit around for long periods of time studying or waiting for professors to assist them. On the contrary, the voice search function on smart speakers can overcome this obstacle by returning precise and pertinent results rapidly. Internet information can be accessed using voice search. One solution is to teach Alexa a new "skill" or set of voice commands tailored to answering kids' questions with information from their immediate surroundings. The ability to tailor and train devices to meet specific classroom demands is a major benefit of speech technology (Smutny & Schreiberova, 2020). The 'Skill Blueprints' feature of Amazon's Echo Dot smart speaker lets educators create custom interactions for a wide range of pedagogical purposes. The utility provides a library of pre-built templates that may be used without the need for any coding knowledge or experience. Teachers, for instance, can create a quick test to gauge student understanding of the most recent unit by using an existing quiz template. In addition, students who have access to the same or similar technologies at home can take the quiz with their classmates.

Remote students can also greatly benefit from the use of voice technology in the form of quizzes, tests, and other review activities. Educators can create podcasts out of recorded audio recordings of their classes (Singh, 2022). In order to listen to these podcasts, students can just ask their voice assistant to do so. Students can benefit greatly from these podcasts by having instant, portable access to a wealth of useful material as they engage in last-minute studying and preparation. Furthermore, podcasts provide a great deal of adaptability to the students, allowing them to learn at their own pace. Furthermore, because voice-powered smart speakers lack a screen, students are less likely to become easily distracted. In addition to helping with classroom tasks, voiceactivated technology can serve as a helpful companion for educators (Winkler *et al.*, 2021).

These gadgets can be utilized in a variety of ways, including as reminders, to provide students with instructions, to respond to students' questions, etc. This means educators will have more time to plan lessons, engage students, and develop as educators. The speaker systems in each classroom can be replaced with smart speakers, allowing the administration to further capitalize on speech technology.

2.8.7 Adaptive learning softwares

Adaptive learning is an instructional strategy that employs AI and computer algorithms to tailor content and exercises to each individual student (Muangprathub *et al.*, 2020; Bajaj & Sharma, 2018). These programs serve as a digital mentor to each individual student by filtering through all available data to find the best resources and assignments for them. The program is tailored according to their requirements using cutting-edge technology. Adaptive learning equips students to deal with any challenge, whenever it arises (Peredo *et al.*, 2011; Jossberger *et al.*, 2010). Learners' memories are regularly analyzed by the technology, which flags any gaps in their knowledge and suggests courses of study to fill them.

The use of AI-based adaptive learning encourages participation from all workers. These programs routinely test the student to identify problem areas and help fill in any gaps in their knowledge. As a result of this type of education, educators may track the development of their students through measurable indicators. It's a great way to monitor their progress, assess their abilities, and enhance their education. Vere360, developed in Singapore, combines AI and VR to provide high-calibre instruction in the areas of social issues and professional growth. The Virtual Reality (VR) Education App on the Platform is a collaborative effort between the Platform and a number of knowledge partner customers who provide content for use by students in traditional and alternative educational settings. Botsify, a chatbot that evaluates students by displaying images, videos, and texts related to a topic and asking questions, is another fascinating example of an AI-based chatbot in education (Essel *et al.*, 2022). This type of AI-powered educational technology fosters individualized instruction that caters to each student's unique skill set.

All the students, from the brightest to the dullest, can benefit since the material will be tailored to their individual talents and learning styles. Companies like Knewton, Cognii, Smart Sparrow, Century, and many more have entered this industry recently. Each has a unique methodology for creating intelligent tutoring systems. Students of all ages benefit from Khan Academy's individualized dashboard, which features subject-specific teaching videos, practice questions, and a timer that enables them to learn at their own speed (Baker *et al.*, 2019). Furthermore, they provide individualized study plans that might include a variety of media types (videos, games, etc.). CanopyLAB, on the contrary, is a social, adaptive, and intelligent learning space that uses AI to understand the learners' needs, skills, and wants and then applies this data to its AI-driven content authoring tool to model each course and create adaptive courses, giving each student a unique and tailor-made educational experience (McIntosh, 2014). The cognitive data analytics and neuroscience of Century Tech's platform are used to tailor each student's education. In addition, the AI technology monitors the pupils' development, pinpoints their knowledge gaps, and provides commentary. Plus, the availability of a variety of tools helps cut down on preparation and grading time.

2.8.8 Game-based learning platforms

Game-based learning platforms aim to enhance learner engagement and productivity by incorporating gaming elements into the teaching approach. A study involving elementary and secondary school students (Castro *et al.*, 2015) demonstrated that playing games had a positive impact on students' motivation, class participation, and academic performance. Similarly, Crocco *et al.* (2016) argued that game-based learning produced comparable effects in higher education. This notion was supported by Eltahir *et al.* (2021), whose study revealed that the use of game-based learning techniques led to improved learning outcomes compared to traditional approaches. Hanus & Fox (2015) and Tobias *et al.* (2014) also reported enhanced learning outcomes. These findings align with other research indicating the effectiveness of gaming as a pedagogical tool.

Maytin *et al.* (2023) found that EdApp, a learning platform based on gamification principles, integrates various elements of engagement to enhance learner retention and increase course completion rates. In addition, this system provides access to a team of instructional designers that may build interactive lessons for its users. One of EdApp's primary methodologies, microlearning, chunks down lengthy training materials into manageable chunks. Key points are highlighted, and students can finish a lesson in a matter of minutes. Combining this tactic with gamification, which turns boring training courses into mobile games, can help make learning enjoyable. Learners can encourage, motivate, and be inspired by one another with the use of such platforms because of the customizable achievements function. Higher levels of engagement and improved learning habits result from this because it sparks a buzz among staff and provides learners with a source of self-motivation. Kahoot is another online quiz generator and game-based learning platform that incorporates aesthetically pleasing gamification components to increase student engagement and retention rates (Chelawat & Sant, 2022). These quizzes and activities can be accessed by students using any web browser or mobile app. Trainers can use the platform's reporting and analytics tools to identify and fill in any knowledge gaps, and learners can give and receive feedback.

To enhance the training experiences of their learners, whether involved in onboarding or upskilling initiatives, organizations can leverage Gametize, an enterprise-level platform for game-based learning and learning management system (LMS) solution. With this tool, businesses can effortlessly create their own gamified content by choosing from a diverse range of game templates tailored to different project types, including employee engagement, learning and development, talent acquisition, and more. The use of flashcards, quizzes, and interactive challenges can also increase training participation and retention rates. Just like other gamification programs, Gametize makes use of leaderboards, badges, and awards to incentivize users and promote friendly rivalry among groups (Oluwajana *et al.*, 2019). The tool's additional benefits include analytics for measuring performance, improved moderating of games, and the enhanced ability to work together as a group. Centrical, a powerful training tool for gamification, allows users to develop gamified microlearning content. Its intuitive interface empowers users to create sophisticated game-based learning materials without the need for extensive technical design skills. Within the platform, users can design personalized learning challenges, organize competitions with rewards, or craft quest-based game narratives that encourage learners to adopt desired behaviors, practice skills in a secure virtual environment, and enhance their overall knowledge and success-oriented abilities. GoSkills is another on-demand, web-based training solution with a variety of capabilities for quickly and easily developing instructional materials. It offers many short courses in in-demand areas like data analysis, business writing, and web development. In line with the demands of contemporary learners, Hurix Digital provides a complete range of tools for producing and disseminating digital content. One such system is an in-house learning management system (LMS), which facilitates the distribution of instructional materials in the form of interactive modules. With multi-device access to interactive video content, games, simulations, and scenario-based learning, users can modify their LMS to fit the training processes of their respective organizations. The game-based learning approach encompasses a variety of activities, including problem-solving games, puzzles, challenge-based games, strategic games, and more. Also, Quizlet is a web-based quiz generator popular for its flashcard-style questions (Sanosi, 2022). Its content, which is presented in a game show format, can be used for teaching and capacity building.

2.8.9 Language learning applications

Learning a new language is essential in today's worldwide economy, as most businesses favor candidates who can communicate in more than one language. Even if there are many options for learning a new language, the number of people actively using them seems to be declining, possibly because they are too difficult to use or because they lack the enthusiasm to keep trying. Fortunately, there is cause for optimism as AI is being incorporated into language learning apps in order to boost motivation. Due to the rise of AI in the classroom, most modern educational apps make use of language learning to make studying more engaging and fruitful (Lomicka & Lord, 2019).

Automated feedback on practice tests and drills is a major benefit of AI for language learners. Learners get instantaneous comments that they may use right away to make improvements, rather than having to wait days for feedback. Duolingo, the most widely used online language learning tool, mainly uses AI to provide its users with tailor-made lessons (Li & Lan, 2022). Babbel, like Duolingo, incorporates individualized learning activities to keep students interested and employs speech recognition technology to help them pronounce words correctly (Sad *et al.*, 2022). The app also features an online test to evaluate the user's reading and listening comprehension with the help of intelligent AI algorithms. Memrise, another app, uses chatbots to prioritize a user's individual needs in terms of language study. These chatbots are designed to mimic human interaction for those looking to enhance their conversational abilities. They have the ability to provide real-time grammar correction and topic-specific vocabulary suggestions during discussions (Lotherington, 2018). Busuu is another app that provides a comprehensive language-learning experience by fusing AI-powered language learning with live, one-on-one tutoring (Rosell-Aguilar, 2018). The voice-recognition mechanism on Google Home now facilitates Busuu's Spanish-language training in collaboration with Google Assistant.

2.8.10 Other Applications

There are tools to help identify instances of plagiarism. AI-enhanced plagiarism checks can now examine not only similarities in wording but also similarities in context and structure (Kang & Haas, 2018). AI has the potential to revolutionize test automation, with far-reaching effects across the testing lifecycle thanks to its potential to automate or streamline testing processes like test planning, authoring, development, and maintenance. Li *et al.* (2020) examined students' test scores and have also used data-driven AI algorithms for performance prediction. As a result of these initiatives, several automatic grading tools are created to examine, evaluate, and score students' written work and standardized tests. Automatic grading made possible by AI paper checkers relieves teachers of some of their workload (Cavalcanti *et al.*, 2021). Aside from this obvious benefit, there are several other reasons why an AI grading tool is so effective. An AI tool's grading function can be made to evolve by feeding it fresh data. The paper grader's ability to learn from human-graded papers through scanning keeps the grading process relevant. AI paper graders learn from their mistakes to refine their grading method.

The NPE 2020 aimed to simplify the teaching and learning process for both educators and learners by prioritizing digital education and making the schooling system universally accessible. Online education has become ubiquitous across all levels of education, from K-12 to HE and even the business sector. To administer exams digitally and streamline invigilation, several schools have turned to a remote proctoring technology powered by AI (Hancock *et al.*, 2022). Proctoring is a form of invigilation where an impartial third party watches over an exam, quiz, or other type of test that applicants, students, or employees are taking. Distance learners can have their exams proctored in a safe and secure manner with the help of online proctoring software. The entire invigilation procedure can be streamlined and standardized with the help of AI-based software, preventing any stagnation in the education process. This approach is both secure and difficult to cheat at. In order to provide high-stakes, all-encompassing assessment solutions, Mercer Mettl implements anti-cheating technologies to guarantee a secure and fair testing environment (Kush, 2020). Shinkan Edge is cutting-edge AI online proctoring software that guards against cheating and identity theft. Examus is an online proctoring service that allows teachers to monitor their students' conduct while they take tests from remote locations (Nigam *et al.*, 2021). Eklavvya is an AI-based proctoring solution designed for conducting assessments in HE and workplace environments, which offers innovative features and functionalities (Deepika *et al.*, 2021).

The utilization of AI in exam proctoring software has streamlined the process of scheduling and conducting exams remotely, resulting in cost and time savings by eliminating the need for manual labour. As speech recognition technology improves, the emphasis can be shifted from the act of writing itself to the expression of ideas and information. It is true that students need direct teaching and practice to become better writers, but they may also benefit from supports that allow them to work around obstacles to writing as they develop their abilities. Technology alone won't guarantee students' academic achievement; it must be integrated with tried-and-true methods of instruction, such as the demonstration of clear steps for organizing various forms of written work. Speech recognition has come a long way in recent years, making it a practical alternative to typing and giving students another option for displaying their knowledge in written form. One such technology is speech recognition, also known as speech-to-text or voice recognition, which translates spoken words into text and makes one's voice the primary means by which a person interacts with a computer (Prasad, 2015). Despite the potential of voice recognition to aid students with physical and severe learning difficulties, its use in the classroom has been inconsistent. People with physical disabilities can use speech-to-text as a means of accessing a computer, and it has also been used to help struggling writers improve their craft. Numerous popular devices can benefit from speech recognition, including those meant to aid in the learning of a second language, those designed to aid the visually impaired, and many more.

2.9 Teachers' perceptions

Governments around the world acknowledge that teachers are the ones who make or break their own educational systems (Schleicher, 2012). Educators' use of technology in their classrooms and curricula is influenced by their technological literacy, perceptions of technological constraints, and views on the role of technology in education, as suggested by a literature analysis (Szymkowiak *et al.*, 2021; Hennessy *et al.*, 2005). Teachers' perceptions of the usefulness of ICT in education play a significant role in their pedagogical reasoning (Abel *et al.*, 2022), and these conceptions frequently hinder teachers' attempts to implement ICT in the classroom (Alsuhaibani, 2019).

Individuals respond differently to everyday situations based on their personalities and emotional dispositions. According to Mosley *et al.* (2022), there is a correlation between emotional intelligence and coping strategies that enhance well-being, alleviate psychological distress, and regulate negative emotions. Emotional intelligence, which encompasses self-perception and emotional tendencies, supports effective coping in stressful circumstances. According to Jurado *et al.* (2022), there is a necessity to enhance teachers' competencies in mastering technology and utilizing it effectively based on their opinions and perceptions of technology use in classroom teaching. Teachers' positive perceptions of their own experiences with technology suggest not only a willingness to expand their use of it but also a greater understanding of its possibilities and an eagerness to try out new, more interactive methods that emphasize their students (Sitthiworachart *et al.*, 2022). A comprehensive list of terminology, such as values, thinking, attitudes, judgments, perspectives, dispositions, opinions, ideologies, and conceptions, was also offered by researchers (Meneses, 2020). In most cases, one's perceptions act as a sort of internal compass, guiding one toward a better understanding of oneself and the world around them.

According to the research conducted by Valverde-Berrocoso *et al.* (2021), teachers' views on integrating technology into the classroom are shaped by various factors such as limited initial and continuous technology training and a need for a structured approach to incorporating ICT into curriculum and instruction. The study highlights the challenges educators face in acquiring ICT skills and effectively integrating ICT into their teaching plans. This is attributed to factors such as limited time and high student-to-teacher ratios. Perienen (2020) also found that most teachers regularly used ICT in the classroom when they had the right level of technical knowledge, enough access to classroom technology, and a technological culture that supported the growth of meaningful learning.

Over numerous years, extensive evidence has been discovered by researchers, indicating that the personal beliefs and values held by teachers significantly influence the way they conduct their classrooms (Fischer & Hänze, 2020). When examining the integration of ICT, the perceptions of teachers are often explored as they are believed to impact their willingness to embrace a new curriculum, adopt novel instructional methods, and implement fresh initiatives (Tondeur *et al.*, 2017). It seems evident that teachers' attitudes towards technology are pivotal in determining its utilization within the classroom. Margot and Kettler (2019) noted that certain educators' attitudes towards teaching could pose obstacles to students' use of gadgets in the classroom instruction. For example, a teacher who favors direct instruction as the most effective teaching method may view some technological tools as inappropriate for their pedagogical approach. A study by Li and Wang (2021) investigated the perspectives and behaviours of educators in incorporating ICT in teaching. The observation revealed that young and inexperienced teachers displayed a willingness to utilize ICT. Nonetheless, certain educators questioned the rationale behind incorporating it into their instructional practices. Simultaneously, equipment issues, time constraints, and heavy teaching loads were the most significant obstacles to their ICT integration (Yadav *et al.*, 2016). The study by Aljawarneh (2020) demonstrated the various types of technologies used by the teachers, like software, social media, online learning platforms, and journal subscriptions, that provide teachers with access to learning materials. Therefore, it is crucial to incorporate ICT into teacher training programs, providing assistance and encouragement to educators in developing favorable attitudes towards learning and integrating ICT into their teaching methodologies.

2.10 Behavioural theories on ICT adoption

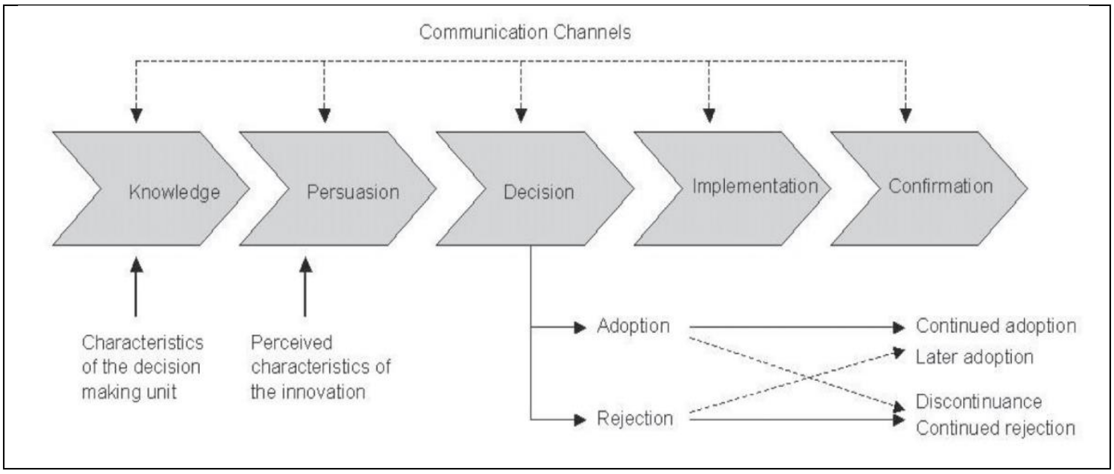
The integration of technology in education has been shaped by a range of cultural, social, and economic factors over time. Cultural factors, such as individual beliefs and attitudes towards technology, can impact its use in the classroom. Social factors, such as access to technology and teacher support, as well as government policies, can also influence the integration of technology in education. For instance, limited access to technology in some countries or lack of training and support for teachers can hinder their ability to effectively utilize technology in the classroom (Lawrence & Tar, 2018; Voogt & McKenney, 2017). Moreover, economic factors, such as budget constraints and technology infrastructure, can also impact the extent to which technology is integrated into education (Marks & Al-Ali, 2022; Tadesse & Muluye, 2020). Schools with limited budgets may not be able to afford the latest technology, while institutions in rural areas may lack the necessary infrastructure to support its use. It is crucial to understand these factors to enable informed decisions by educators and policymakers regarding tech. integration and ensure its effective use in supporting teaching and learning outcomes.

Information systems (IS) scholars have extensively studied the widespread adoption of technology over the years. In order to better understand this phenomenon, researchers have developed a number of theories and models by conceptualizing additional aspects over time due to the rapid changes in the technological landscape. As per Tarhini *et al.* (2015), technology adoption is the stage at which a technology is selected for usage by an individual or an organization. The adoption of technology is now recognized as a complex process that depends not only on the technology itself but also on user attitude and personality (Özbek *et al.*, 2014), SI (Vannoy & Palvia, 2010; Ajzen & Fishbein, 1975), trust (Wu & Chen, 2005; Gefen *et al.*, 2003), and FC (Paul *et al.*, 2015; Lu *et al.*, 2005). The importance of technology adoption is evident in the significant investment made by organizations and governments to introduce cutting-edge technologies that can significantly transform individuals' daily routines. If individuals do not use these advancements, then all of this investment may be wasted. Therefore, examining the history and future research prospects of this information systems research subfield is crucial. Although the terms adoption and diffusion are used interchangeably in the literature, Geroski (2000) and Comin & Hobijn (2010) suggest that technology diffusion is "the stage at which the technology expands to general usage and application," while adoption refers to a single instance. Here is a chronological summary of the various theories and models that have been developed to explain the adoption of technology:

2.10.1 Diffusion of innovation theory

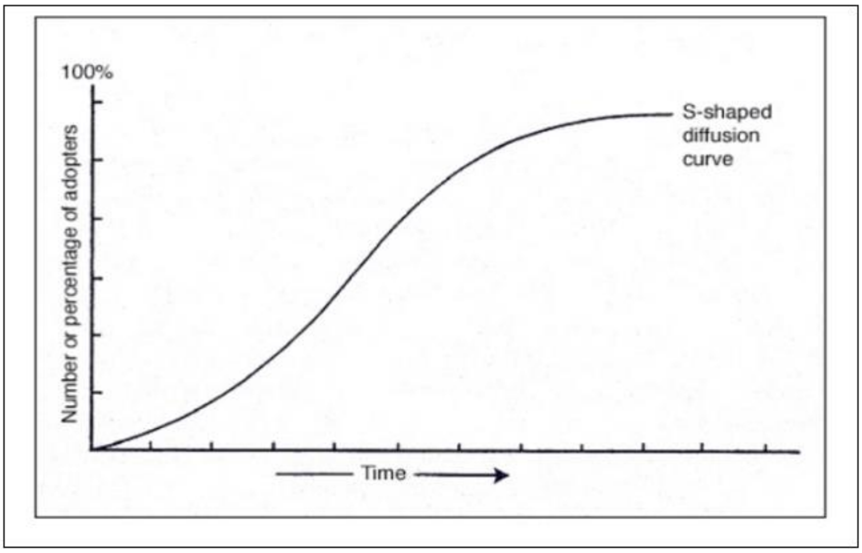
Rogers' (1962) Diffusion of Innovation Theory is a seminal work that has served as the foundation for subsequent studies on the spread of new ideas. The theory posits that the proliferation of an idea is dependent on four key factors: the innovation itself, the channels of communication through which it is distributed, the passage of time, and the social system in which it is introduced. The process of diffusion is made up of five stages: knowledge, persuasion, decision, implementation, and confirmation (Scott & McGuire, 2017; Sahin, 2006), culminating in six types of users: innovators, early adopters, the early majority, the late majority, and laggards. Figure 1 illustrates one possible representation of the theory.

Figure 1. The Diffusion of Innovation Theory



The concept of an S-shaped curve of adoption, also known as the epidemic model of adoption, was introduced by the diffusion of innovation theory (Hubbard & Sandmann, 2007). This theory suggests that the spread of new technologies or ideas can be compared to the transmission of illnesses within a population. The pattern of diffusion is characterized by a slow initial pace, followed by an acceleration in the middle of the curve, and finally, a tapering off, resulting in the S-shaped curve depicted in Figure 2. This phenomenon is due to the fact that innovative ideas tend to originate from individuals and groups on the fringes of the established social order. That means there will initially only be a small audience for the innovation. People in the social system who are already open to the innovation will spread the word to others. That's why the rate of spread keeps going up. After some time, most of the population embraces the innovation, and its rate of expansion slows. Because there are no more potential adopters, the trend immediately fades out. The S-shaped curve depicted in Figure 2 illustrates a crucial "take-off point" in which the growth curve's slope turns positive, indicating that a significant number of individuals have adopted the innovation. At this point, the number of potential adopters diminishes, and the innovation reaches its maximum diffusion potential. This happens when 10–20% of people in a social system have started using the new technology.

Figure 2. S-Shaped Diffusion Curve

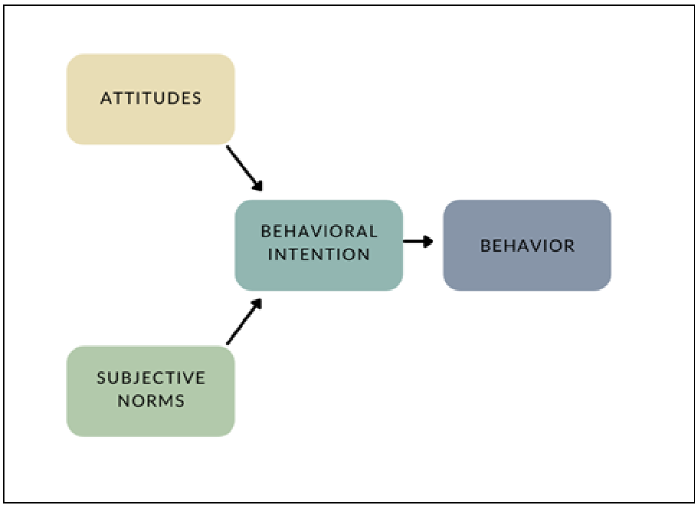


The S-shaped adoption curve is typical for most new developments. But its practical use is especially crucial for the spread of modern means of communication. The more people who utilize the new communication system, the more valuable it is to those who are already using it. The adoption curve flattens and shortens with each new user since each new user improves the experience for current users. This argument is frequently used to explain the extraordinary expansion of the Internet during the past 15 years.

2.10.2 Theory of reasoned action

Ajzen and Fishbein (1975) developed the Theory of Reasoned Action (TRA) within a social psychological framework, as illustrated in Figure 3. This theory comprises three fundamental concepts: attitude, subjective norms, and behavioral intention. Attitude and subjective norms are critical determinants of an individual's behavioral intentions. From a mathematical perspective, behavioral intention is the sum of an individual's attitude and personal norms. Moreover, if the individual's desire to act is strong enough, it is likely that the intention to act in a particular way will translate into actual behaviour.

Figure 3. Theory of Reasoned Action

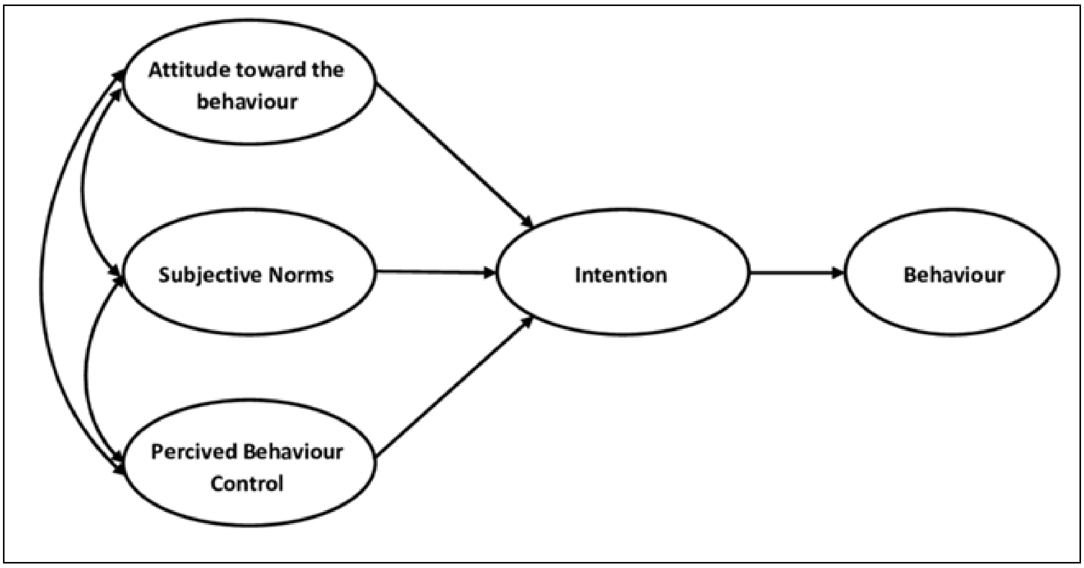


As suggested by Straub (2009), an individual's attitude toward a particular behaviour is a combination of their beliefs and judgments about that behaviour. In contrast, Mathieson (1991) defined subjective norms as the opinions of others, which are weighted by the value an individual places on each of those opinions and are likely to impact their behaviour. These two factors, attitudes and subjective norms, are crucial predictors of an individual's behavioral intention, which, in turn, is a reliable indicator of their actual behaviour.

2.10.3 Theory of planned behaviour

The theory of planned behaviour, introduced by Ajzen (1991) as an extension of the theory of reasoned action, aims to predict an individual's intention to engage in a specific behaviour at a particular time and place. This theory posits that individual behaviour is driven by behavioral intentions, which are influenced by three factors: attitude toward behaviour, subjective norms, and perceived behavioral control. In addition to the constructs of attitudes and subjective norms, which form the basis of the TRA, the TPB introduces the concept of perceived behavioral control, which refers to an individual's perception of their ability to regulate their behaviour (refer to Figure 4). The SE theory (SET) proposed by Bandura (1977) serves as the theoretical foundation for PBC.

Figure 4. Theory of Planned Behaviour



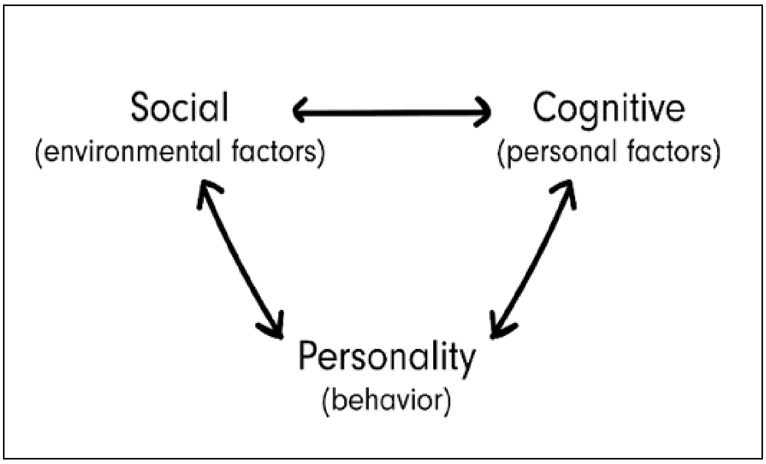
According to Skaalvik & Skaalvik (2007), SE is defined as an individual's belief in their ability to effectively plan and execute the actions required to handle upcoming challenges. Because it results in the development of coping behaviours, SE is considered to be the single most essential factor in determining whether or not an individual will engage in a particular behaviour. Personal attitude is the accumulation of all our knowledge, attitudes, and prejudices, both positive and negative, that we weigh when considering behaviour (Kraus, 1995). Subjective norms refer to how we perceive other people's beliefs about a given activity. The extent to which we believe we can regulate our conduct is referred to as perceived behavioural control. This is determined by how we perceive internal elements such as our own talent and determination, as well as external factors such as the resources and assistance available to us.

2.10.4 The social cognitive theory

As per Bandura (1986), SCT is grounded in three pivotal factors: behavior, personal characteristics, and environment. This theory is a subset of social learning theory, which discovered that individuals learn from their own experiences and from witnessing the experiences of others when it comes to health behaviour modification. The main concerns of the SCT model's behaviour element are efficiency, usefulness, and uptake.

Personal factors, on the contrary, encompass all characteristics of an individual, including their thoughts, feelings, and demographics.

Figure 5. The Social Cognitive Theory

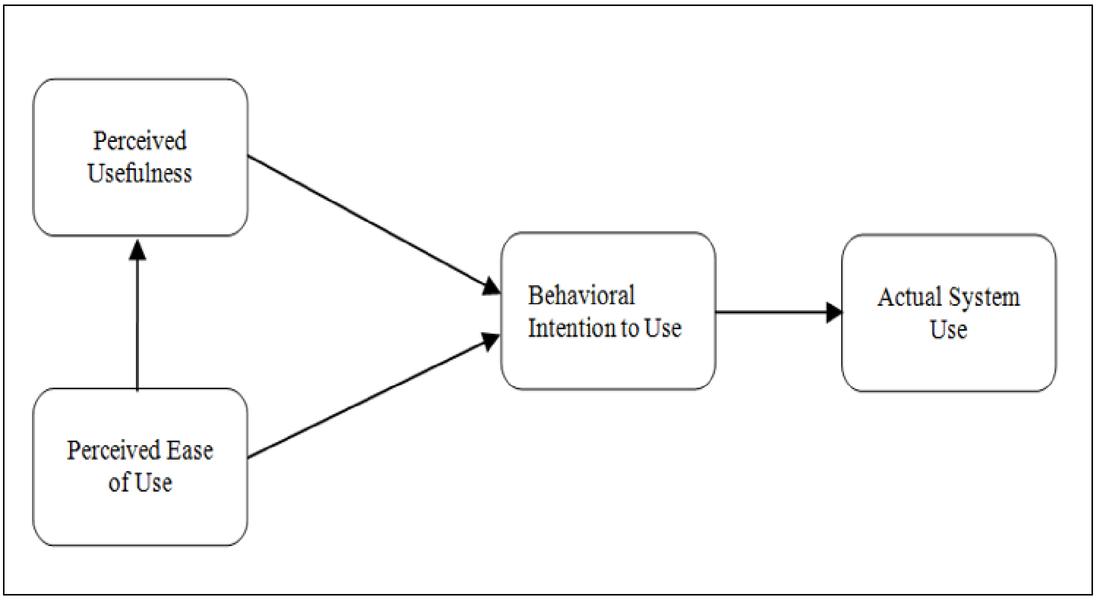


The term "environmental factors" refers to both the physical and social elements present in an individual's immediate surroundings. Because SCT involves three interdependent parts, each of which affects and is affected by the other two parts at all times, the three parts together constitute an inseparable triadic structure. As shown in Figure 5, SE, expected performance outcomes, anxiety, emotion, and personal outcome expectations are all part of the SCT model used to gauge IT adoption and utilisation.

2.10.5 Technology acceptance model (TAM)

Davis (1989) introduced TAM, a highly impactful framework for evaluating technology acceptance. The model emphasizes that an individual's perceived ease of use and perceived usefulness of a new technology are the primary factors that influence their decision to adopt it (see Figure 6 for reference). This model's distinguishing characteristic is the importance it places on the opinions of the target audience. In other words, the inventor of a piece of technology may have every reason to believe that his or her creation is helpful and straightforward to use, but that doesn't mean it will be adopted by the market.

Figure 6. Technology Adoption Model

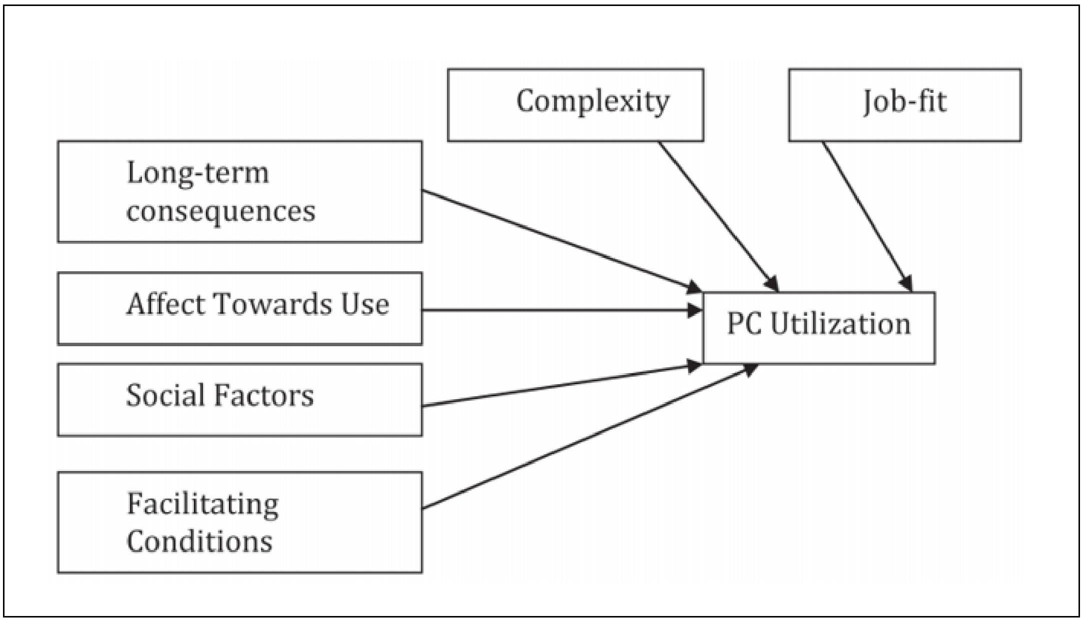


Bandura's (1982) theory of SE posits that perceived ease of use refers to an individual's judgment of their ability to perform the necessary actions to deal with a potential situation. Rogers and Shoemaker (1971) define ease of use as the extent to which an innovation is perceived as easy to comprehend and use. TAM has historically been viewed as a reliable, effective, and concise model for predicting user acceptance. However, the UTAUT model proposed by Venkatesh *et al.* (2003) has been found to be more effective in evaluating technology adoption due to its stronger results. Dwivedi *et al.* (2010) conducted a comparative analysis of TAM and UTAUT and concluded that UTAUT is increasingly being referenced by researchers instead of TAM. Additionally, Benbasat and Barki (2007) have challenged TAM's ability to keep up with the dynamic nature of the information technology industry.

2.10.6 The model of PC utilization

This theory, proposed by Thompson *et al.* (1991), focuses on the amount of time that an employee chooses to spend using a personal computer, which is not mandated by the employer but is rather left to the employee's discretion. The theory proposes that a number of factors, including the employee's attitude (affect) toward computer use, social norms regarding PC use in the workplace, general habits related to PC use, expected user outcomes from PC use, and the extent to which conditions are present at work to facilitate PC use, all play a role in determining the employee's actual PC usage. FC, affect, long-term consequences, SIs, perceived consequences, complexity, and job fit are all directly evaluated in this model (Refer to Figure 7).

Figure 7. The Model of PC Utilization

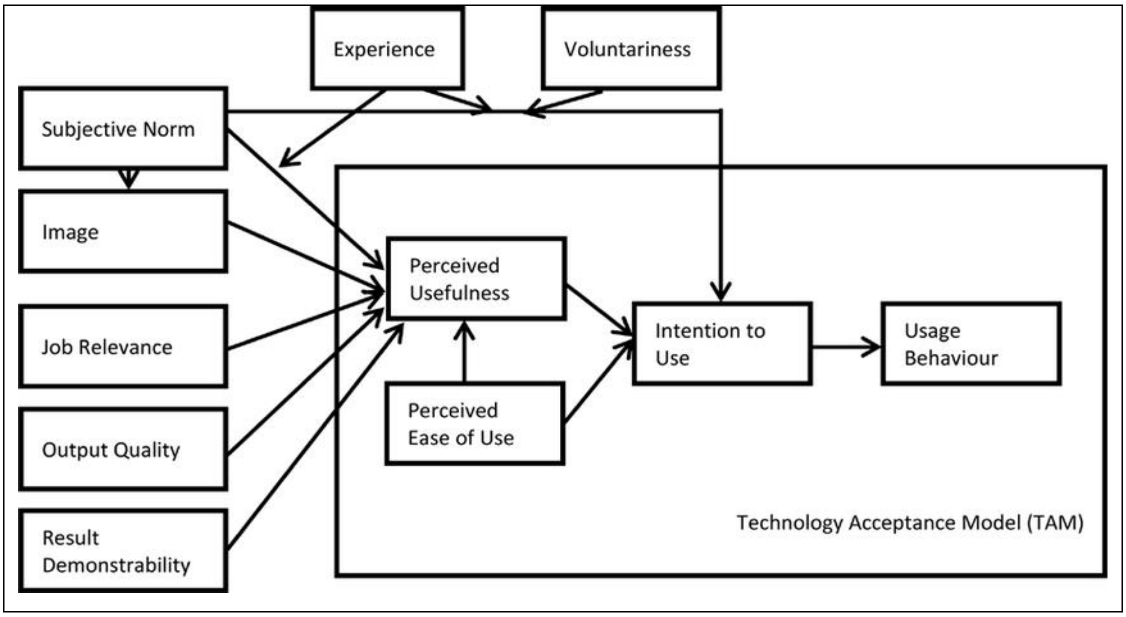


The findings support the significance of work suitability, social impacts, long-term implications, and complexity of PC use. However, there is little connection between FC and PC use. Despite the fact that habits are an excellent predictor of behaviour, they are not taken into account in the MPCU.

2.10.7 TAM 2 model

Venkatesh and Davis (2000) enriched the TAM model by introducing several new, essential factors to its existing constructs of perceived usefulness and usage intention. The new constructs included cognitive subjective norms, image, voluntariness, job relevance, result demonstrability, output quality, and perceived ease of use. These new constructs were added to improve the adaptiveness, explanatory power, and specificity of TAM. Figure 8 shows a graphic overview of TAM 2.

Figure 8. TAM 2 Model

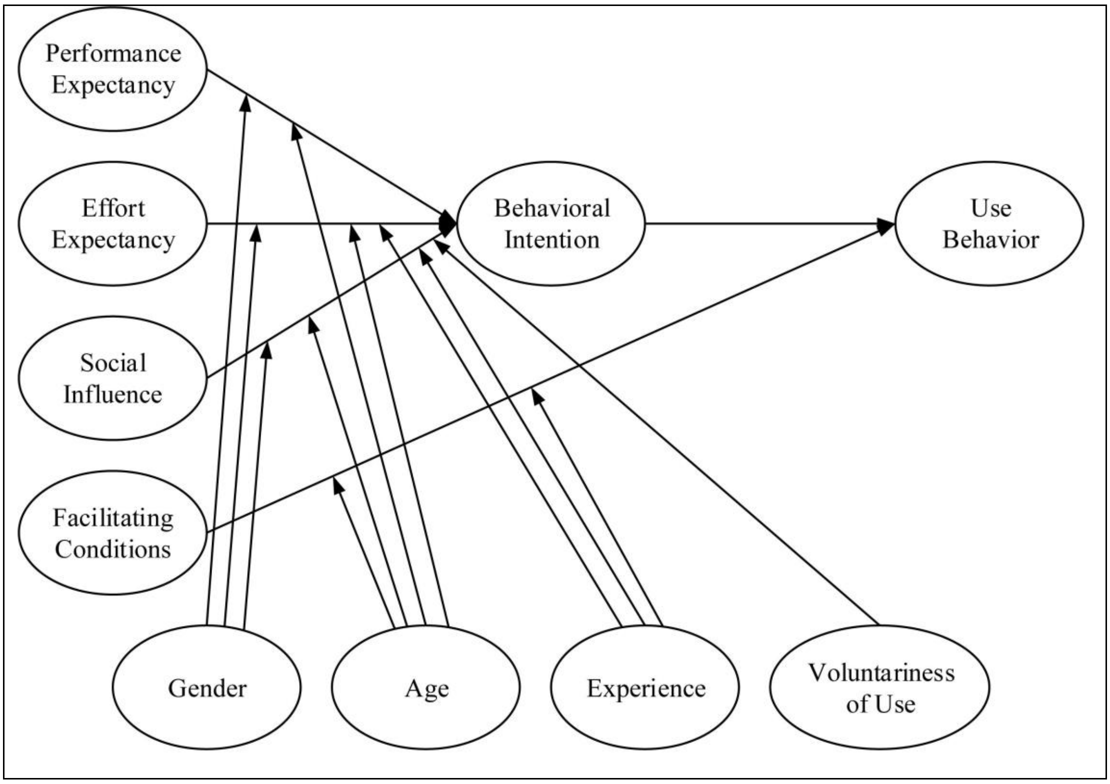


TAM2 proposes that subjective norms have a direct influence on intention in a computer usage context, but only under mandated usage settings, and this effect is stronger than that of perceived usefulness and perceived ease of use. Therefore, voluntariness is considered a moderating factor in TAM2. Additionally, TAM2 suggests that subjective norms have a positive impact on an individual's image. If an individual's workgroup views it as important to complete a task (such as using a system), then the individual's performance of that activity enhances their image within the group. Moreover, TAM2 posits that the direct effect of subjective norms on intentions for mandatory usage contexts will be robust before implementation and during early usage, but will diminish over time as individuals gain direct experience with the system, which serves as a basis for ongoing use intentions.

2.10.8 Unified theory of acceptance and use of technology (UTAUT)

Venkatesh *et al.* (2003) synthesized and consolidated constructs from eight prior theories to create a new theory called UTAUT, as seen in Figure 9. The main components of UTAUT are effort expectancy (EE), performance expectancy (PE), facilitating conditions (FC), and social influence (SI).

Figure 9. UTAUT Model



The authors of the study systematically gathered and tested all the characteristics from prior models to create a unified model. They hypothesized that four of the seven constructs previously utilized are the most influential factors that determine the intention to use information technology. The remaining three constructs, namely attitude towards technology utilization, self-efficacy (SE), and anxiety, are fully mediated by ease of use, which is referred to as PE in the unified model, and therefore, are not direct predictors of intention. This is why the UTAUT model omits these three components. The authors proposed that the unified theory is superior to preceding models because it accounts for 70% of the variance in adoption behavior, compared to only 30-40% explained by previous models (Venkatesh *et al.*, 2003).

The details of the various constructs used in UTAUT are mentioned below.

I. **Performance expectancy:** It refers to an individual's perception of how the use of a system will enhance their job performance (Mehta *et al.*, 2019; Teo, 2011; Venkatesh *et al.*, 2003). Various theoretical models such as the TAM, the TAM

2, the theory of planned behaviour, the motivational model, the model of PC usage, the innovation diffusion theory, and the social cognitive theory have been used to predict PE. It is a significant predictor of future behaviour in both mandatory and voluntary contexts (Alshammari & Rosli, 2020).

II. **Social influence:** It encompasses the alterations in an individual's behaviour that are made to meet the expectations of their social surroundings. This concept, as described by various researchers (Al Kurdi *et al.*, 2020; Lu, 2014; Venkatesh *et al.*, 2003), is similar to the concepts of TRA, TAM2, TPB, MPCU, and IDT, which all pertain to the ways in which individuals adapt their actions based on the perceptions that others hold about them. SI, like these other concepts, is influenced by social factors, subjective norms, and image constructs. When it comes to mandating people use technology, the influence of social pressure can make all the difference (Kemp *et al.*, 2019; Venkatesh *et al.*, 2003). Those who are compelled to utilize a certain piece of technology do so out of necessity, rather than choice (Venkatesh & Davis, 2000). This could be the reason why the construct showed varying effects in separate experiments meant to validate the concept.

III. **Effort expectancy:** This according to Garone *et al.* (2019) and Venkatesh *et al.* (2003), refers to the level of simplicity associated with utilizing a system. This concept is based on previously established theories that explore perceived ease of use and complexity, which are equivalent in meaning and measurement scales. Simply, it is the ease with which a system or procedure can be executed. This is predicated on the assumption that one's level of effort in the workplace is correlated with one's level of performance and, in turn, with the reward one receives for their efforts. After extensive use of technology, the influence of the construct becomes insignificant (Salloum & Shaalan, 2019).

IV. **Facilitating Conditions:** As defined by Scherer *et al.* (2019) and Venkatesh *et al.* (2003), it refers to an individual's perception of the presence of organizational and technical infrastructure that supports the use of a system.

This construct is formed by combining the compatibility, perceived behavioral control, and FC constructs from previous theories. Favorable conditions have a positive and direct impact on the inclination to use the system, although this effect diminishes after the first use. Therefore, the model proposes that enabling factors have a significant and immediate impact on usage behaviour (Bervell & Arkorful, 2020; Venkatesh *et al.*, 2003).

2.11 Moderating effects in UTAUT

According to Venkatesh *et al.* (2003), various factors can significantly impact our ability to predict intent, including age, gender, experience, and voluntariness of usage. For instance, age acts as a moderator for all four predictors, as indicated by Khechine *et al.* (2014). Additionally, gender differences come into play when examining the associations between SI, EE, and PE. Moreover, experience plays a crucial role in determining the strength of the interconnections between FC, EE, and SI. Finally, the relationship between SI and behavioral intention is primarily influenced by the degree of voluntary use, as highlighted by Hu *et al.* (2020) and Venkatesh *et al.* (2003).

2.12 Application of UTAUT in educational context

The UTAUT model has gained widespread popularity in the field of education, as it offers a comprehensive framework for understanding the factors that influence the acceptance and usage of technology in various contexts. This includes online learning, mobile learning, and educational software. Through the model, researchers have been able to identify the direct and indirect effects of key factors such as PE, EE, SI, and FC on technology acceptance and usage by students and teachers. These findings have provided valuable insights into the design and implementation of technology-enhanced learning environments that can better support learning and classroom instruction. Experts widely regard the UTAUT model as the best approach for studying the factors that influence people's decisions to adopt new technologies, as it incorporates every viable theory in the field and provides the most extensive explanation compared to other theories of technology adoption (Venkatesh *et al.*, 2011). The model has been used in diverse educational settings, including web conferencing, smart boards, and cloud-based virtual learning tools (Suki and Suki, 2017), and has been instrumental in exploring students' openness to and usage of new technology (Khechine *et al.*, 2014). Moreover, researchers have used the UTAUT model to examine technological developments that aid in HE (Halili and Sulaiman, 2018). The model's extended versions have also been applied to model several phenomena, including user adoption of technology in the consumer environment (Venkatesh *et al.*, 2012).

The UTAUT model, originally developed in 2003, has undergone several revisions based on feedback from researchers and empirical studies that validated the original model. Scholars have added new constructs and expanded on the original UTAUT model to provide a more comprehensive understanding of technology adoption. One of the most recent revisions, the UTAUT2 model, incorporates additional constructs such as hedonic motivation and habit to account for the emotional and habitual aspects of technology use. Domain-specific models have also been developed for specific technological contexts, such as mobile payment technology adoption. However, there is evidence from academic studies that UTAUT has reached its practical limits in understanding individual decisions regarding technology adoption and usage inside businesses. Despite this, UTAUT has been extensively used as a study paradigm in conjunction with other theoretical frameworks to study a wide range of new technologies in both business and non-business contexts.

2.13 Proposed theoretical framework

Many of the UTAUT extensions utilized novel endogenous mechanisms or moderation mechanisms, as well as introduced new exogenous and outcome mechanisms. A significant number of these extension studies included fresh variables that could anticipate technology use or behavioral intention, thus introducing new endogenous mechanisms. For example, a study has been designed to incorporate the impact of ICT SE, an internal factor, on an individual's behavioral intention to use technology and subsequent technology use behavior. The influence of ICT SE has been investigated in various studies, including those by Gurer (2021), Teo (2012), Venkatesh and Bala

(2008), and Wu and Wu (2015), where it was used as an exogenous mechanism in the UTAUT model. By incorporating these extensions, the study model has been formulated based on the information provided below.

2.14 Impact of organizational culture on UTAUT constructs

While many different factors that influence IT adoption have been studied, the impact of OC values has received less attention. There are a wide variety of approaches to describe culture. It means the set of norms and assumptions held by members of a group. Culture is also defined as the sum of a group's shared norms of behaviour, arts, beliefs, institutions, and other manifestations of human ingenuity and creativity (Gay, 2013; Deal & Peterson, 2010). A company's culture, including its core values, beliefs, and underlying assumptions, may be challenged by the introduction of new technologies (Schein, 1983). The decision of whether a university wants to communicate with its students in the conventional face-to-face style, through some type of distance education, or any combination of the two would require careful consideration of the institution's culture. Despite the growing significance of technology in education and organizational development, there is a notable lack of published research on how technology impacts OC. Tushman and Anderson (1986) have called for more research on how companies adapt to new technologies, emphasizing the crucial role that culture plays in this process (Denison & Mishra, 1995).

The significance of OC in IT planning has also been recognized by Boynton and Zmud (1987) as a factor that warrants consideration. Zammuto and O'Connor (1992) have further underscored the potential impact of OC on technology adoption, suggesting that it may pose a barrier to effective implementation. The culture of an organization shapes the ways in which its members make sense of the world and think about it (Phillips *et al.*, 1994). While subcultures demonstrate that culture is not a unitary idea, studies have shown that most businesses have a common set of values (Chatman & Jehn, 1994).
Table 1 shows the details of past studies with various UTAUT based constructs.

Author(s)	Objective(s) of the study	Sample Size	Respondents	Constructs	Effects	Moderating Effects	Technology Used	Conclusion
Venkatesh *et al.*, 2003	To assess likelihood for success for new technology introductions by understanding drivers that affect acceptance	8 organizations with a total sample size over 500 respondents	Faculty/Student	Performance expectancy, effort expectancy, social influence and Facilitating conditions	Performance Expectancy, Effort Expectancy, Social Influence &Facilitating Conditions	Gender, Age, Voluntariness, Experience	Information Communication Technologies	UTAUT was successful in integrating key elements from among initial set to form a unified theory which accounted 70% variance
Mehta *et al.*, 2019	To integrate values with technology adoption models and apply it to digital education context by investigating influence of individual level values on e-learning adoption among workers from The Gambia & UK.	273 respondents - 160 useable responses from The Gambia & 113 From UK	Workers	Performance expectancy, Price value, Hedonic motivation, Effort Expectancy and Social Influence	Performance Expectancy, Price Value And Habit Primarily Influenced Worker Intention To Use E-Learning	Not discussed as sample size was relatively small	E learning	Organization's values enhance technology adoption.
Alshammari & Rosli, 2020	To critically discuss strengths and limitations associated with some popular technology acceptance models such as TAM, TRA, UTAUT & ETAM.	The study is a comparison of various theories.	Users from different organisations and companies who use technology for their goals attainment.	Perceived usefulness, perceived ease-of-use, attitude towards using a system & behavioural intention	Perceived ease of use directly affects attitude towards using system while behavioural intention directly affect usage	Gender and age	No specific technologies have been	This paper concluded that no theory was free from limitation so all had both strengths and weaknesses; thus providing future researchers an opportunity to adopt suitable models for performing empirical studies with various technologies
Al Kurdi *et al.*, 2020	To determine factors that influence student's acceptance towards e-learning systems, and find out how these factors affect their intention to use them	270 university students	University students who utilized an e-learning system	Social Influence, Perceived Enjoyment, Self - Efficacy, Perceived usefulness & perceived ease Of Use	TAM is directly related with social influence which further affects all other variables like self efficacy etc	Gender and age group	Social influence, perceived enjoyment, self-efficacy, perceived usefulness and perceived ease of use" are the strongest predictors in	The paper concludes that "social influence, perceived enjoyment, self-efficacy, perceived usefulness and perceived ease of use" are the strongest predictors in determining students'

							determining students' intention to employ E-learning systems.	intention to employ E-learning systems.
Garone *et al.* 2019	1. To investigate the user acceptance and use of technology among university professors in Belgium. 2. To identify different subgroups within a sample population based on their attitudes towards using new technological applications for teaching purposes.	97 participants	University professors from two different universities in Belgium	Performance Expectancy, Effort Expectancy, Social Influence and Facilitating Conditions. Additionally, three further determinants were added to UTAUT for this particular study: Self-Confidence, Anxiety and Attitude towards technology use.	Performance expectancy has a direct effect on behavioural intention. effort expectancy and social influence have an indirect effect on behavioural intention, mediated by attitude towards use of technology. facilitating conditions also have an indirect influence on the user's intention to adopt new technologies through self confidence and anxiety as mediating variables.	Age, gender and experience moderate the relationship between performance expectancy and behavioural intention. Voluntariness of use moderates the relationship between effort expectancy and attitude towards technology use.	Learning Management System	Institutes need to implement technologies by considering the individual needs of users. By employing a person-centred approach, users can be split into subgroups and targeted with support during implementation in order to maximise uptake.
Scherer *et al.*, 2019	To clarify some controversies and inconsistent findings in the field by combining meta-analysis with structural equation modeling approaches.	The meta-analysis included 114 empirical TAM studies with a total sample size of 34,357 teachers.	The respondents of the study were 34,357 teachers from 114 empirical TAM studies. The majority of these studies originated from Asian teacher samples; however, there was also a significant number of non-Asian participants included in the meta-analysis.	Perceived Usefulness, Perceived Ease of Use, Attitude towards Using Technology and Behavioral Intention to use technology.	Perceived Usefulness (PU) had a direct effect on Behavioral Intention to use technology, in addition to the indirect effect of Attitudes towards using Technology.	Facilitating conditions moderated the relationship between Perceived Ease of Use and Behavioral Intention to use technology.	Educational technologies	The role of Facilitating Conditions was found to be particularly important for predicting teachers' Behavioral Intention to use technology.
Bervell & Arkorful, 2020	To define a model which influence LMS-enabled blended learning uptake by tutors.	267 tutors	Experienced and novice tutors from different countries across the world.	Facilitating Conditions, Voluntariness of Use, Actual Use Behaviour	Facilitating Conditions --> Voluntariness of Use and Facilitating Conditions --> Actual Use Behaviour.	Voluntariness of use moderates the relationship between facilitating conditions and actual use behaviour.	Learning Management System	Facilitating Conditions had a direct and significant effect on both Voluntariness of Use and Actual Use Behaviour.

Venkatesh *et al.*, 2012	1. To examine how age, gender and experience can influence the use of technology. 2. It also aims to investigate the moderating effects of demographic characteristics on habit-intention and habit-use relationships. 3. Additionally, it seeks to explore how hedonic motivation, price value and habits affect consumer's behavior towards using technology applications.	1,512 consumers	Consumers who had prior experience in mobile Internet use. They included both men and women, aged 18-65 years old from different countries around the world.	Performance Expectancy, Effort Expectancy, Social Influence and Facilitating Conditions.	Performance Expectancy has a direct effect on Behavioral Intention. Effort Expectancy and Social Influence have an indirect effect on Behavioral Intention through Facilitating Conditions.	Age, Gender and Experience jointly moderate the effect of Habit on Technology Use through both stored-intention path and instant activation paths. Social Influence moderates the relationship between Behavioral Intention and Behavior Usage in UTAUT model.	Mobile Internet applications.	In the context of consumers use of technology, hedonic motivation, price value and habit have complex effects. Age gender and experience jointly moderate the effect of Habit on Technology Use while Social Influence moderates the relationship between Behavioral Intention and Behavior Usage.
Khechine *et al.*, 2014	To determine the factors that explain the acceptance of a webinar system (Elluminate) in a blended learning course by students.	114 students	Students enrolled in a blended information systems course at Laval University in Quebec, Canada.	One dependent variable, Performance Expectancy; two independent variables, Effort Expectancy and Facilitating Conditions; as well as two moderating variables - Gender and Age.	The intention to use a webinar was directly influenced by Performance Expectancy Effort Expectancy and Facilitating Conditions	The Age variable moderates the relationship between Performance Expectancy, Effort Expectancy and Facilitating Conditions with Intention to Use Elluminate.	Elluminate, a webinar system.	Age played a major role in influencing students' intention to use webinars, as younger students were more concerned with their performance and older students worried more about facilitating conditions.
Hu *et al.*, 2020	To identify factors influencing their intentions to use as well as actual usage of mobile technologies using an extended UTAUT2 Model.	890 academicians	890 academicians from higher education institutions in China	Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions, Hedonic Motivation, Price Value and Habit.	The most significant factors affecting academics' behavioural intention and behaviours of use were their Performance Expectancy, Facilitating Conditions, Hedonic Motivation and Habit. It was also observed that Behavioural Intention had a direct effect on how	Gender, age, teaching experience and discipline were the moderating factors in the path model. It was observed that these variables had an effect on how Performance Expectancy, Effort	Mobile technologies	The extended UTAUT2 Model is effective in understanding academics' acceptance, preparedness and adoption for mobile technologies within higher education. The most significant factors affecting behavioural intention were found to

					faculty staff used their mobile technologies.	Expectancy, Social Influence Facilitating Conditions Hedonic Motivation , Price Value and Habit affected academics' behavioural intention to adopt mobile technologies as well as their actual usage of it.		be Performance Expectancy, Facilitating Conditions, Hedonic Motivation and Habit. Gender, age teaching experience as well as discipline also had an effect on how these variables affected behaviour intentions towards using mobile technology.
Teo, 2007	To investigate the relationships between organizational variables and mode of Internet adoption as well as between mode of internet adoption and impact on competitive advantage.	566 firms	566 firms in Singapore	Organizational variables and mode of Internet adoption.	The organizational variables (respondent's hierarchical level, industry sector, firm size, annual investment in Internet technology and business strategy) have a direct effect on the mode of Internet adoption. Mode of internet adoption has an impact on the five dimensions of competitive advantage - differentiation, cost reduction, innovation, growth & alliance.	Firm size. It was found to have a significant effect on Internet adoption mode, with larger firms tending to be at an advanced internet adoption mode compared to smaller ones.	Internet Technology. It includes web sites, e-mail addresses and other online services that enable firms to do business electronically.	Firms operating in an advanced adoption mode invest more in Internet technology, had larger firm size, proactive business strategy and significantly greater perceived Internet contributions to competitive advantage than did those operating in a basic adoption mode.
Tarafdar and Vaidya, 2006	To analyze and explain the factors that determine an organization's inclination towards deploying E-Commerce (EC) technologies.	The study was based on qualitative data	4 firms in the financial services industry in India.	Top management, organizational culture, information systems professionals, organization structure	Top Management construct has a direct effect on Organization Culture, Information Systems Professionals and Organization Structure. The other three constructs have an indirect influence on each other through their relationship with Top Management.	Top Management construct moderates the relationship between Organization Culture, Information Systems Professionals and Organization Structure.	E-Commerce (EC) technologies	The findings suggest that top management attitude and commitment towards EC technology adoption as well as providing resources for its implementation are important determinants influencing an organization's inclination towards deploying such technologies.
Venkatesh & Zhang, 2010	1. Compare and contrast how UTAUT	600	Employees from a single organization	Performance Expectancy, Effort	Performance expectancy it was seen to be strongest	Direct effect of Performance	Information Systems	The study found similarities and

	works in different cultural contexts such as US vs China. 2. They also sought out to understand the role of culture in affecting factors that influence an individual's behavioral intention towards technology adoption for successful IT implementations in China.		that operated both in the US. and China, with over 300 participants from each country	Expectancy, Social Influence, Facilitating Conditions and Voluntariness.	among men particularly younger ones while effort expectancy had a stronger influence amongst women especially those with less experience using technology.	Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions on Behavioral Intention is moderated by gender, age and experience in both US & China contexts.		dissimilarities between US & China in terms of how social influence, gender, age and voluntariness affect technology adoption. It was confirmed through empirical research that social influence is more uniformly important across all employees without contingencies related to gender, age or volunatariness which were found to be significant factors affecting technology acceptance in the US context but not so much in Chinese context.
Karahanna *et al.*, 2005	It is a conceptual study and does not involve empirical data collection or analysis.	NA	NA	The research model used in this study is based on theories of behavior from social psychology, such as the Theory of Reasoned Action (Fishbein & Ajzen, 1975) and the Model of Subjective Culture (Triandis, 1972).	The Theory of Reasoned Action (TRA) states that attitude fully mediates the influence of cognitive beliefs on behavioral intention. However, studies in information systems have shown that some cognitive beliefs, such as perceived usefulness, also have a direct effect on behavioral intention over and above their effect via attitude.	Perceived usefulness and performance impact of a technology will depend on how well it fits with existing practices. These practices are proposed to moderate the relationship between attitude towards adopting an innovation and behavioral intention to adopt it.	This study does not involve the use of any specific technology. Rather, it is a conceptual study that examines how different levels of culture influence individual behavior in an organizational setting.	This paper has provided a new theoretical lens for researchers to examine how culture affects behaviours across multiple contexts such as nationality, profession or organization
Silic & Back, 2013	To investigate the impact of organizational culture on the adoption and use of Unified Communications &	115 participants from 25 different countries	Participants were taken from a Fortune 500 companies and belonged to 5 functional	Performance Expectancy, Effort Expectancy, Social Influence and Facilitating Conditions.	Performance Expectancy has a direct effect on the intention to use UC&C technology. Effort Expectancy and Social Influence have an	Gender moderates the relationship between Performance Expectancy and Behavioral	Unified Communications & Collaboration (UC&C) technology.	Organizational culture does have an impact on UC&C technology adoption and use in organizations. The results also showed that

	Collaboration (UC&C) technology.		departments (Accounting, Marketing, Operations, Management & Call Centre).		indirect influence on the user's behaviour through their impact on performance expectancy. Facilitating Conditions also affects users' intentions directly, but it is not part of UTAUT model as such; rather, it acts as a moderator in this study by influencing other constructs like effort expectancy and social influence.	Intention. It also moderates the relationship between Effort Expectancy and Behavioral Intention.		when companies had a more external focus, aiming for flexibility and adaptability, then it facilitated the adoption and use of UC&C solutions.
Dasgupta & Gupta, 2010	1. To review the role of organizational learning and knowledge management in innovation. 2. To analyze the contributions of various factors such as culture, structure, technology and leadership towards promoting knowledge development and learning within an organization which are prerequisites for innovation.	90 articles, published in various academic journals	The research papers were identified within a 10 year period ranging from 1997 to 2007.	1. Organizational Learning 2. Knowledge Management 3. Culture of Trust and Knowledge Sharing 4. Flexible Organization Structure 5. Strong Technological Network - Committed Leadership	1. Organizational Learning has a direct effect on Knowledge Management. 2. Culture of Trust and Knowledge Sharing has a direct effect on Flexible Organization Structure which promotes innovation. 3. Strong Technological Network has a direct effect on Committed Leadership.	1. Culture of Trust and Knowledge Sharing moderates the relationship between Organizational Learning and Knowledge Management. 2. Flexible Organization Structure moderates the relationship between Strong Technological Network and Committed Leadership.	The study does not mention any specific technology that has been used. However, it mentions the importance of internets and intranets to promote communication as well as a strong technological network for knowledge development and learning in an organization which is necessary for innovation.	Organizational learning and knowledge management are essential for an organization to be adaptive and respond effectively to changes in its environment.
Mardiana, *et al.* (2018)	To explore the effect of organizational culture, particularly clan culture, on information system implementation success.	319 Employees	Employees from an IT-based company.	User satisfaction, Intention to use, Net benefits and Organizational culture.	User Satisfaction has a direct effect on Intention to Use. 1. Net Benefits have a direct effect on both User Satisfaction and Intention to Use. 2. Organizational Culture	Organizational Culture moderates the relationship between User Satisfaction and Intention to Use, as well as Net Benefits and both User	Information Systems	The conclusion of the study was that clan culture can be a dominant culture in IT-based companies, even though generally they have tendencies toward

					also had an indirect influence through its effects on the other constructs in the research model, such as user satisfaction and intention to use.	Satisfaction and Intention to Use.		adhocracy or market cultures.
Bhattacherje e and Premkumar (2004)	To understand how users' beliefs and attitudes change during the course of their IT usage, define emergent constructs driving such change, and propose a temporal model of belief and attitude change.	The sample size of this study was two longitudinal studies in end-user computing (computer based training system usage) and system development (rapid application development software usage).	Data collected from two different contexts, which were then used to analyze user beliefs and attitudes.	Perceived usefulness, attitude, disconfirmation and satisfaction.	1. Perceived usefulness has a direct effect on attitude in the pre-usage stage. 2. Disconfirmation and satisfaction have an indirect influence on post-usage perceived usefulness and attitude, as they are emergent constructs that can lead to changes over time.	1. Disconfirmation moderates the relationship between pre-usage perceived usefulness and post-usage attitude. 2. Satisfaction also moderates the relationship between pre-usage attitude and post usage perceived usefulness.	Computer based training systems (CBT) and rapid application development software (RAD).	User beliefs and attitudes are key perceptions driving information technology usage, which can change over time as users gain first-hand experience with IT.
Wang and Liao (2008)	To investigate how six dimensions (information quality, system quality, service quality, use, user satisfaction and perceived net benefit) influence each other when it comes to measuring the success of a G2C eGovernment system from a citizen's perspective.	119 users of G2C eGovernment systems in Taiwan.	These respondents were spread across six popular G2C systems: Taiwan Railways, an electronic motor vehicle and driver IS, tax filing system, a virtual employment services centers, an eGovernment portal and a tourism bureau.	Information quality, system quality, service quality, use, user satisfaction and perceived net benefit.	1. The study found that information quality, system quality and service quality had a direct effect on user satisfaction. 2. User satisfaction was also directly linked to use of the G2C eGovernment systems as well as perceived net benefit. 3. System Quality had an indirect influence on Use through its impact on User Satisfaction.	NA	eGovernment systems	The conclusion of the study was that, except for the link from system quality to use, all other hypothesized relationships between six success variables were significantly or marginally supported by data.

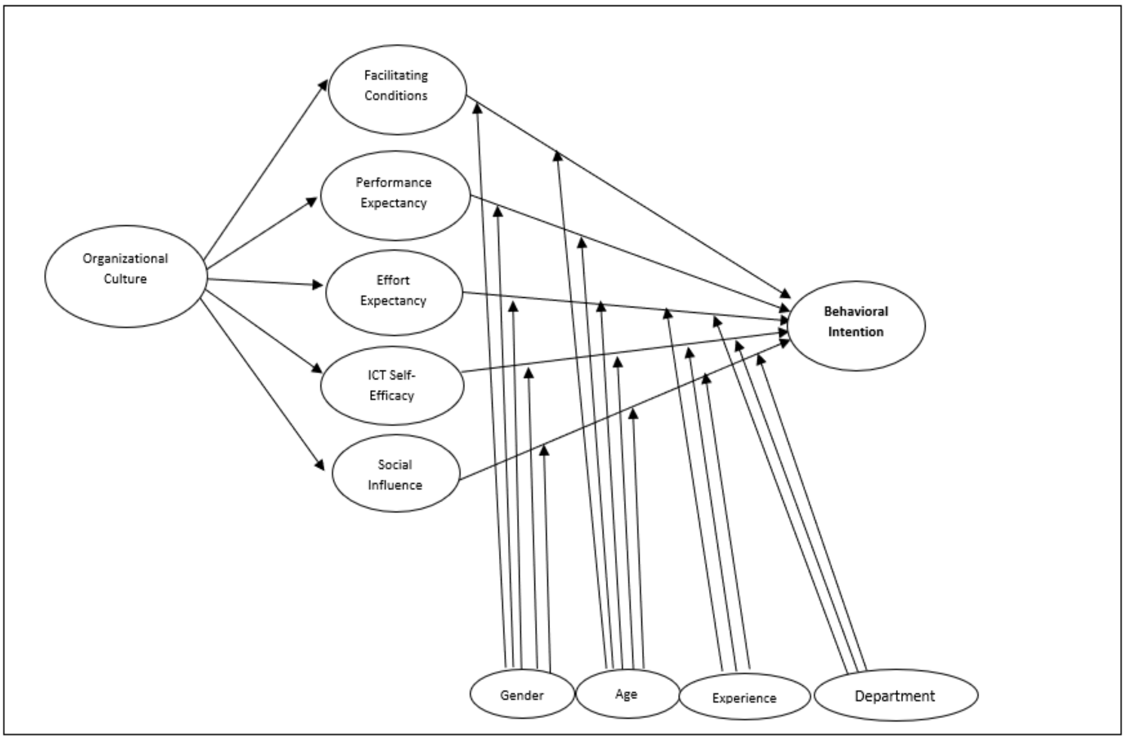
Wang *et al.* (2015)	To investigate the effectiveness of an Intelligent Tutor (iTutor) in improving students' learning outcomes.	132 students	132 students from a university in China. They were divided into two groups, an experimental group and a control group, with each having 66 participants.	Personalization and Intelligent Tutor.	Personalization has a direct effect on Intelligent Tutor. This means that personalizing the learning environment can help to improve the effectiveness of an intelligent tutor in improving students' learning outcomes.	The variable that moderates the relationship in the path model is 'different levels of prior knowledge'. This means that different levels of prior knowledge can affect how effective an Intelligent Tutor (iTutor) system is at improving students' learning outcomes.	Intelligent Tutoring System (ITS)	iTutor can be effective in improving students' learning outcomes, especially for those with low-level prior knowledge. Additionally, extending the traditional architecture of ITS and exploring new methods to model student's learning process and performance are two key issues when launching e-Learning.
Sheng *et al.* (2003)	To examine the relationship between organizational culture and employees' self-efficacy.	352	Employees of northwestern wood products company	Teamwork, morale, supervision, involvement, information flow and meetings.	1. The results from multiple regression and discriminant analysis showed that teamwork and information flow had the most direct effect on employees' computer self efficacy. 2. Supervision, involvement, morale and meetings were found to have an indirect influence on computer self-efficacy through their effects on either team work or information flow.	NA	Computers	Two subconstructs of organizational culture - teamwork and information flow had a significant positive contribution towards employee's Computer Self Efficacy while Teamwork contributed most significantly compared to other factors such as Information Flow.

Adopting technology can be challenging in emerging economies due to factors such as inadequate infrastructure and slower adoption rates compared to developed countries like the West (Al-Jaghoub *et al.*, 2010; Kannabiran *et al.*, 2012). Workplace culture is a crucial factor that affects the pace of technology adoption within organizations. Teo (2007) discovered that Singaporean firms' adoption of the Internet was hampered by the absence of a conducive OC and other factors. Similarly, a study on Malaysian SMEs showed that internet adoption was influenced by infrastructure, new technology, and factors such as manager traits, perceived benefits, OC, technological competence, and the cost of adoption (Alam, 2009). Ciganke *et al.* (2008) investigated the adoption of knowledge management systems and found that cultural factors, such as a process-oriented open communication system and OC, significantly impacted adoption. Overall, these studies underscore the importance of OC in successfully introducing new technology within a firm.

A study by Tarafdar and Vaidya (2006) explored the influence of organizational characteristics on the adoption of e-commerce technology in India, encompassing aspects such as leadership importance, company culture and structure, and personal traits of IT workers. Given the current level of interest in this area, further examination of the impact of company culture on IT infrastructure is necessary, making the proposed theoretical framework valuable. Venkatesh and Zhang (2010) conducted a long-term investigation into the effect of OC on employees' intention to adopt new technologies, examining UTAUT scores in the United States and China. Their findings indicate that cultural norms play a significant role in the pace of new technology acceptance. In a similar vein, Yang and Forney (2013) used a modified UTAUT model to provide a comprehensive framework for predicting mobile commerce adoption. Ahmad, Markkula, and Oivo (2013) identified PE, EE, FC, and SI as the driving forces behind adoption, utilizing the UTAUT model. Denison and Mishra's (1995) framework for analyzing OC serves as the foundation for the proposed model.

Recent research has also suggested that a company's culture may play a role in determining whether or not a particular type of technology is adopted and used within the organization (Karahanna *et al.*, 2005). An organization's culture is hypothesized to have preceded the UTAUT. The model developed by Denison and Mishra (1995) puts an emphasis on the importance of valuing and displaying cultural characteristics linked to success. They divide cultural characteristics and norms into four dimensions: involvement, adaptability, consistency, and mission. Denison and Mishra's (1995) framework for analyzing cultural values and their quantification has been employed in various studies of company culture, thus giving an indication that it is valid. The level of participation in the organization is referred to as involvement. The greater an individual's involvement inside an organization, the greater his or her sense of responsibility and ownership. Consistency provides an implicit control mechanism based on internalized organizational ideals. It denotes the level of normative integration. Adaptability reflects organizational norms and attitudes and provides the capability for internal change in response to external circumstances. The mission trait offers meaning and purpose, as well as a long-term vision. The proposed extended UTAUT model is depicted in Figure 10.

Figure 10. Proposed Extended UTAUT Model



The degree to which individuals believe that information systems or technology usage would enhance their job performance is known as PE. Therefore, OC should promote the adaptation and consistency of individual members, as well as facilitate the design and implementation of information systems that align with the organization's goals. It can be argued that an individual's PE is affected by the values of the organization's culture demonstrated by that individual member. The following hypotheses have been proposed based on the existing literature:

H1: Organizational culture has a significant and positive impact on educators' PE to use technology in classroom instruction.

The adoption of technology in organizations is influenced by various factors, with OC being a critical aspect, as noted by Silic and Back (2013). The connection between OC and EE in the UTAUT model has been examined in several studies. Dasgupta and Gupta (2011), for instance, discovered that OC had a direct and positive effect on EE in the UTAUT model. The authors suggested that organizations that value innovation and risk-taking in their culture may be more inclined to adopt new technologies based on their findings.

EE gauges an individual's perception of a system's ease of use, reflecting their ability to adapt and participate in maintaining the system. Ciganke *et al.* (2008) demonstrated that company culture significantly impacts the perceived usability of knowledge management systems. The UTAUT's EE is equivalent to the perceived ease of use in TAM. Consequently, cultural values like involvement and adaptability are anticipated to affect EE. Mardiana *et al.* (2018) found a positive relationship between OC and EE in the UTAUT model. They suggested that organizations with a culture that promotes open communication, collaboration, and knowledge sharing may have employees who perceive the adoption of new technology as less demanding. In summary, the literature emphasizes the importance of considering OC when investigating new technology adoption in organizations. A culture that values innovation, risk-taking, open communication, and collaboration may enhance EE, leading to successful adoption of new technology. Based on the literature, the following hypotheses have been proposed:

H2: Organizational culture has a significant and positive impact on educators' EE to use technology in classroom instruction.

The SI construct in the UTAUT model is influenced by OC, as demonstrated in prior studies. Bhattacherjee and Premkumar (2004) discovered a positive relationship between a supportive OC and SI, indicating that employees are more likely to adopt technology when they perceive support from colleagues and superiors. Wang and Liao (2008) also found a positive correlation between a culture of innovation and risk-taking and SI. Their findings suggest that employees are more likely to adopt technology if they perceive an OC that values innovation and is willing to take risks. In contrast, a culture that resists change was found to have a negative relationship with SI, implying that employees are less likely to adopt technology if they perceive resistance to change within the organization.

The extent to which an individual is influenced by others to adopt a system can be measured through their level of SI (Venkatesh *et al.*, 2003). Subjective norms were first suggested by TAM (Davis, 1989) as a way to assess this construct. Based on their research into how people react to KMS, Ciganke *et al.* (2008) concluded that OC has a role in shaping individuals' expectations. As a result, SI will be affected by the culture of the organization. Balthazard *et al.* (2006) discovered that company culture affects employees' propensity to follow rules. Assumptions about how the system should be used will be shaped by the culture of the organization. It is anticipated that such expectations will be driven by the cultural values of the organization, such as involvement and mission. An increased expectation of system utilization might be expected if the OC takes on characteristics of higher involvement and higher mission. The results indicate that OC has a significant impact on how employees perceive SI, which, in turn, affects their readiness to embrace new technologies. Based on the literature, the following hypotheses have been proposed:

H3: Organizational culture has a significant and positive impact on educators' SI to use technology in classroom instruction.

FC refer to the level of confidence an individual has in the organization and the technology, enabling them to successfully use an information system (Venkatesh *et al.*, 2003). This includes the TAM dimension of perceived behavioral control (Davis, 1989; Venkatesh *et al.*, 2003). Research on the adoption of knowledge management systems conducted by Ciganke *et al.* (2008) indicates that OC significantly affects perceived behavioral control. OC is hypothesized to affect FC in part due to its influence on perceived behavioural control. In particular, characteristics like consistency, involvement, and adaptability that permeate an organization's culture will have an impact on FC. An individual's level of involvement in an organization is defined by Denison and Mishra (1995). Organizations with strong cultures of participation also have well-developed organizational and technical frameworks to back up their operations. Research has examined how OC influences FC in the adoption of technology. One study by Hsiao *et al.* (2016) discovered that an OC that values innovation and change has a beneficial effect on FC for adopting e-learning technology. Similarly, Wang *et al.* (2015) found that a positive OC, characterized by innovation and collaboration, had a positive impact on FC for mobile learning adoption. Taken together, the studies reviewed indicate that the impact of OC on FC is an important factor to consider when examining technology adoption behavior within the UTAUT model. A positive OC that values innovation and collaboration is more likely to create the necessary FC for technology adoption, including technical support, training, and resources. It is suggested that an organization's stated culture will have a significant impact on FC. Based on the literature, the following hypotheses have been proposed:

H4: Organizational culture has a significant and positive impact on FC to use technology in classroom instruction.

SE, derived from social cognitive theory, is the perception an individual has of their ability to perform a specific task competently (Bandura, 2002). People who believe in their own abilities are more likely to push through difficult situations and make an effort to learn from and teach others (Cabrera *et al.*, 2006). OC was recognized as a significant contextual factor that influences SE, and the evidence suggests that SE is not a fixed characteristic but rather a dynamic assessment that shifts depending on the circumstances (Sheng *et al.*, 2003). Research suggests that OC can have a significant impact on the adoption of new technology and ICT SE. A supportive OC that encourages innovation, teamwork, and communication can increase employees' confidence in their ability to use new technologies effectively. Computer SE, which refers to an individual's confidence in using their computer skills in various contexts, was defined by Compeau and Higgins (1995) as a measure of SE in the realm of IT. Some have argued that because widespread use of computers is a part of IT-based corporate initiatives like ERP systems, employees should have a high level of computer SE (Chou *et al.*, 2014). ERP users must transition from paper-based to IT-based work as they make use of the system's features; this requires them to develop and maintain a high level of computer SE, an important internal psychological cognitive factor that is positively related with individuals' intentions and behaviour toward IT utilisation (Gattiker & Goodhue, 2005). Prior studies have demonstrated that OC is a key external factor that affects employees' confidence in their computer skills (Sheng *et al.*, 2003). Research by Alzougool *et al.* (2018) further supports this by showing that an OC that emphasizes training, collaboration, and empowerment can have a significant positive impact on employees' ICT SE and their adoption of new technology. But there haven't been many studies looking at how OC and computer SE both influence employees' propensity to share what they know with others. In the context of new technology adoption, there is a pressing need for more empirical investigations to determine the most effective typologies of OC for raising workers' levels of computer SE (Jones *et al.*, 2006). To investigate how ICT SE influences OC in the context of ICT adoption, this research uses an extended UTAUT model grounded in social cognitive theory. Based on the literature, the following hypotheses have been proposed:

H5: Organizational culture has a significant and positive impact on educators' SE to use technology in classroom instruction.

The concept of SE refers to one's confidence in their ability to accomplish a task or achieve a desired outcome. This belief in one's own capabilities has been shown to be a critical psychological factor that impacts an individual's ability to overcome obstacles and achieve their goals (Bandura, 2006). Research has indicated that SE also plays a significant role in the adoption of new technologies, such as mobile banking and cloud computing (Chong *et al.*, 2012; Al Awadhi & Morris, 2014). Computer SE (CSE) specifically refers to an individual's belief in their ability to effectively use computer technology in various contexts (Compeau & Higgins, 1995). Studies have consistently demonstrated the importance of CSE in predicting an individual's intent to use technology (Agarwal *et al.*, 2000; Wang *et al.*, 2006). Individuals with higher levels of CSE tend to have more favorable attitudes toward technology and are more likely to make use of it than those with lower levels of CSE (Compeau *et al.*, 1999). Furthermore, research has indicated that ICT SE, a specific form of CSE, is a significant predictor of the adoption of e-learning technologies (Ong & Lai, 2006) and digital learning resources in primary education (Hatlevik & Hatlevik, 2018). Although computer SE is not included as frequently as the TAM in adoption models, several studies have advocated for its inclusion alongside TAM constructs (Holden & Rada, 2014; Zhu *et al.*, 2010; Agarwal *et al.*, 2000; Igbaria & Iivari, 1995) due to its potential as a promising predictor of system usage (Jeyaraj *et al.*, 2006). Bellini *et al.* (2016) also found that higher levels of ICT SE were positively related to the use of digital media, while anxiety was negatively related to its use.

Based on the research literature, it has been found that ICT SE plays a crucial role in predicting the behavioral intention of both educators and students to use technology in various educational contexts (Al-Fudail & Mellar, 2008; Chang & Liang, 2015; Chai *et al.*, 2010; Hsu & Lu, 2004; Kuo *et al.*, 2014; Lee & Mendlinger, 2011; Prifti, 2022; Teo, 2012). In particular, students and pre-service teachers who exhibit high levels of SE towards technology are more likely to develop a positive attitude towards it and demonstrate greater readiness to employ it for educational purposes (Al-Fudail & Mellar, 2008; Chang & Liang, 2015; Chai *et al.*, 2010; Hsu & Lu, 2004; Kuo *et al.*, 2014; Lee & Mendlinger, 2011; Prifti, 2022; Teo, 2012). Moreover, teachers with high SE in using technology are more likely to have a positive attitude towards technology and be more willing to use it in their teaching practices (Al-Fudail & Mellar, 2008; Chang & Liang, 2015). Students with high levels of SE towards technology also tend to exhibit a greater willingness to use e-learning platforms for learning purposes (Prifti, 2022).

The following hypotheses have been proposed based on the literature review:

H6: The educators' BI to use technology in their classroom teaching is positively and significantly affected by SI.

H7: The educators' BI to use technology in their classroom teaching is positively and significantly affected by EE.

H8: The educators' BI to use technology in their classroom teaching is positively and significantly affected by PE.

H9: ICT SE has a significant and positive impact on the educators' BI to use technology in classroom instruction.

H10: FC have a significant and positive impact on the educators' BI to use technology in classroom instruction.

2.15 New moderators

According to previous research, the UTAUT framework, which takes into account factors such as PE, SI, EE, and FC, is widely used for understanding the adoption of technology in educational settings. However, the correlation between these factors and technology adoption may vary depending on the academic department and the specific teaching strategies and technological tools used. Therefore, it is important to investigate the moderating effect of academic department on the relationship between these factors and technology adoption. This will provide insight into how technology adoption may differ across academic departments and inform future research and practice. Researchers have studied technology adoption across different user types, including teachers and researchers in disciplines such as management, commerce, and economics.

However, the reasons why effect sizes vary among these categories are not well understood. Previous studies have found that an individual's role and nature of tasks can significantly affect the strength of various parameters in the path model. While significant moderation effects of user types have been found in previous research, further investigation is needed to determine whether these effects hold true for all relationships in the UTAUT model. (Šumak *et al.*, 2011; Yousafzai *et al.*, 2007; Schepers and Wetzels, 2007; Sun and Zhang, 2006).

Several studies have focused on the moderating effect of the academic department on the relationship between key determinants of technology adoption and behavioral intention to use technology in HE. The impact of PE, SI, and FC on behavioral intention to use technology has been investigated across different academic departments in these studies. Ozkan and Koseler (2009) found that the association between PE and behavioral intention is stronger for engineering students than for business and social science students. Wu *et al.* (2010) found that the association between SI and behavioral intention is stronger for business students than for education students. Lee *et al.* (2010) also found that SI has a stronger effect on behavioral intention for users in the Humanities department compared to those in the Science department. Wang *et al.* (2009) found that the association between FC and behavioral intention is stronger for science and engineering students than for humanities and social sciences students. Cheung and Vogel (2013) found that the association between FC and behavioral intention is stronger for business students than for science and engineering students. These studies suggest that different academic departments may have varying levels of readiness, resources, and needs when it comes to incorporating technology into teaching and learning. Therefore, it is important to consider the academic department as a factor in technology adoption research in educational contexts (Ozkan and Koseler, 2009; Wu *et al.*, 2010; Lee *et al.*, 2010; Wang *et al.*, 2009; Cheung and Vogel, 2013).

According to previous research, the role of the academic department as a moderator in the UTAUT model in the educational context is crucial. It has been found that the impact of the various constructs in the UTAUT model on behavioral intention and actual system use may differ depending on the user's academic department. As a result, it is necessary to consider the potential moderating impact of the department on user behavior when introducing new educational technologies. More research is required to examine the moderating impact of academic departments (economics, management, and commerce) on the relationship between various constructs in the UTAUT model and behavioral intention to use technology in educational contexts.

2.16 Barriers to technology adoption

The development of ICT has had a profound impact on society, altering nearly every facet of human existence. A comparison of the previous two or three decades shows that ICT has had a huge impact on many different sectors, including pharma, banking, education, engineering, agriculture, and architecture (Revathi & Aithal, 2019). The modern state of these industries is very different from their historical counterparts. The field of education, on the contrary, appears to have been remarkably unaffected and changed far less frequently than other areas. Several researchers (e.g., Groves & Zemel, 2000; Ejiaku, 2014) have attempted to probe the reasons behind this inertia and lack of impact.

According to Ngao *et al.* (2022), educators working at the institution should possess the ability to incorporate ICT resources, which include social media channels such as Facebook, WhatsApp, Twitter, and LinkedIn, as well as digital media such as television, cable networks, and radio, into their instructional strategies. A study by Gulbahar and Guven (2008) asserted that providing schools with these technical tools does not enhance the quality of instruction when teachers are not equipped to use them to their full potential. According to Rana *et al.* (2020), if teachers lacked the essential skills to utilize these technologies proficiently, it can be concluded that students would not be able to attain their desired outcomes.

In spite of the many advantages that ICT has brought to society, there is still a significant digital divide between developed and developing nations. This divide is characterized by unequal access to technology and the internet, as well as disparities in technology usage and skills (Chinn & Fairlie, 2017). This digital divide has led to an unequal distribution of the benefits of ICT and has resulted in new forms of social and economic inequality. Therefore, it is crucial to address this issue in order to ensure that the benefits of ICT are shared more equitably among different populations and regions. Targeted investments in technology infrastructure and digital literacy programs, as well as public-private partnerships aimed at bridging the digital divide, can be effective ways to achieve this goal (Molla & Licker, 2015).

The potential benefits of ICT in education are often overlooked, despite its capacity to enhance both teaching and learning (Trucano, 2005). The implementation of ICT adoption in universities is often poorly executed and based on unrealistic expectations (Afshari *et al.*, 2009). While many educators are cautious about using technology in the classroom (Williams, 2011), research suggests that significant barriers exist when it comes to incorporating technology into HE, including classroom activities (Brock, 2010). However, there is no one-size-fits-all solution to these difficulties, as the adoption of ICT is influenced by a range of factors, including economic, social, organizational, and psychological aspects, as well as the characteristics of the technologies themselves (Zhao & Frank, 2003). Instructors from various nations have distinct views on the main obstacles to the use of ICT, according to the findings of another international study by Buabeng-Andoh (2012).

Numerous empirical studies have been conducted regarding the hindrances to the widespread adoption of information and communication technologies, in addition to theoretical research. Ertmer and Ottenbreit-Leftwich (2010) emphasize the significance of exploring the reasons for the underutilization of digital tools, particularly among novice instructors. Teachers can benefit from identifying and thinking about the challenges they face in the classroom so that they can devote more time and energy to learning and practicing the skills they need for their teaching practices and becoming familiar with the enabling factors and strategies they can employ to remove the obstacles over which they have control (Ertmer, 1999). Although many educators make use of digital technology in their private lives, research shows that when these tools are implemented in the classroom, teachers face significant technical, logistical, and pedagogical challenges (Ferri *et al.*, 2020). Therefore, Cuhadar (2018) concludes that educators' degree of technological competence is somewhere between moderate and low. Kerr *et al.* (2013) suggest that the challenges linked to the integration of digital technology at the personal level are linked to inadequate usage or the application of these instruments in an automated and academically unproductive approach.

Numerous studies and research have recognized insufficient institutional planning and the inconsistent implementation of digital tools in HE as major hindrances at the institutional level (Chukwunonso & Oguike, 2013; Prestridge, 2012; Agyei & Voogt, 2011; AlSenaidi *et al.*, 2009; Karasavvidis, 2009). This lack of uniformity places the onus on teachers to develop their own methods of integrating technology, resulting in sporadic and inconsistent usage, contingent solely on the individual educator's motivation and willingness to explore new avenues of instruction (Selwyn, 2007). It is important to note that teachers' views, technological proficiency, and perceived barriers towards the implementation of technology heavily influence the introduction of ICT into education and learning (Hew and Brush 2007). According to Webb and Cox (2004), a teacher's conviction regarding the significance of technology in teaching is essential in shaping their pedagogical decision-making process. However, as noted by Bingimlas (2009), the attitudes and resistance of educators towards technology often hinder its effective integration in the classroom. Furthermore, teachers' willingness to experiment and embrace innovative practices may be deterred by their organization's lack of consistent ICT policy and support (Opfer & Pedder., 2011).

According to the literature, there are various obstacles to the successful implementation of instructional technology, such as insufficient funding, inadequate technical support, limited sharing of information among institutions, and a shortage of time for training and development of faculty and staff. Chizmar and Williams (2001) have observed that professors at Illinois State University face significant challenges, such as a lack of financial support, institutional backing, and insufficient time to acquire expertise in new technologies. Butler and Sellbom's (2002) survey of 125 professors revealed that the main barriers to adopting ICT were concerns about technology durability, difficulty in learning to use it, skepticism about its value, and lack of support from the institution. In light of these challenges, it is imperative for institutions to provide clear policies and consistent support to foster the adoption of technology in HE. Through collaborative efforts between administration, faculty, and technical support personnel, universities can create an environment that encourages innovative pedagogical practices and the effective integration of technology into instruction.

Researchers have recognized several obstacles that impede the broad implementation of digital technology in the realm of education. These barriers can be classified into several categories, such as individual, organizational, and group barriers. Individual barriers include personal characteristics, such as a lack of time or education, whereas organizational obstacles may arise from a lack of incentives or a reluctance to change. Additionally, there are external or first-order barriers and internal or second-order barriers, which can be categorized as primary or secondary barriers. Researchers have identified various factors that can prevent educators from using technology effectively in the classroom. One key factor is access to technology, which can determine how much educators incorporate it into their teaching. Additionally, a teacher's comfort and proficiency with information and communication technology (ICT) can play a crucial role in how deeply they engage with it. If educators are not comfortable using computers, they are less likely to utilize them in their classrooms. Teachers may also reduce their use of ICT if they face problems with their own devices. Another barrier is a lack of time to prepare and research materials for classes. Furthermore, if classroom instruction methods for ICT are ineffective, it can discourage educators from using it. A teacher's perception of the value of ICT is also significant in their willingness to use it. Resistance to change is a common obstacle to the adoption of new technologies. As per the study by Al-Senaidi et al. (2009), there is evidence to suggest that a teacher's gender can affect their level of computer anxiety, with male educators experiencing more anxiety and female educators using ICT more frequently. So, it is important to analyse the group differences also which can be on the basis of age, gender, academic rank, academic department etc.

A new outlook is required to overcome these obstacles. Experts have suggested that various factors such as personal traits, preferences, the tool's requirements, and external circumstances should be considered. By doing this, educators can gain a better understanding of the hindrances that prevent them from incorporating digital technology in their teaching and work towards overcoming them.

2.17 Research gap

There is a research gap concerning the framing of objectives related to the integration of ICT and AI in classroom instruction among business faculties in universities in Punjab, particularly in the UTAUT model. While there exists literature discussing the adoption of ICT and AI in education, there is a dearth of research specifically examining the context of faculties in B-Schools within universities of Punjab. This research gap is significant because integrating technology in classroom instruction can potentially enhance learning outcomes, teaching efficiency, and prepare students for the digital economy. However, the effective integration of technology requires a nuanced understanding of the factors that influence its adoption and the obstacles that need to be overcome. Without specific studies on business faculties in universities of Punjab, policymakers and educators may not have access to the contextualized insights they need to develop effective strategies for tech. integration.

Table 2 shows the data extracted from the National Institutional Ranking Framework's (NIRF) website which reveals that Punjab and Chandigarh consistently report a considerable percentage of unplaced business graduates across the academic years 2018–19, 2019–20, and 2020–21, setting them apart from the other northern Indian states. This highlights the need to investigate the extent of ICT implementation in Punjab's management institutes since inadequate and conventional teaching methodologies are likely causing poor placement results. To address these issues, it is essential to conduct a study on the teaching practices of Punjab's management faculties, as identified by NITI Aayog's National Strategy for AI (2018), to determine their potential to adopt cutting-edge technology to enhance learning outcomes and employment opportunities.

Table 2. Percentage of unplaced students in North Indian States as per NIRF data

State/UT	2020-21	2019-20	2018-19
Chandigarh	43.31%	43.09%	47.19%
Punjab	45.73%	38.31%	39.56%
Delhi	3.65%	7.24%	3.93%
Haryana	5.39%	6.06%	9.3%
Himachal Pradesh	0.0%	6.12%	3.17%
Jammu and Kashmir	25.4%	24.03%	24.22%
Rajasthan	5.06%	8.68%	11.74%
Uttar Pradesh	14.63%	12.3%	18.16%
Uttarakhand	20.2%	21.84%	25.63%

While literature on AI adoption in education exists, there is a lack of research that specifically looks into educators' attitudes towards integrating AI into their teaching. This gap is significant as AI has the potential to revolutionize teaching and learning, and it's important for educators to understand its benefits and challenges. Without research on educators' awareness of AI integration in teaching, policymakers and educators may not have the necessary insights to develop effective integration strategies. It's therefore crucial to conduct research that examines educators' awareness level of AI integration in teaching, especially in Punjab, where unique factors such as socio-economic status, cultural values, and educational policies can influence technology adoption. To fill this gap, it's important to study the attitudes and perspectives of business faculties in Punjab's universities towards integrating ICT and AI in classroom instruction.

2.18 Chapter summary

In this chapter, the focus is on the important role played by OC and SE in using ICT, specifically in relation to the UTAUT model. Research suggests that organizations that prioritize innovation and taking risks are more inclined to adopt new technologies. Furthermore, the chapter highlights the influence of academic departments as moderators of technology adoption in HE. Numerous studies have explored how academic departments impact the link between critical factors of technology adoption and the intention to use technology. However, there is a gap in research that specifically examines how ICT and AI are integrated into teaching in business faculties in Punjab universities, specifically within the framework of the UTAUT model. The chapter concludes by stressing the necessity of evaluating the extent of ICT implementation in B-Schools in Punjab to enhance teaching pedagogy and improve learning outcomes.

CHAPTER-3
RESEARCH METHODOLOGY

Chapter overview

In this chapter, an overview of the study is presented, which includes the reason for conducting the research, the research objectives, the research plan, and the methodology. Initially, the study validates the applicability of technology acceptance models to the academic context. After that, a structural model is developed and tested to understand the intention of teachers to use ICT for teaching and learning, based on previous studies on behavior and technology acceptance. The chapter starts with a discussion of the results of the pilot study, followed by an explanation of the sampling process. It then proceeds to describe the data collection method, sample characteristics, data cleaning process, and data distribution. Additionally, it provides information on the data analysis approach, definitions of terms used, measurement scales, and measures employed in the research. Finally, the chapter describes the structural model used in the study and presents the items used for constructing the measurement model.

3.1 Research objectives

Over the past few years, the significance of technology in education has grown substantially, particularly with the widespread availability of teaching technologies such as AI. The potential of these technological developments to transform teaching and learning approaches is enormous, which can enhance the efficiency and usefulness of education. However, the adoption of these technologies in the classroom remains a challenge. This study aims to fulfill the following objectives:

- To study the socio-economic characteristics of business faculties' of universities of Punjab.
- To examine the frequency of ICT usage by the business faculties in their classroom instruction.

- To examine the factors shaping the behavioral intention of business faculties towards the adoption of ICT in classroom instruction
- To investigate the business faculties' perceptions of barriers to integrate ICT in classroom instruction.
- To check the awareness level of business faculties towards the integration of artificial intelligence in classroom instruction.

3.2 Research design

In this study, a descriptive research approach was utilized, and the primary data for the research was obtained through a survey that employed a pre-tested questionnaire.

3.3 Data collection instrument

A questionnaire was used to assess the factors that contribute to the intention to use technology. The questionnaire consisted of five sections, with Section A containing ordinal scale statements that focused on the frequency of ICT usage by business faculty. This section was further divided into two sub-sections, which included questions related to the frequency of ICT tools and applications used in classroom teaching, as well as the frequency with which ICT is used to perform various tasks by business faculties. The technologies listed in Section A were derived from various studies by Boonmoh *et al.*, 2021; Castro & Tumibay, 2021; Avila *et al.*, 2021; Aljawarneh, 2020; Kattoua *et al.*, 2016; Estes *et al.*, 2014; Aloraini, 2012; Toro & Joshi, 2012; Duţă & Martínez-Rivera, 2015; Schulz *et al.*, 2015; and Olson *et al.*, 2011. Each statement was evaluated on a five-point Likert scale ranging from 1 = never to 5 = always.

The questionnaire's Section B contained ordinal scale statements that addressed the factors influencing the behavioral intention of faculty to use ICT in their classroom instruction. This section included statements related to different constructs, such as OC, PE, EE, SI, FC, ICTS SE, and behavioral intention to use technology. Each statement was evaluated on a seven-point Likert scale, ranging from 1 = strongly disagree to 7 = strongly agree. Table 3 displays the constructs that were part of this section.

Table 3. Sources of Items Used in Various Constructs

S. No.	Constructs Measured	Items Adopted	Number of Items
1	Organizational culture	Denison & Mishra (1995)	8
2	Performance expectancy	Venkatesh *et al.* (2003), Venkatesh *et al.* (2012)	4
3	Effort expectancy	Venkatesh *et al.* (2003), Venkatesh *et al.* (2012)	4
4	Social influence	Venkatesh *et al.* (2003), Venkatesh *et al.* (2012)	4
5	Facilitating conditions	Venkatesh *et al.* (2003); Umrani-Khan & Iyer (2009)	6
6	ICT self-efficacy	Compeau & Higgins (1995)	4
7	Behavioural intention to use technology	Venkatesh *et al.* (2003)	3

Section C contains 14 statements on an ordinal scale, which pertain to the obstacles that impede the integration of ICT in the classroom instruction of business faculty. These statements were sourced from the works of Nikolopoulou & Gialamas (2013), Franklin (2007), Al-Senaidi *et al.* (2009), and Ihmeideh (2009). Section D is composed of statements related to the understanding of business faculty about the utilization of AI in their teaching practices. This section is subdivided into three parts, with each part containing statements that relate to (i) the extent of knowledge of business faculty about AI in classroom instruction, (ii) the degree of familiarity with AI-based applications used in classroom instruction, and (iii) the level of concurrence on the potential advantages of AI to educators. All statements in these subsections were rated on a five-point Likert scale, with the first subsection rated from 1 = Not at all Aware to 5 = Extremely Aware, the second subsection from 1 = Not at All Familiar to 5 = Extremely Familiar, and the third subsection from 1 = Strongly Disagree to 5 = Strongly Agree. The list of AI tools and applications used in the survey was compiled with the help of various studies by authors such as Ricca *et al.* (2021), Ahmad *et al.* (2020), Richter *et al.* (2019), Alokluk (2018), Lin *et al.* (2018), Urh *et al.* (2015), and Senel (2016). During the survey, the faculty were provided with brief definitions of AI-based technologies. Section E was the final section, which collected demographic data such as gender, age range, highest educational qualification, name of institution, type of employment, department, experience using ICT, and compulsory usage of ICT. The survey was conducted using Google Forms for data collection.

3.4 Validity of the instrument

Validity describes the precision with which a technique measures something. If a technique measures what it promises to measure and the findings closely match actual data, then it can be deemed valid (Churchill and Peter, 1984). Validity guarantees that a scale can accurately measure the targeted concept. According to the literature, research should have construct validity, content validity, face validity, and criterion validity (Middleton, 2022). The extent to which a measurement tool accurately assesses the intended construct is referred to as its construct validity. This factor is critical in evaluating the consistency and accuracy of the assessment. In contrast, a questionnaire with good content validity indicates that it measures the construct of interest with precision and comprehensiveness. A questionnaire’s face validity is its apparent ability to measure the construct being studied. When evaluating face validity, experts look at how appropriate the questions seem at first glance. A high level of face validity is attained when most people agree that the test items appear to measure the construct being assessed. A test's ability to predict a specific result is measured by its criterion validity.

This study used an instrument that was based on tools used in previous research. As a result, the instrument was deemed to possess construct validity, content validity, and criterion-related validity. To ensure that the measurements were appropriate for the study's focus on B-Schools within HE, a face validity check was conducted. This involved reassessing the validity of the measurements after they had been revised and rephrased. A panel of experts with a minimum of five years of research experience from five renowned institutions was consulted for advice. The questionnaire was reviewed by the experts, and their suggestions were integrated into the instrument. Some experts advised to change the demographic questions, for example, changing the content from "experience to working experience" and restructuring the age-groups. Some other professionals recommended changing the order of the questionnaire. For instance, they proposed starting with asking about how often the business faculties use ICT, then inquiring about their willingness to use ICT for teaching purposes, and placing the demographic questions at the end of the questionnaire. They also suggested that several of the questions for the study's key concepts be rephrased. For instance, it was advised that statements for the "ICT SE" construct strictly follow the literature. Furthermore, it was suggested that the "FC" construct include dimensions like training and technical support, ICT infrastructure, leadership style, and institution-specific ICT policies. For better study outcomes, it was also suggested to include a wider list of ICT tools and AI applications in the respective sections.

3.5 Pilot study analysis

A pilot survey is essentially a copy and test of the main survey. The objective of conducting a pilot study is to detect any defects in the measuring device. This process is essential to test the accuracy and precision of the instrument and to identify any constraints or inaccurate data it may generate, as stated by Wedlock and Trahan (2019). To ensure that survey participants would understand the questions and to aid in the process of item reduction, pilot research was carried out. All of the constructs used in the analysis were identified from the research literature. The study relied on scales that had already been described in the literature; however, a validation method was conducted to ensure their validity by calculating their internal consistency reliability and outer loadings. According to Schroder *et al.* (2011), pilot testing for the newly designed instrument should be carried out on the same population as the proposed extensive study. When conducting a pilot study for the purpose of conducting a preliminary survey or developing a scale, Johanson & Brooks (2010) suggest gathering data from at least 30 participants who are typical of the population of interest. Hill (1998) and Isaac and Michael (1995) proposed 10 to 30 people for pilot survey research. Hertzog (2008) suggests that assessing the clarity, phrasing, and layout of study items can be achieved with a sample size of 10 or less. Similarly, Connelly (2008) proposes that the pilot study should comprise 10% of the total sample size intended for the primary research. To evaluate items in a university context, a pilot project was conducted, which involved collecting responses from 30 teachers from different B-Schools.

3.5.1 Reliability of the instrument

To evaluate the reliability of the instrument, the pilot study employed external loadings and internal consistency reliability. According to Hair *et al.* (2012), the internal consistency reliability of the partial least squares Structural Equation Modeling technique should not be measured using Cronbach's alpha value. The requirement for the indicator's outer loadings is greater than 0.70, while the criterion for composite reliability is greater than 0.60.

Table 4. Pilot Study Results: Cronbach's Alpha and Composite Reliability

S. No.	Constructs Measured	Cronbach's Alpha	Composite Reliability
1	Organizational Culture	0.744	0.813
2	Performance Expectancy	0.823	0.871
3	Effort Expectancy	0.778	0.812
4	Social Influence	0.805	0.855
5	Facilitating Conditions	0.781	0.837
6	ICT Self-Efficacy	0.730	0.804
7	Behavioural Intention to Use Technology	0.817	0.858

Table 4 presents that all of the constructs in the pilot study have acceptable internal consistency reliability, as the composite reliability values are higher than the threshold (i.e., 0.70). The constructs used in the pilot study are deemed to have internal consistency reliability since both Cronbach's alpha value and the composite reliability value are above the threshold. The reliability test results are satisfactory, i.e., within the threshold limit, indicating that the items in each set have a positive correlation with each other (Sekaran & Bougie, 2016).

Table 5's outer loading results show that the indicators employed to measure the latent variables have outer loadings that are greater than the threshold value of 0.70. As a result, every item utilized in the pilot study was retained.

Table 5. Results of Pilot Study: Outer Loadings of Various Items

S. No.	Indicators	Outer Loadings
1	OC1	0.815
2	OC2	0.781
3	OC3	0.767
4	OC4	0.800
5	OC5	0.824
6	OC6	0.833
7	OC7	0.798
8	OC8	0.858
9	PE1	0.836
10	PE2	0.799
11	PE3	0.864
12	PE4	0.803
13	EE1	0.892
14	EE2	0.901
15	EE3	0.753
16	EE4	0.927
17	SI1	0.894
18	SI2	0.889
19	SI3	0.832
20	SI4	0.845
21	FC1	0.754
22	FC2	0.811
23	FC3	0.707
24	FC4	0.793
25	FC5	0.700

26	FC6	0.720
27	SE1	0.923
28	SE2	0.886
29	SE3	0.875
30	SE4	0.843
31	BI1	0.864
32	BI2	0.877
33	BI3	0.812

3.5.2 Construct validity

To ascertain the internal structure of the set of a specific number of items, the questionnaire was subjected to item validation by factor analysis. Factors were generated using the Principal Component Analysis method with Varimax Rotation and Kaiser Variation.

3.6 Sample design

Designing a sample is a crucial step in any research study, as it determines the accuracy and representativeness of the data collected. This section outlines the sampling process used for the current study and displays how the sample size was determined. Kothari (2004) divided the sampling design into five steps: (i) research population definition; (ii) selection of the sampling frame; (iii) selection of the sampling technique; (iv) determination of sample size; and (v) execution of the sampling process. These steps were followed for the purpose of sampling design.

3.6.1 Target population

This research aims to examine business faculty who work at universities situated in Punjab, India, and are accredited by the University Grants Commission (UGC). The UGC is a government body that evaluates HE institutions for compliance with established quality criteria. The study aims to obtain a comprehensive understanding of technology adoption and attitudes toward innovation among business faculty by including both private and public universities. By analyzing both types of universities, the research intends to compare differences in technology adoption and perceptions of innovation. Furthermore, universities offer a broader range of resources, such as infrastructure, job prospects, innovation, and skill development, to both educators and students compared to colleges.

3.6.2 Sampling frame

To ensure a representative sample, this study employed the quota sampling technique. First, a list of universities in Punjab that have been approved by the University Grants Commission (UGC) was obtained by searching the official UGC website. Next, an exhaustive search using the Google search engine was conducted to identify B-Schools within these universities that offer management, commerce, and economics programs. This process resulted in a preliminary list of potential schools, which was then refined based on inclusion criteria such as accreditation, reputation, and program offerings.

Table 6. List of Universities in Punjab Accredited by University Grants Commission

Sr. No.	Name	Type
1	Akal University	Private
2	Chandigarh University	Private
3	C.T. University	Private
4	D.A.V. University	Private
5	GNA University	Private
6	Chitkara University	Private
7	Lovely Professional University	Private
8	RIMT University	Private
9	Sri Guru Granth Sahib World University	Private
10	Rayat Bahra University	Private
11	Punjabi University	State
12	Panjab University	State

13	Guru Nanak Dev University	State
14	The I.K. Gujaral Punjab Technical University	State

The final list, consisting of 14 universities, is presented in Table 6. Of these, 10 are privately held, while the remaining four are state-owned. This sampling approach was chosen to ensure that the sample is diverse and representative of the B-Schools in Punjab that offer management, commerce, and economics programs.

3.6.3 Sampling

For the purpose of this study, non-proportional quota sampling was used as the proportions within the population were not known (McFarland & Caceres, 2001). This method of sampling enables the acquisition of specific proportions of traits within a sample population, regardless of whether the numbers accurately reflect the proportions in the overall population (Etikan & Bala, 2017). With this method, a minimum percentage is specified that must be included rather than the percentage of the subgroup existent in the population (Alvi, 2016; Morrow *et al.*, 2007). Initially, it was decided to consider a sample size of 35 respondents from each business school, but due to low response rate and non-availability of faculty during data collection, the sample decided from each business school was reduced to 25 with an overall total of 350 respondents from all the business schools considered for the study. So, the sampling and data collection for this doctoral study on the adoption of ICT by business faculties involved selection of 25 business faculties from each of the 14 B-Schools as the minimum number of respondents available from each institution were 25. This study focuses on faculty in the field of business who are appointed as lecturers, assistant professors, associate professors, or professors in the management, economics, and commerce departments of these B-Schools.

3.6.4 Data collection

This study involved the collection of primary data from faculty members in business schools through online surveys. The process of participant selection included utilizing personal references, as well as employing various communication methods such as social media, email, and phone calls to maximize the response rate. Initially, the target was set at 436 educators in July 2020. However, due to a lack of responsiveness to messages and calls, as well as limited activity on social media platforms, a minimum viable response was sought from each institution. Initially, 121 responses were received, and this number gradually increased to 392 complete responses after sending reminder messages. Subsequently, 22 incomplete responses were excluded. Given that the minimum obtainable sample from each business school was 25, this number was deemed final. The data collection process concluded over a span of approximately eleven months, commencing in July 2020 and concluding in June 2021. This timeline afforded sufficient time to secure an adequate sample size from each business school and facilitated effective data collection endeavors. The response rate ultimately averaged around 80%.

3.7 Data cleaning

As part of the quality assurance process, the responses were carefully examined to ensure the accuracy and reliability of the data. One important issue that was examined was the occurrence of "straight-lining," which refers to the tendency of respondents to provide the same answer or rating for all questions, regardless of the content. Upon examination, it was found that 22 cases of straight-line response patterns were observed in the dataset. Therefore, it was necessary to eliminate such responses before proceeding with data analysis. It ensured that the data was accurate, reliable, and free from any biases that could have potentially skewed the results. The thorough examination of responses is crucial in ensuring that the data collected is of high quality and represents the true opinions and experiences of the respondents.

3.8 Data distribution

As per Razali & Wah (2011), Shapiro-Wilk and Kolmogorov-Smirnov are the most robust tests for all distribution types and sample sizes. So, to test the normality of the data, these tests were carried out. The results of these tests are illustrated in Table 7.

Table 7: Details of Tests of Normality

Items	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
PE1	.389	350	.000	.592	350	.000
PE2	.330	350	.000	.677	350	.000
PE3	.297	350	.000	.693	350	.000
PE4	.330	350	.000	.711	350	.000
EE1	.245	350	.000	.811	350	.000
EE2	.196	350	.000	.859	350	.000
EE3	.233	350	.000	.839	350	.000
EE4	.243	350	.000	.814	350	.000
SI1	.194	350	.000	.877	350	.000
SI2	.190	350	.000	.880	350	.000
SI3	.225	350	.000	.854	350	.000
SI4	.200	350	.000	.854	350	.000
BI1	.318	350	.000	.684	350	.000
BI2	.300	350	.000	.761	350	.000
BI3	.223	350	.000	.834	350	.000
SE1	.282	350	.000	.792	350	.000
SE2	.446	350	.000	.522	350	.000
SE3	.189	350	.000	.883	350	.000
SE4	.138	350	.000	.916	350	.000
FC1	.238	350	.000	.809	350	.000
FC2	.204	350	.000	.865	350	.000
FC3	.194	350	.000	.899	350	.000
FC4	.280	350	.000	.834	350	.000
FC5	.210	350	.000	.789	350	.000
FC6	.232	350	.000	.777	350	.000
OC1	.356	350	.000	.734	350	.000
OC2	.317	350	.000	.795	350	.000
OC3	.260	350	.000	.857	350	.000

OC4	.205	350	.000	.871	350	.000
OC5	.178	350	.000	.863	350	.000
OC6	.186	350	.000	.865	350	.000
OC7	.324	350	.000	.793	350	.000
OC8	.298	350	.000	.839	350	.000
a. Lilliefors Significance Correction						

As the significance level is less than 0.05, the data distribution was found to be non-normal. This test confirms that these deviations are significant.

3.9 Constructs and items used in measurement model

The table 8 below shows the details of various items used in the measurement model. These items have been adopted from the previous studies as mentioned in the table 3.

Table 8. Details of the Items for Various Constructs Used in the Measurement Model

Construct	Item Code	Items
Organizational Culture (OC)	OC1	Most people at my institute have input into the decisions that affect them.
	OC2	Cooperation and collaboration across various departments is actively encouraged at my institute.
	OC3	There is a high level of agreement about the way that we do things at my institute.
	OC4	The approach to execute tasks is very consistent and predictable at my institute
	OC5	Stakeholders' comments and recommendations often lead to changes at my institute.
	OC6	My institute is very responsive and changes easily.
	OC7	My institute has a long-term purpose and direction.
	OC8	There is a shared vision of what my institute will be like in the future.
Facilitating Conditions (FC)	FC1	There is an adequate provision of training in my institute to facilitate the utilization of ICT in teaching activities.

	FC2	There is a technical help available if required while using ICT in teaching activities.
	FC3	Adequate ICT infrastructure is available at my institute when I need it.
	FC4	My institute has a well-framed ICT usage policy.
	FC5	My institute gives due attention to the use of ICT in teaching activities.
	FC6	The ICT infrastructure at my institute is maintained properly.
Performance Expectancy (PE)	PE1	I find ICT useful in my daily teaching activities.
	PE2	Using ICT in teaching activities enables me to accomplish tasks more quickly. (e.g., Completing the topic, assessing assignments, etc.)
	PE3	Using ICT in teaching activities increases my productivity.
	PE4	If I use ICT in teaching activities, I will increase my chances of achieving the course outcomes.
Effort Expectancy (EE)	EE1	My interaction with ICT systems is clear and understandable.
	EE2	Learning how to use ICT systems is easy for me
	EE3	It is easy for me to become skillful at using ICT.
	EE4	I find ICT systems easy to use.
Social Influence (SI)	SI1	People who are important to me think that I should use ICT in teaching activities.
	SI2	People who influence my behaviour think that I should use ICT in teaching activities.
	SI3	People whose opinions I value prefer that I should use ICT in teaching activities.
	SI4	The administration of my institute has been helpful in the use of ICT in teaching activities.
Technology Self-Efficacy (SE)	SE1	I could complete my teaching activities using the ICT system if I had never used a system like it before.
	SE2	I could complete my teaching activities using the ICT system if I had only the system manuals for reference.
	SE3	I could complete my teaching activities using the ICT system if I had seen someone else using it before.
	SE4	I could complete my teaching activities using the ICT system if I had just the built-in help facility for assistance.
Behavioural Intention to Use Technology	BI1	I intend to continue using ICT in teaching activities in the future.
	BI2	I plan to continue to use ICT frequently.
	BI3	I will always try to use ICT in my teaching activities.

3.10 Technique for data analysis

The research utilized several software programs for data analysis, including SPSS (Statistical Package for the Social Sciences), SmartPLS 3, and MS Excel. Descriptive statistics were generated using SPSS 20.0 and MS Excel, while the PLS-SEM technique was employed to specify the model, measure variables, and test moderators, as outlined by Hair *et al.* (2011).

3.11 Data characteristics and statistical tests used

The current study was carried out with a total of 350 responses from participants as its sample size. The analysis of the data is carried out without the constraints of any distributional assumptions. For data analysis, the following techniques have been used:

3.11.1 Objective 1: To study the socio-economic characteristics of business faculties of universities of Punjab.

- Categorical variables such as gender, age-group, qualification, department, employment type, ICT experience in teaching, voluntariness to use ICT, and institution name were used for the analysis.
- Descriptive statistics were used to analyze the data, specifically through pivot tables in MS Excel.
- Pivot tables were created in MS Excel to summarize and aggregate the collected data, allowing for a comprehensive understanding of the demographic characteristics of the business faculties in the universities of Punjab.

3.11.2 Objective 2: To examine the frequency of ICT usage by the business faculties in their classroom instruction.

- Descriptive statistics were used to analyze the frequency of usage of various classroom technologies by teachers, specifically through pivot tables in MS Excel.

- Each classroom's teaching technology usage was measured on a five-point Likert scale, with 1 = never, 2 = rarely, 3 = sometimes, 4 = often and 5 = always. This type of frequency scale has been widely used in past studies on technology use in education (Morahan-Martin & Schumacher, 2000; Ghavifekr *et al.*, 2016; Alharthi, 2020; Al-Aufi & Fulton, 2014; Lin *et al.*, 2016).
- Pivot tables were created in MS Excel to summarize and aggregate the collected data, for a comprehensive understanding of the frequency of usage of various ICT tools by business faculties, gender-wise, age-group-wise, and department-wise.

3.11.3 Objective 3: To examine the factors shaping the behavioral intention of business faculties towards the adoption of ICT in classroom instruction.

- The PLS-SEM approach was chosen to be utilized in this research study because it was suitable for this research endeavor taking into consideration the data features of the current study (Hair *et al.*, 2014; Henseler *et al.*, 2009).
- In order to accomplish the goals of this objective, a model of the reflective-reflective type has been used. OC, PE, EE, SI, FC, and ICT SE were used as exogenous constructs in this study and were measured on a 7-point Likert scale. The BI to use ICT is the endogenous construct used in the structural model, which was also measured on a 7-point Likert scale. Cooper *et al.* (2012) described that 7-point scales are a better approximation of a normal response curve that extracts more diversity among respondents. Furthermore, information system researchers (Venkatesh and Bala, 2008; Venkatesh *et al.*, 2003; Venkatesh and Davis, 2000; Davis, 1989) used a 7-point scale in their respective studies. The data was gathered utilizing a 7-point Likert scale, which is categorized as an ordinal scale according to the work of Likert (1932) and the variation of responses is represented over the continuum of responses by providing two moderate opinions ('Moderately Agree' and 'Moderately Disagree') along with two extremes ('Strongly Agree' and 'Strongly Disagree'), two intermediates (‘Somewhat Agree’ and ‘Somewhat Disagree’), and one neutral opinion (‘Neither Agree nor Disagree’) to the respondents.

- Gender, age, ICT experience in teaching, and department were used as moderating variables in the path model to explain the relationships between PE, EE, SE, SI, FC, and BI.
- The scale ran from one to seven, with seven representing a positive evaluation as the response "strongly agree" and one representing a negative evaluation as the response "strongly disagree.
- For data analysis, structural equation modeling was used to validate the results between various constructs (Hair *et al.*, 2012; Henseler *et al.*, 2009).
- To check the moderating effects of gender, ICT experience in teaching, age-group, and department, the multi-group analysis technique was used.

3.10.4 Objective 4: To investigate the business faculties' perceptions of barriers to integrate ICT in classroom instruction.

- A 14-item instrument was developed from the previous studies and measured on a Likert scale with five alternatives ranging from 1= strongly disagree to 5 = strongly agree.
- An exploratory factor analysis technique utilizing the principal axis factoring technique and a varimax rotation was applied for the identification of underlying variables. Further, to check the group differences, a two-way ANOVA technique was used. SPSS 20.0 software was used to apply these techniques.

3.10.5 Objective 5: To check the awareness level of business faculties towards the integration of artificial intelligence in classroom instruction.

- In order to evaluate the level of awareness of AI in classroom instruction, a set of six statements on an ordinal scale with five options (ranging from "Not at all aware" to "Extremely aware") were utilized to describe AI. Additionally, various AI tools and technologies mentioned in the review of literature were identified, and instructors were requested to indicate their familiarity with these options using a standard scale (ranging from "Not at all familiar" to "Extremely familiar").

- In order to assess how faculty perceive the potential advantages of AI for educators, a list of eight benefits was provided and evaluated using a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree).
- For data analysis, descriptive statistics were used through pivot tables in MS Excel.

3.12 Chapter summary

This chapter provides a comprehensive explanation of the research design used for this study. To ensure the reliability of the research instrument, a pilot study was conducted among 35 respondents, and the subsequent 350 responses were utilized for further data analysis. The chapter delves into the research design, including the data collection process, data cleaning, and the specifics of the data distribution. Additionally, the chapter outlines the measurement instruments employed for data collection, including the structural model, measurement models, and items used.

CHAPTER-4
DEMOGRAPHIC INFORMATION OF THE BUSINESS FACULTIES

Chapter overview

This chapter aims to evaluate the socio-economic characteristics of business faculties in universities across the Punjab region of India. A sample of 350 respondents was taken from 14 B-Schools associated with universities accredited by the University Grants Commission (UGC). The study examines the distribution of respondents on the basis of gender, age-group, experience in teaching through ICT, and association with management, commerce, and economics departments at each university. This chapter provides valuable insights into the demographic information of business faculties in Punjabi universities, which can be used to inform future policies and practices in HE.

4.1 Gender-wise distribution of responses across universities

Table 9 below displays the breakdown of female and male responses by university. For each university, the total number of female and male respondents is listed in a frequency table. There were a total of 350 respondents (192 female and 158 male) among all participating universities, as shown in the grand total row. Based on the data in the table, Lovely Professional University has the highest female response rate (18) compared to the other universities, while GNA University has the lowest (10). However, Rayat Bahra University has the highest number of male respondents (15 total) of any university. With 8 male respondents each, Sri Guru Granth Sahib World University and D.A.V. University tie for the lowest number of male respondents among all universities.

Table 9. Gender-Wise Distribution of Responses Across Universities

University	Female	Male	Grand Total
Akal University	12	13	25
Chandigarh University	16	9	25
C.T. University	13	12	25
D.A.V. University	17	8	25
GNA University	10	15	25
Chitkara University	13	12	25

Lovely Professional University	18	7	25
Panjab University	13	12	25
Sri Guru Granth Sahib World University	17	8	25
Punjabi University	13	12	25
Rayat Bahra University	10	15	25
RIMT University	13	12	25
Guru Nanak Dev University	14	11	25
The I.K. Gujaral Punjab Technical University	13	12	25
Grand Total	**192**	**158**	**350**

4.2 Department-wise distribution of responses across universities

For the purpose of the study, a sample of 350 respondents was taken from 14 B-Schools across the Punjab region of India. These B-Schools were selected based on their association with the universities that are accredited by the University Grants Commission (UGC). Although there are 26 universities in Punjab that are accredited by UGC, these have been narrowed down to 14 on the basis of the presence of management, commerce, and economics departments in each university. According to the table 10 below, most of respondents belong to the management department, with a total of 136, followed by the commerce department, with a total of 113, and the least number of respondents belong to the economics department, with a total of 101. Furthermore, when compared to other universities, Punjabi University has the highest number of respondents who work in the commerce department, followed by I.K. Gujaral Punjab Technical University, which has the highest number of respondents in the management department, and Akal University and GNA University, which have the highest number of respondents in their economics departments.

Table 10. Department-Wise Distribution of Responses Across Universities

Sr. No.	University	Type	Commerce	Economics	Management	Grand Total
1	Akal University	Private	9	10	6	25
2	C.T. University	Private	10	5	10	25
3	Chandigarh University	Private	8	6	11	25
4	Chitkara University	Private	8	7	10	25
5	D.A.V. University	Private	10	6	9	25
6	GNA University	Private	7	10	8	25

7	Guru Nanak Dev University	State	8	7	10	25
8	Lovely Professional University	Private	7	6	12	25
9	Panjab University	State	8	8	9	25
10	Punjabi University	State	11	5	9	25
11	Rayat Bahra University	Private	7	8	10	25
12	RIMT University	Private	8	8	9	25
13	Sri Guru Granth Sahib World University	Private	6	9	10	25
14	The I.K. Gujaral Punjab Technical University	State	6	6	13	25
Grand Total			**113**	**101**	**136**	**350**

4.3 Age-wise distribution of responses across departments

According to the Table 11, most of the respondents are between the ages of 31 and 35. This reflects the fact that B-Schools are taking advantage of young talent to improve their services. Further, if observed department-wise, most of the faculty in commerce and management departments belong to the age-group of 31–35 years, except in the case of economics departments, where most of the faculty fall in the elderly age-group of 40–45 years. This reflects the fact that universities are utilizing the benefits of experienced faculty in their economics departments.

Table 11. Age-Wise Distribution of Responses Across Departments

Department	**Age-group**					
	30 Years and Below	**31-35 Years**	**36-40 Years**	**40-45 Years**	**Above 45 Years**	**Grand Total**
Commerce	12	39	24	21	17	113
Economics	11	28	13	30	19	101
Management	6	45	23	43	19	136
Grand Total	**29**	**112**	**60**	**94**	**55**	**350**

4.4 Age-wise distribution of responses across universities

The age-wise division of respondents at university level is shown in Table 12. It can be observed that the highest number of respondents from RIMT University and Chitkara University belong to the elderly age-groups of 40–45 years and above 45 years. It is worth noting that very few respondents fall in the younger age-group of 30 years and below when considering the entire sample. The maximum number of respondents fall in the age-group is 31-35 years and the least number of respondents belong to the age-group of 30 years and below. Overall, it can be observed that maximum number of respondents belong to younger age-groups.

Table 12. Age-Wise Distribution of Responses Across Universities

	Age-groups					
University	**30 Years and Below**	**31-35 Years**	**36-40 Years**	**40-45 Years**	**Above 45 Years**	**Grand Total**
Akal University	0	5	0	16	4	25
C.T. University	3	3	12	4	3	25
Chandigarh University	3	4	10	4	4	25
Chitkara University	5	2	3	5	10	25
D.A.V. University	0	13	2	9	1	25
GNA University	3	9	3	5	5	25
Guru Nanak Dev University	2	8	2	4	9	25
Lovely Professional University	3	12	2	6	2	25
Panjab University	0	10	10	5	0	25
Punjabi University	1	5	8	8	3	25
Rayat Bahra University	3	5	8	5	4	25
RIMT University	0	6	0	19	0	25
Sri Guru Granth Sahib World University	2	15	0	3	5	25
The I.K. Gujaral Punjab Technical University	4	15	0	1	5	25
Grand Total	**29**	**112**	**60**	**94**	**55**	**350**

4.5 Gender-wise distribution of respondents across departments in universities

The Table 13 below represents the number of respondents, gender-wise, who are working in different departments (management, commerce, and economics) at various universities in Punjab, India. The university with the highest number of respondents in commerce is Punjabi University, with 11 respondents. The university with the highest number of respondents in Economics is Chandigarh University, with 11 respondents. The university with the highest number of respondents in management is Lovely Professional University, with 12 respondents. The gender-wise analysis of the number of respondents in each department at various universities is as follows:

Commerce: The highest number of female respondents was recorded at Punjabi University (6), and the lowest was recorded at the I.K. Gujaral Punjab Technical University (2). The highest number of male respondents was recorded at Chandigarh University (5), and the lowest was recorded at the I.K. Gujaral Punjab Technical University (1).

Economics: The highest number of female respondents was recorded at Chandigarh University (7), and the lowest was recorded at the I.K. Gujaral Punjab Technical University (2). The highest number of male respondents was recorded at Lovely Professional University (6), and the lowest was recorded at the I.K. Gujaral Punjab Technical University (2).

Management: The highest number of female respondents was recorded at Chandigarh University (7), and the lowest was recorded at Akal University (2). The highest number of male respondents was recorded at Lovely Professional University (8), and the lowest was recorded at Akal University (2).

Table 13. Gender-Wise Distribution of Respondents Across Departments in Universities

University	**Commerce**	**Economics**	**Management**	**Grand Total**
Akal University	**9**	**10**	**6**	**25**
Female	7	5	2	14
Male	2	5	4	11
C.T. University	**10**	**5**	**10**	**25**
Female	5	2	8	15
Male	5	3	2	10
Chandigarh University	**8**	**6**	**11**	**25**
Female	4	5	7	16
Male	4	1	4	9
D.A.V. University	**10**	**6**	**9**	**25**
Female	7	4	2	13
Male	3	2	7	12
GNA University	**7**	**10**	**8**	**25**
Female	2	7	4	13
Male	5	3	4	12

Guru Nanak Dev University	**8**	**7**	**10**	**25**
Female	6	3	5	14
Male	2	4	5	11
Lovely Professional University	**7**	**6**	**12**	**25**
Female	5	2	4	11
Male	2	4	8	14
Panjab University	**8**	**8**	**9**	**25**
Female	3	5	5	13
Male	5	3	4	12
Punjabi University	**11**	**5**	**9**	**25**
Female	6	3	5	14
Male	5	2	4	11
Chitkara University	**8**	**7**	**10**	**25**
Female	3	6	7	16
Male	5	1	3	9
Rayat Bahra University	**7**	**8**	**10**	**25**
Female	5	7	2	14
Male	2	1	8	11
RIMT University	**8**	**8**	**9**	**25**
Female	2	6	5	13
Male	6	2	4	12
Sri Guru Granth Sahib World University	**6**	**9**	**10**	**25**
Female	2	3	6	11
Male	4	6	4	14
The I.K. Gujaral Punjab Technical University	**6**	**6**	**13**	**25**
Female	5	4	6	15
Male	1	2	7	10
Grand Total	**113**	**101**	**136**	**350**

4.6 Gender and age-wise distribution of respondents across universities in Punjab

The Table 14 below provides information about the distribution of respondents across different universities, age-groups, and genders. In the given table, there are a total of six columns representing age-groups and universities. The first column, "University," represents the names of the universities. The remaining columns "30 Years and Below", "31-35 Years", "36-40 Years", "40-45 Years", and "Above 45 Years," represent the number of respondents in each of the corresponding age-groups for each university.

The table also includes the gender breakdown of the respondents, with the rows "Female" and "Male" showing the number of female and male respondents, respectively, for each university and age-group.

In terms of university-wise analysis, it can be observed that C.T. University has the highest number of respondents in the 31–35 year age-group (12), while RIMT University has the highest number of respondents in the 40–45 year age-group (19). In terms of age-group wise analysis, it can be observed that the largest age-group is 31–35 years old, with 112 total respondents. The smallest age-group is 30 years and below, with only 29 total respondents. The age-group with the highest number of female respondents is 31–35 years old (70 in total), while the age-group with the highest number of male respondents is 36–40 years old (60 in total). The highest number of females in various age-groups can be found at Chandigarh University (16 females), and the lowest number of females can be found at Guru Nanak Dev University (14 females). The highest number of males in various age-groups can be found at RIMT University (12 males), and the lowest number of males can be found at Panjab University (7 males). The universities with the highest number of respondents in various age-groups are as follows:

- 31-35 years: Sri Guru Granth Sahib World University (15 respondents)
- 36-40 years: The I.K. Gujaral Punjab Technical University (15 respondents)
- 40-45 years: RIMT University (19 respondents)

The universities with the lowest number of respondents in various age-groups are as follows:

- 30 years and below: Akal University and Panjab University (0 respondents)
- Above 45 years: Akal University and Panjab University (4 respondents each)

Table 14. Gender and Age-Wise Distribution of Respondents Across Universities in Punjab

University	30 Years and Below	31-35 Years	36-40 Years	40-45 Years	Above 45 Years	Grand Total
Akal University	**0**	**5**	**0**	**16**	**4**	**25**
Female	0	5	0	5	2	12
Male	0	0	0	11	2	13

C.T. University	**3**	**3**	**12**	**4**	**3**	**25**
Female	3	3	4	2	1	13
Male	0	0	8	2	2	12
Chandigarh University	**3**	**4**	**10**	**4**	**4**	**25**
Female	2	3	7	3	1	16
Male	1	1	3	1	3	9
Chitkara University	**5**	**2**	**3**	**5**	**10**	**25**
Female	2	0	3	4	4	13
Male	3	2	0	1	6	12
D.A.V. University	**0**	**13**	**2**	**9**	**1**	**25**
Female	0	7	1	8	1	17
Male	0	6	1	1	0	8
GNA University	**3**	**9**	**3**	**5**	**5**	**25**
Female	2	1	0	2	5	10
Male	1	8	3	3	0	15
Guru Nanak Dev University	**2**	**8**	**2**	**4**	**9**	**25**
Female	1	3	2	4	4	14
Male	1	5	0	0	5	11
Lovely Professional University	**3**	**12**	**2**	**6**	**2**	**25**
Female	3	8	1	5	1	18
Male	0	4	1	1	1	7
Panjab University	**0**	**10**	**10**	**5**	**0**	**25**
Female	0	4	5	4	0	13
Male	0	6	5	1	0	12
Punjabi University	**1**	**5**	**8**	**8**	**3**	**25**
Female	1	4	5	3	0	13
Male	0	1	3	5	3	12
Rayat Bahra University	**3**	**5**	**8**	**5**	**4**	**25**
Female	1	0	5	2	2	10
Male	2	5	3	3	2	15
RIMT University	**0**	**6**	**0**	**19**	**0**	**25**
Female	0	6	0	7	0	13
Male	0	0	0	12	0	12
Sri Guru Granth Sahib World University	**2**	**15**	**0**	**3**	**5**	**25**
Female	2	9	0	1	5	17
Male	0	6	0	2	0	8
The I.K. Gujaral Punjab Technical University	**4**	**15**		**1**	**5**	**25**
Female	3	5	0	1	4	13
Male	1	10	0	0	1	12

Grand Total	**29**	**112**	**60**	**94**	**55**	**350**

4.7 Distribution of respondents by university and qualification

The table 15 below shows the distribution of respondents across different universities and their qualifications. The qualifications considered are a doctorate and a master's degree. In total, there are 350 respondents, with 177 having a doctorate and 173 having a master's degree. It can be observed from the table that Punjabi University has the highest number of doctorate respondents (16), while GNA University has the lowest (7). On the contrary, GNA University has the highest number of Masters respondents (18) and Punjabi University has the least (5). When considering gender, the number of male respondents with doctorate and masters qualifications is close in most of the universities. However, the number of female respondents with doctorates is lower compared to those with master's degrees in most of the universities. Overall, the data shows a roughly equal distribution of respondents with doctorate and masters qualifications, with slightly more respondents having doctorates.

Table 15. Distribution of respondents by University and Qualification

University	Doctorate	Masters	Grand Total
Akal University	**14**	**11**	**25**
Female	5	7	12
Male	9	4	13
C.T. University	**10**	**15**	**25**
Female	3	10	13
Male	7	5	12
Chandigarh University	**11**	**14**	**25**
Female	7	9	16
Male	4	5	9
Chitkara University	**16**	**9**	**25**
Female	8	5	13
Male	8	4	12
D.A.V. University	**19**	**6**	**25**
Female	14	3	17
Male	5	3	8
GNA University	**7**	**18**	**25**
Female	3	7	10

Male	4	11	15
Guru Nanak Dev University	**17**	**8**	**25**
Female	11	3	14
Male	6	5	11
Lovely Professional University	**10**	**15**	**25**
Female	6	12	18
Male	4	3	7
Panjab University	**12**	**13**	**25**
Female	6	7	13
Male	6	6	12
Punjabi University	**20**	**5**	**25**
Female	9	4	13
Male	11	1	12
Rayat Bahra University	**12**	**13**	**25**
Female	5	5	10
Male	7	8	15
RIMT University	**8**	**17**	**25**
Female	5	8	13
Male	3	9	12
Sri Guru Granth Sahib World University	**9**	**16**	**25**
Female	6	11	17
Male	3	5	8
The I.K. Gujaral Punjab Technical University	**12**	**13**	**25**
Female	7	6	13
Male	5	7	12
Grand Total	**177**	**173**	**350**

4.8 Teaching experience through ICT among respondents in universities of Punjab

The Table 16 below shows the respondents' experiences in teaching through ICT. Based on the data, most of the respondents (104 out of 350, or 29.7%) have between 1 and 5 years of experience in teaching through ICT. This is followed by a group of 91 respondents (26%) who have 6–10 years of experience. Another 85 respondents (24.3%) have 11–15 years of experience. On the contrary, a smaller group of 25 respondents (7.1%) have less than 1 year of experience, and 45 respondents (12.9%) have more than 15 years of experience in teaching through ICT.

Based on the data in the Table 16 , it can be observed that the number of respondents from each university with experience in teaching through ICT varies. The universities with the highest number of respondents with experience are:

- D.A.V. University has 14 respondents with 1–5 years of experience.
- RIMT University had 18 respondents with 11–15 years of experience.
- Chitkara University has 10 respondents with more than 15 years of experience.

The universities having respondents with the lowest number of years of experience are:

- Akal University has 5 respondents who have less than 1 year of experience.
- Sri Guru Granth Sahib World University with two respondents who have less than one year of experience
- Chandigarh University with 1 respondent who has less than 1 year of experience

In conclusion, it can be observed that the experience of the respondents in teaching through ICT varies by university.

Table 16. Table Showing Respondent's Teaching Experience Through ICT

University	**Experience in Teaching through ICT**					
	Less than 1 Year	**1-5 Years**	**6-10 Years**	**11-15 Years**	**More than 15 Years**	**Grand Total**
Akal University	0	5	4	12	4	25
C.T. University	3	3	15	2	2	25
Chandigarh University	1	5	12	3	4	25
Chitkara University	5	2	5	3	10	25
D.A.V. University	0	14	3	8	0	25
GNA University	3	7	6	5	4	25
Guru Nanak Dev University	3	7	4	2	9	25
Lovely Professional University	0	11	5	9	0	25
Panjab University	0	10	11	4	0	25
Punjabi University	1	5	11	8	0	25
Rayat Bahra University	3	5	10	4	3	25
RIMT University	0	4	3	18	0	25
Sri Guru Granth Sahib World University	2	12	0	7	4	25

The I.K. Gujaral Punjab Technical University	4	14	2	0	5	25
Grand Total	**25**	**104**	**91**	**85**	**45**	**350**

4.9 Other demographic information

The Table 17 below illustrates the demographic information of business faculties who work in universities in Punjab in terms of their academic position held, employment type, and voluntariness to use ICT in teaching. The findings reveal that a majority of the faculties hold the position of assistant professor (70.57%), followed by associate professors (23.42%), professors (6.00%), and lecturers (7.71%). In terms of employment type, regular employees constitute the majority (82.0%) compared to contractual employees (18.00%). Furthermore, a significant percentage of faculties report that the use of ICT in teaching is always mandatory (69.71%), followed by sometimes mandatory (20.00%), and not at all mandatory (10.28%).

These findings have several implications for universities in Punjab. First, most of faculties hold the position of assistant professor, indicating a need to recruit more experienced professors to maintain a balance in the academic workforce. Second, while regular employment is the norm, contractual employment should be offered with care and consideration to ensure job security and fair remuneration. Finally, the high percentage of faculties who report that the use of ICT in teaching is always mandatory highlights the need for universities to provide adequate training and resources to support their use of technology in teaching. Overall, these findings can guide universities in Punjab to enhance their recruitment policies, employment practices, and technology support services to better support their faculties and students.

Table 17. Table Showing Other Demographic Information of the Respondents

Demographic variables	**Options**	**Frequency**	**Percentage**
Academic position held	Lecturer	27	7.71%
	Assistant Professor	247	70.57%
	Associate Professor	82	23.42%
	Professor	21	6.00%

Employment type	Regular	287	82.00%
	Contractual	63	18.00%
Voluntariness to use ICT in teaching	Always Mandatory	244	69.71%
	Sometimes Mandatory	70	20.00%
	Not at all Mandatory	36	10.28%

4.10 Chapter summary

The findings highlight the prevalence of young faculty in commerce and management departments, while the economics departments tend to have a more experienced faculty. The gender-wise analysis suggests that there is still a gender gap in the representation of female faculty, especially in certain departments and universities. The data also reveal variations in the distribution of respondents across universities, age-groups, and genders. While some universities have a higher concentration of faculty in a particular age-group or department, others have a more balanced distribution. Overall, this study serves as a useful reference for policymakers and academic institutions to improve the representation and diversity of their faculty and to take advantage of the strengths and experiences of different age-groups and genders in their respective fields. This can lead to a more inclusive and diverse academic environment that fosters innovation, creativity, and excellence in teaching and research.

CHAPTER-5
FREQUENCY OF BUSINESS FACULTIES' USE OF ICT

Chapter overview

In B-School education, using ICT well has become a key part of providing high-quality learning activities that encourage engagement, interaction, and new ideas. Different digital tools and platforms have changed how teachers plan, deliver, and evaluate learning experiences. ICT can offer many different options, such as delivering multimedia content, making it easier for students to work together and talk to each other, and automating routine tasks to make them more efficient. Therefore, this objective seeks to examine the current usage of ICT in classroom instruction among faculty teaching at B-Schools. By gaining insights into the current practices, we can identify potential areas for improvement and suggest ways to enhance classroom instruction through the effective utilization of digital tools. This objective aims to provide a comprehensive analysis of the frequency of usage of various digital tools and platforms in classroom instruction, including desktop computers, laptops, tablets, projectors, audio equipment, smart boards, digital cameras, educational websites, online assessment tools, social media, etc. on the basis of gender, age-group, and department. By understanding this, targeted interventions can be designed to promote the use of digital tools among faculty. Overall, this objective seeks to promote equal opportunities for all faculty to benefit from the use of ICT in classroom instruction, leading to improved learning outcomes for students.

5.1 Desktop computer

The following section provides an overview of how business faculties use desktop computers in their classroom instruction, with a focus on their gender, age-group, and department. The section also includes a detailed analysis of the findings and their potential implications for the future of teaching and learning in B-Schools.

5.1.1 Gender-wise usage of desktop computers

Table 18 shows the percentage of female and male faculty of B-Schools in Punjab who use desktop computers in teaching, classified by the frequency of their usage. The data shows that there is a higher percentage of female faculty who never use desktop computers compared to male faculty (30.21% vs. 22.78%). On the contrary, a higher percentage of male faculty often use desktop computers compared to female faculty (12.66% vs. 9.38%). The data also reveals that there is a higher percentage of both female and male faculty who use desktop computers rarely (44.36% for males and 33.85% for females). Additionally, a higher percentage of female faculty sometimes use desktop computers compared to male faculty (22.40% vs. 16.46%). These findings suggest that there is a disparity in the usage of desktop computers in teaching between female and male faculty in B-Schools in Punjab. Overall, the usage of desktop computer by business faculties was observed to be low by the business faculties.

Table 18. Gender-Wise Frequency of Usage of Desktop Computers by Business Faculties

Frequency	**Female**	**Male**
Always	4.17%	3.74%
Never	30.21%	22.78%
Often	9.38%	12.66%
Rarely	33.85%	44.36%
Sometimes	22.40%	16.46%
Grand Total	**100.00%**	**100.00%**

5.1.2 Age-wise usage of desktop computers

Table 19 below represents the frequency of desktop computer usage by the faculty of B-Schools in Punjab, divided into five age-groups. The results indicate that the age-group with the highest percentage of faculty who use desktop computers often is the 31–35 year age-group, at 17.86%. The lowest percentage of faculty who use desktop computers often is in the 40–45 and 36-40 years age-groups, at 3.19% and 10%, respectively. The age-group with the highest percentage of faculty who never use desktop computers is 40-45 years group, at 30.91%. The age-group with the lowest percentage of faculty who never use desktop computers is the 36–40 year group, at 6.67%.

Table 19. Age-Wise Frequency of Usage of Desktop Computers by Business Faculties

Frequency	**Age-group**				
	30 Years and Below	**31-35 Years**	**36-40 Years**	**40-45 Years**	**Above 45 Years**
Never	24.03%	28.57%	6.67%	30.91%	24.55%
Rarely	31.03%	35.71%	55.07%	32.36%	39.00%
Sometimes	27.91%	10.71%	25.03%	25.53%	12.55%
Often	10.34%	17.86%	10.00%	3.19%	13.91%
Always	6.69%	7.15%	3.23%	8.01%	9.99%
Grand Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

5.1.3 Department-wise usage of desktop computers

The Table 20 presents data regarding the frequency of usage of desktop computers in classroom instruction among the faculty of management, commerce, and economics departments of B-Schools in Punjab. The findings indicate a low frequency of desktop computer usage in the classroom instruction of these departments. The economics department has the highest percentage of faculty who never use desktop computers in their classroom instruction (54.01%), followed by the commerce department (41.28%). On the contrary, the lowest percentage of faculty who never use desktop computers in their classroom instruction can be found in the management department (37.24%). When it comes to frequency of usage, the commerce department has the highest percentage of faculty who use desktop computers either rarely (33.86%) or sometimes (17.70%). The category "always" had the lowest percentage of usage across all departments, with the highest being in the economics department (3.93%). In conclusion, the data indicates a limited utilization of desktop computers in the classroom instruction of the faculty of management, commerce, and economics departments in B-Schools in Punjab.

Table 20. Department-Wise Frequency of Usage of Desktop Computers by Business Faculties

Frequency	**Department**		
	Commerce	**Economics**	**Management**
Always	1.77%	3.93%	2.94%
Rarely	33.86%	22.34%	25.74%

Often	5.39%	8.91%	11.03%
Never	41.28%	54.01%	38.24%
Sometimes	17.70%	10.81%	22.06%
Grand Total	**100.00%**	**100.00%**	**100.00%**

5.1.4 Findings

The overall findings from the data presented suggest that there is a disparity in the usage of desktop computers in teaching between female and male faculty and between different age-groups and departments in B-Schools in Punjab. Female faculty have a higher percentage of never using desktop computers compared to male faculty, and they have a higher percentage of sometimes using desktop computers compared to male faculty. The age-group with the highest percentage of respondents rarely using desktop computers is the 31-35- and 36-40-year groups, while the highest percentage of respondents often using desktop computers is in the 36-40 year group. The economics department has the highest percentage of faculty who never use desktop computers in classroom instruction, while the commerce department has the highest percentage of faculty who use desktop computers either rarely or sometimes. The data overall indicates a limited utilization of desktop computers in the classroom instruction of business school faculty in Punjab.

5.1.5 Practical implications

As per the data presented, the future implications for B-Schools in Punjab are as follows:

a) **Bridging the gender gap:** B-Schools may need to take steps to address the disparity in the usage of desktop computers in teaching between female and male faculty. This could involve providing training and support for female faculty to increase their comfort and proficiency with using technology in the classroom.

b) **Age-specific training:** B-Schools may also consider offering targeted training and support for faculty in different age-groups according to their current level of technology usage. For example, those in the 31–35 and 36–40 year age-groups who rarely use desktop computers may need additional support to increase their usage.

c) **Department-specific training:** The differences in technology usage between the management, commerce, and economics departments suggest that departments may have different technology needs. B-Schools should consider offering department-specific training and support to address these needs and increase overall technology utilization in classroom instruction.

d) **Investment in technology:** To support the increased use of desktop computers in teaching, B-Schools may need to invest in technology infrastructure, such as updated hardware and software, to ensure that faculty have access to the tools they need to effectively integrate technology into their teaching.

In conclusion, the data highlights the need for B-Schools in Punjab to take a proactive approach to technology utilization in teaching in order to enhance the educational experience for students and keep pace with the rapidly changing technological landscape.

5.2 Tablet

The following section provides an overview of how business faculties use tablet in their classroom instruction, with a focus on their gender, age-group, and department. The section also includes a detailed analysis of the findings and their potential implications for the future of teaching and learning in B-Schools.

5.2.1 Gender-wise usage of tablets

The Table 21 presents the frequency data of tablet usage by female and male faculty in B-Schools in Punjab during classroom instruction. A comparative analysis of the data reveals that there is a disparity in tablet usage between female and male faculty. A higher percentage of female faculty (42.71%) often utilize tablets in teaching compared to male faculty (18.99%). Conversely, a greater proportion of male faculty (43.04%) never use tablets in teaching compared to female faculty (22.92%). Additionally, the data indicates that there is a higher percentage of male faculty (26.99%) who rarely use tablets in teaching compared to female faculty (18.23%). Furthermore, female faculty demonstrate a higher usage rate of always using tablets in teaching, with 7.81%, compared to male faculty, at 4.02%. These results suggest that there is a disparity in the usage of tablets by female and male faculty in B-Schools in Punjab during classroom instruction.

Table 21. Gender-Wise Frequency of Usage of Tablets by Business Faculties

Frequency	**Female**	**Male**
Always	7.81%	4.02%
Never	22.92%	43.04%
Often	42.71%	18.99%
Rarely	18.23%	26.99%
Sometimes	8.33%	6.96%
Grand Total	**100.00%**	**100.00%**

5.2.2 Age-wise usage of tablets

Table 22 represents the frequency of usage of tablets in classroom instruction by the faculty of B-Schools in Punjab, who have been categorized into various age-groups. According to the data, it can be observed that 34.03% of faculty aged 30 or below, as well as 33.93% of faculty aged 31 to 35, do not utilize tablets in their teaching practices. On the contrary, 43.75% of the faculty who are 36 to 40 years old often use a tablet in their classroom instruction. The percentage of faculty who rarely use a tablet in their classroom instruction ranges from 10.71% to 35.71%. The percentage of faculty who sometimes use a tablet range from 4.46% to 21.67%. Finally, the percentage of faculty who always use a tablet range from 3.05% to 12.35%. It indicates the different patterns and trends in the usage of tablets in teaching among the different age-groups.

Table 22. Age-Wise Frequency of Usage of Tablets by Business Faculties

Frequency	**Age-Group**				
	30 Years and Below	**31-35 Years**	**36-40 Years**	**40-45 Years**	**Above 45 Years**
Never	34.03%	33.93%	33.33%	34.04%	23.64%
Rarely	23.38%	10.71%	19.33%	21.28%	36.36%
Sometimes	12.00%	4.46%	21.67%	7.40%	14.64%
Often	18.24%	43.75%	16.67%	34.23%	18.09%
Always	12.35%	7.14%	9.00%	3.05%	7.27%
Grand Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

5.2.3 Department-wise usage of tablets

Table 23 represents how often the management, commerce, and economics departments of B-Schools in Punjab use tablets in their teaching. It shows that the different departments use tablets for teaching in different ways, with some departments using them more often than others. In terms of the highest usage rate, the commerce department has the highest percentage of faculty who use tablets either often (32.51%) or always (10.08%). On the contrary, the management department has the highest percentage of faculty who never use tablets in their classroom instruction (32.90%). The economics department falls in between, with a relatively equal split between those who never use tablets (26.73%), those who use them rarely (33.66%), and those who use them often (22.73%). The least frequent usage of tablets was found in the category "sometimes" across all departments, with the lowest percentage being in the economics department (6.89%). Overall, the results suggest that the use of tablets in classroom instruction is not as widespread as that of laptops, with a higher percentage of faculty not using them at all or only using them rarely. This may indicate a preference for other methods of teaching or a lack of access to or comfort with technology in the classroom.

Table 23. Department-Wise Frequency of Usage of Tablets by Business Faculties

Frequency	**Department**		
	Commerce	**Economics**	**Management**
Always	10.08%	9.99%	16.69%
Never	30.02%	26.73%	32.90%
Often	32.51%	22.73%	11.68%

Rarely	20.31%	33.66%	28.85%
Sometimes	7.08%	6.89%	9.88%
Grand Total	**100.00%**	**100.00%**	**100.00%**

5.2.4 Findings

The data on tablet usage by faculty in B-Schools in Punjab during classroom instruction shows disparities according to gender, age-group, and department. A higher percentage of female faculty use tablets often compared to male faculty, who have a higher percentage of never using tablets. The usage of tablets also varies among different age-groups, with older faculty using them more frequently. The highest usage rate was found in the commerce department, while the management department had the highest percentage of faculty who never use tablets. Overall, the results suggest that the use of tablets in teaching is not as widespread as laptops, with a preference for other methods or a lack of access to or comfort with technology in the classroom.

5.2.5 Practical implications

The data on tablet usage by faculty in B-Schools in Punjab has several future implications for the schools. Firstly, it highlights the need for gender-inclusive policies and programs to promote equal usage of technology in teaching. The disparity between female and male faculty in tablet usage may indicate a gender gap in access and comfort with technology, which needs to be addressed to ensure equitable teaching practices. Secondly, the varying usage of tablets among different age-groups indicates the need for age-inclusive technology training programs and support. The schools could provide training and support to faculty who are less comfortable with technology to help them integrate it into their teaching practices. Finally, the differences in tablet usage among different departments suggest that there may be a need for department-specific technology training programs. The schools could tailor their technology training programs to meet the specific needs and preferences of different departments, ensuring that all faculty have the necessary support to effectively use technology in their teaching practices. In conclusion, the data on tablet usage by faculty in B-Schools in Punjab has significant implications for the future of technology in education. The schools need to address the disparities in tablet usage and provide equal access and support to technology for all faculty, regardless of gender, age, or department.

5.3 Laptop

The following section provides an overview of how business faculties use laptops in their classroom instruction, with a focus on their gender, age-group, and department. The section also includes a detailed analysis of the findings and their potential implications for the future of teaching and learning in B-Schools.

5.3.1 Gender-wise usage of laptops

The Table 24 represents the frequency of laptop usage by business school faculty of both genders. The results indicate that a majority of the faculty, 69.79% of females and 73.42% of males, always use laptops in their classroom instruction. A small portion, 0.52% of females and 0.63% of males, never use laptops. About 22.40% of females and 14.56% of males often use laptops in their teaching, while a slightly larger portion, 2.60% of females and 6.96% of males, rarely use laptops. The remaining percentage of faculty, 4.69% of females and 4.43% of males, sometimes use laptops in their classroom instruction.

Table 24. Gender-Wise Frequency of Usage of Laptops by Business Faculties

Frequency	**Female**	**Male**
Always	69.79%	73.42%
Never	0.52%	0.63%
Often	22.40%	14.56%
Rarely	2.60%	6.96%
Sometimes	4.69%	4.43%
Grand Total	**100.00%**	**100.00%**

5.3.2 Age-wise usage of laptops

The Table 25 indicates the frequency of laptop usage in classroom instruction by the faculty of B-Schools in Punjab, who have been categorized into different age-groups.

It shows that most of the faculty (82.76%) in the age-group of 30 years and below always use laptops in their classroom instruction. Likewise, laptops are consistently utilized by a significant portion (71.43%) of faculty aged 31-35 years as an integral part of their instructional methods. In contrast, individuals above the age of 45 display a lower frequency of laptop usage, with only 45.09% of faculty relying on them consistently for their teaching endeavors. The data also shows that the usage of laptops is lowest among the faculty in the age-group of 36–40 years, with only 74.00% using them always in their classroom instruction. Overall, the table suggests that most of the faculty in the B-Schools of Punjab use laptops in their classroom instruction, but the frequency of usage varies with different age-groups.

Table 25. Age-Wise Frequency of Usage of Laptops by Business Faculties

Frequency	**Age-group**				
	30 Years and Below	**31-35 Years**	**36-40 Years**	**40-45 Years**	**Above 45 Years**
Always	82.76%	71.43%	74.00%	60.06%	45.09%
Never	1.03%	0.89%	1.82%	3.78%	12.82%
Often	10.79%	8.79%	13.46%	28.71%	27.27%
Rarely	3.40%	11.71%	7.39%	2.13%	13.00%
Sometimes	2.02%	7.18%	3.33%	5.32%	1.82%
Grand Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

5.3.3 Department-wise usage of laptops

The table 26 represents the frequency of laptop usage in classroom instruction by the faculty of management, commerce, and economics departments of B-Schools in Punjab. It indicates that most of the faculty in these departments use laptops in their classroom instruction, with the highest usage rate being found in the economics department (71.29%). This suggests that the faculty in this department rely heavily on technology in their teaching pedagogy. The commerce department follows closely behind with a usage rate of 59.36%, while the management department has a usage rate of 65.02%. On the contrary, there is a small portion of faculty who never use laptops in their classroom instruction, with the lowest percentage found in the economics department (0.99%).

Table 26. Department-Wise Frequency of Usage of Laptops by Business Faculties

Frequency	**Department**		
	Commerce	**Economics**	**Management**
Always	59.36%	71.29%	65.02%
Never	15.45%	0.99%	7.77%
Often	14.58%	18.81%	19.12%
Rarely	6.19%	2.97%	4.41%
Sometimes	4.42%	5.94%	3.68%
Grand Total	**100.00%**	**100.00%**	**100.00%**

5.3.4 Findings

The results indicate that a majority of the faculty in B-Schools in Punjab use laptops in their classroom instruction, with both female and male faculty having high usage rates. The faculty in the economics department have the highest usage rate of laptops, suggesting that they rely heavily on technology in their classroom instruction methods. Additionally, the frequency of laptop usage varies with age-groups, with the youngest age-group having the highest usage rate. In conclusion, the data suggests that the use of technology, specifically laptops, is widespread among the faculty in B-Schools in Punjab and is utilized in their classroom instruction. The department and age-group of the faculty seem to have an impact on the frequency of laptop usage in their classroom instruction.

5.3.5 Practical implications

As per the findings, the following suggestions could be made for B-Schools in the future:

a) **Encouragement of technology adoption:** The widespread use of laptops among faculty in B-Schools suggests that technology is important in classroom instruction. B-Schools can encourage the adoption of technology by providing the necessary resources, such as laptops, software, and training sessions.

b) **Emphasis on tech. integration:** B-Schools can integrate technology into their curricula and teaching pedagogy, especially in the economics department, where laptop usage is the highest. This will help prepare students for the digital age and increase their competitiveness in the job market.

c) **Age-specific technology support:** The findings indicate that laptop usage varies with age-groups, with the youngest age-group having the highest usage rate. B-Schools can provide targeted support and training to different age-groups to ensure that they are all equipped to effectively integrate technology into their classroom instruction.

d) **Investment in technology infrastructure:** B-Schools should invest in their technology infrastructure to provide reliable and fast internet access, upgrade hardware and software, and ensure the security of sensitive information.

In conclusion, the findings suggest that the use of technology, specifically laptops, is widespread among faculty in B-Schools in Punjab and has a significant impact on their classroom instruction. B-Schools should take these findings into consideration and make strategic investments to support the integration of technology into their classroom instruction methods.

5.4 Projectors

The following section provides an overview of how business faculties use projectors in their classroom instruction, with a focus on their gender, age-group, and department. The section also includes a detailed analysis of the findings and their potential implications for the future of teaching and learning in B-Schools.

5.4.1 Gender-wise usage of projectors

The table 27 shows results on the frequency of usage of projectors by business school faculty, classified by gender. According to the data, 50% of female faculty reported always using projectors in their classroom instruction, while 39.87% of male faculty reported the same. On the contrary, 10.42% of female faculty reported never using projectors, while 13.92% of male faculty reported the same. In terms of frequently using projectors, the percentage of female faculty was higher, at 23.44%, compared to 32.28% for male faculty. The percentage of both female and male faculty who reported rarely using projectors was low, with 3.65% for female faculty and 2.53% for male faculty. Lastly, 12.50% of female faculty and 11.39% of male faculty reported sometimes using projectors in their classroom instruction. It can be concluded that most ofbusiness school faculty, regardless of gender, reported using projectors frequently in their classroom instruction.

Table 27. Gender-Wise Frequency of Usage of Projectors by Business Faculties

Frequency	**Female**	**Male**
Always	50.00%	39.87%
Never	10.42%	13.92%
Often	23.44%	32.28%
Rarely	3.65%	2.53%
Sometimes	12.50%	11.39%
Grand Total	**100.00%**	**100.00%**

5.4.2 Age-wise usage of projectors

The table 28 below represents the frequency of usage of a projector in classroom instruction by the faculty of B-Schools in Punjab, who have been categorized into various age-groups. The data indicates that a significant majority of the faculty in the age-groups 31–35 years and 36–40 years have always used projectors in their classroom instruction (51.79% and 56.65%, respectively). Compared to the other age-groups, a higher percentage of faculty in the age-group 31–35 years have never used a projector (13.39%). On the contrary, a higher percentage of faculty over 45 have rarely used a projector (40.00%) compared to the other age-groups. In conclusion, the data suggests that the usage of projectors in classroom instruction varies among different age-groups of faculty. A higher percentage of younger faculty have always used projectors, while a higher percentage of older faculty have rarely used projectors.

Table 28. Age-Wise Frequency of Usage of Projectors by Business Faculties

Frequency	**Age-Group**				
	30 Years and Below	**31-35 Years**	**36-40 Years**	**40-45 Years**	**Above 45 Years**
Always	37.93%	51.79%	56.65%	40.43%	30.73%
Never	6.90%	13.39%	8.30%	15.96%	18.09%
Often	31.03%	14.29%	18.67%	30.87%	40.09%
Rarely	3.45%	8.92%	3.00%	2.10%	40.00%
Sometimes	20.69%	11.61%	13.38%	10.64%	7.09%
Grand Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

5.4.3 Department-wise usage of projectors

The table 29 displays the usage frequency of projectors in classroom instruction by the faculty of management, commerce, and economics departments in the B-Schools of Punjab. 31.79% of the commerce faculty always utilize projectors in their lessons, while 9.12% never do. The economics faculty has the highest percentage of members who always use projectors in their classroom instruction, at 42.57%, and the lowest percentage of members who never use them, at 11.88%. Meanwhile, 45.59% of the management faculty always use projectors, and 13.97% never do. The economics faculty also has the highest percentage of members often using projectors at 37.62%, while the lowest percentage of members rarely using them is 2.98%. In contrast, the commerce faculty has the highest percentage of members rarely using projectors at 16.54%. Overall, the management faculty has the highest usage frequency of projectors in their classroom instruction, followed by economics and then commerce.

Table 29. Department-Wise Frequency of Usage of Projectors by Business Faculties

Frequency	**Department**		
	Commerce	**Economics**	**Management**
Always	31.79%	42.57%	45.59%
Never	9.12%	11.88%	13.97%
Often	22.12%	37.62%	21.26%
Rarely	16.54%	2.98%	5.94%
Sometimes	20.43%	4.95%	13.24%
Grand Total	**100.00%**	**100.00%**	**100.00%**

5.4.4 Findings

As per the data, it can be concluded that most business school faculty, regardless of gender or department, reported using projectors frequently in their classroom instruction. However, the usage frequency of projectors varies among different age-groups of faculty, with younger faculty having a higher percentage of always using projectors and older faculty having a higher percentage of rarely using them. Additionally, the management faculty reported the highest usage frequency of projectors in their classroom instruction, followed by economics and then commerce.

5.4.5 Practical implications

Based on the data, there are several future implications for B-Schools:

a) **Emphasize technology in the classroom:** The data suggests that most of faculty, regardless of gender or department, use projectors frequently in their classroom instruction. This highlights the importance of technology in the classroom, and B-Schools should encourage faculty to use technology to enhance the learning experience for students.

b) **Focus on professional development for older faculty:** Older faculty are found to have a higher percentage of rarely using projectors in their classroom instruction. B-Schools should offer professional development opportunities for older faculty to help them integrate technology into their teaching practices.

c) **Emphasize the importance of using projectors in certain departments:** The data indicates that the management faculty has the highest usage frequency of projectors in their classroom instruction, followed by economics and then commerce. This suggests that B-Schools should place a particular emphasis on the usage of projectors in these departments to ensure that students receive the best possible learning experience.

d) **Consider student learning preferences:** The data also suggests that younger faculty use projectors more frequently compared to older faculty. B-Schools should consider the preferences of their students, who are likely to be of a younger age, and ensure that faculty are equipped with the necessary technology and skills to use projectors effectively in their classroom instruction.

Overall, the data highlights the need for B-Schools to prioritize technology in the classroom and provide the necessary resources and support to faculty to effectively integrate technology into their teaching practices.

5.5 Audio equipment

The following section provides an overview of how business faculties use audio equipment in their classroom instruction, with a focus on their gender, age-group, and department. The section also includes a detailed analysis of the findings and their potential implications for the future of teaching and learning in B-Schools.

5.5.1 Gender-wise usage of audio equipment

Table 30 presents the results on the frequency of audio equipment usage by female and male faculty in B-Schools in Punjab during classroom instruction. A comparative analysis of the data reveals that there is a disparity in audio equipment usage between female and male faculty. A higher percentage of female faculty (26.56%) sometimes utilize audio equipment in teaching compared to male faculty (22.15%). Conversely, a greater proportion of male faculty (32.91%) rarely use audio equipment in teaching compared to female faculty (27.08%). Additionally, the data indicates that there is a higher percentage of male faculty (12.66%) who often use audio equipment in teaching compared to female faculty (7.29%). Furthermore, both female and male faculty demonstrate similar usage rates of always using audio equipment in teaching, with 14.56% and 16.15%, respectively. These results suggest that there is a disparity in the usage of audio equipment by female and male faculty in B-Schools in Punjab during classroom instruction.

Table 30. Gender-Wise Frequency of Usage of Audio Equipment by Business Faculties

Frequency	**Female**	**Male**
Always	16.15%	14.56%
Never	22.92%	17.72%
Often	7.29%	12.66%
Rarely	27.08%	32.91%
Sometimes	26.56%	22.15%
Grand Total	**100.00%**	**100.00%**

5.5.2 Age-wise usage of audio equipment

The table 31 represents the frequency of usage of audio equipment by the faculty of B-Schools in Punjab, who have been categorized into various age-groups. The data suggests that the usage of audio equipment in classroom instruction varies greatly among the different age-groups. The frequency of usage of audio equipment among the faculty in the age-groups of 30 years and below and 31-35 years is relatively high, with 34.48% and 25.89% of the faculty in these age-groups using the equipment "sometimes" and "often," respectively. In contrast, a significantly lower proportion of faculty in the age-group above 45 years reported using audio equipment "always" (9.09%) and "often" (34.55%).

A considerable proportion of faculty in all age-groups reported "never" using audio equipment, with the highest percentage being in the 31-35 year age-group (19.64%) and the lowest in the 30 years and below age-group (6.90%). In conclusion, the usage of audio equipment in classroom instruction among the faculty of B-Schools in Punjab is influenced by the age of the faculty. A higher proportion of younger faculty reported using audio equipment more frequently in their classroom instruction, while a relatively lower proportion of older faculty used audio equipment.

Table 31. Age-Wise Frequency of Usage of Audio Equipment by Business Faculties

Frequency	**Age-Groups**				
	30 Years and Below	**31-35 Years**	**36-40 Years**	**40-45 Years**	**Above 45 Years**
Always	6.90%	29.46%	3.00%	14.89%	9.09%

Never	24.14%	19.64%	20.36%	19.15%	20.00%
Rarely	5.01%	8.04%	15.00%	12.77%	7.27%
Often	29.47%	16.96%	38.30%	35.11%	34.55%
Sometimes	34.48%	25.89%	23.33%	18.09%	29.09%
Grand Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

5.5.3 Department-wise usage of audio equipment

The table 32 displays the utilization of audio equipment by faculty in the management, commerce, and economics departments of B-Schools in Punjab during classroom instruction. Of the commerce department faculty, 16.81% always use audio equipment while teaching, and 31.87% rarely use it. Meanwhile, 23.01% of the faculty never use audio equipment in their teaching. In the economics department, 11.77% of the faculty always use audio equipment, while 29.70% rarely use it and 21.89% never use it. In the management department, the highest percentage of faculty, 27.34%, always use audio equipment, with 21.94% rarely using it and the lowest percentage, 10.91%, never using it. Among the three departments, the management department has the highest utilization of audio equipment in teaching, followed by commerce and then economics. The faculty of economics has the lowest rate of faculty who always use audio equipment, but it also has the lowest percentage of faculty who never use it.

Table 32. Department-Wise Frequency of Usage of Audio Equipment by Business Faculties

Frequency	**Department**		
	Commerce	**Economics**	**Management**
Always	16.81%	11.77%	27.94%
Never	23.01%	21.89%	10.91%
Often	6.19%	15.94%	22.79%
Rarely	31.87%	29.70%	21.94%
Sometimes	22.12%	20.70%	16.42%
Grand Total	**100.00%**	**100.00%**	**100.00%**

5.5.4 Findings

The utilization of audio equipment in classroom instruction by the faculty of B-Schools in Punjab is influenced by gender, age-group, and department. The data reveals a disparity in audio equipment usage between female and male faculty, with a higher percentage of male faculty rarely using it and a higher percentage of female faculty sometimes using it. The usage of audio equipment also varies among the different age-groups, with younger faculty using it more frequently compared to older faculty. Among the three departments, the management department has the highest utilization of audio equipment in teaching, followed by commerce and then economics. The data suggests that there is a need for more equal distribution of audio equipment usage among faculty, regardless of gender and age-group.

5.5.5 Practical implications

The findings of this study have significant implications for B-Schools in Punjab. Understanding the differences in audio equipment usage by gender, age-group, and department can inform decision-making processes on investment in audio equipment and support for faculty. B-Schools can use the results to ensure that audio equipment is made available and easily accessible to all faculty, especially those who have been found to have a lower usage rate. This will promote equality and equity in the teaching process and also ensure that all students have access to quality audio-visual resources. B-Schools can also review their policies and guidelines regarding the use of audio equipment to ensure that all faculty feel encouraged and supported to use it in their teaching.

5.6 Smart boards

The following section provides an overview of how business faculties use smart board in their classroom instruction, with a focus on their gender, age-group, and department. The section also includes a detailed analysis of the findings and their potential implications for the future of teaching and learning in B-Schools.

5.6.1 Gender-wise usage of smart boards

The table 33 displays the frequency of smart board usage in teaching by female and male faculty at B-Schools in Punjab. The data suggests that there is a difference in the utilization of smart boards by female and male faculty. While a higher percentage of female faculty—30.73%—use smart boards sometimes in teaching, a higher proportion of male faculty—31.01%—use them with the same frequency. On the contrary, a larger percentage of male faculty (34.81%) reported never using smart boards in teaching compared to female faculty (32.29%). Furthermore, a greater number of male faculty (21.52%) use smart boards often in teaching compared to female faculty (14.58%). Additionally, no male faculty reported always using smart boards in teaching, while 4.17% of female faculty do. These results indicate a discrepancy in the usage of smart boards by female and male faculty in B-Schools in Punjab during classroom instruction.

Table 33. Gender-Wise Frequency of Usage of Smart Boards by Business Faculties

Frequency	**Female**	**Male**
Always	4.17%	0.00%
Never	32.29%	34.81%
Often	14.58%	21.52%
Rarely	18.23%	12.66%
Sometimes	30.73%	31.01%
Grand Total	**100.00%**	**100.00%**

5.6.2 Age-wise usage of smart boards

The table 34 provides information on the frequency of usage of smart boards in classroom instruction by faculty of B-Schools in Punjab, who have been categorized into various age-groups. The results indicate that the usage of smart boards is relatively low among faculty in the age-group of 30 years and below, with only 2.0% of them using smart boards always in their classroom instruction. The usage of smart boards increases among faculty in the 31–35 age-group, with 7.14 percent of them using them always. However, the highest usage of smart boards is seen among faculty in the age-group of 36–40 years, where 37.92% of them use them sometimes. The table also shows that there is a higher frequency of never using smart boards among faculty in the age-group of 50 years and older, with 50.00% of them not using it in their classroom instruction. This indicates that older faculty may be less likely to adopt technology such as smart boards in their teaching pedagogy compared to their younger counterparts. Overall, the data suggests that the usage of smart boards in classroom instruction by faculty of B-Schools in Punjab is not widespread and varies greatly among different age-groups.

Table 34. Age-Wise Frequency of Usage of Smart Boards by Business Faculties

Frequency	**Age-Group**				
	30 Years and Below	**31-35 Years**	**36-40 Years**	**40-45 Years**	**Above 45 Years**
Always	2.00%	7.14%	3.75%	4.26%	1.30%
Never	20.69%	24.11%	21.67%	50.00%	35.06%
Often	13.79%	19.64%	37.92%	8.38%	9.09%
Rarely	27.59%	9.82%	26.67%	16.38%	25.45%
Sometimes	35.93%	39.29%	10.00%	20.98%	29.09%
Grand Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

5.6.3 Department-wise usage of smart boards

Table 35 represents the frequency of usage of the smart board in classroom instruction by the faculty of management, commerce, and economics departments of B-Schools in Punjab. In the commerce department, only 1.77% of the faculty reported using Smart Board always in their classroom instruction. On the contrary, nearly half (49.97%) of the faculty in the commerce department reported never using a smart board in their classroom instruction. In the economics department, 12.98% of the faculty reported using Smart Board always in their classroom instruction, and 37.62% reported never using it. In the management department, the highest percentage of faculty (16.94%) reported always using Smart Board in their classroom instruction, followed by sometimes (21.35%) and rarely (14.71%). Overall, the use of Smart Board in classroom instruction across all departments was reported to be low, with never and rarely being the most common responses. The faculty in the economics department reported the highest usage of the smart board in their classroom instruction among all departments.

Table 35. Department-Wise Frequency of Usage of Smart Boards by Business Faculties

Frequency	**Department**		
	Commerce	**Economics**	**Management**
Always	1.77%	12.98%	16.94%
Never	49.97%	37.62%	37.35%
Often	8.32%	10.47%	9.65%
Rarely	26.95%	10.84%	14.71%
Sometimes	12.99%	28.09%	21.35%
Grand Total	**100.00%**	**100.00%**	**100.00%**

5.6.4 Findings

The findings show that there is a discrepancy in the usage of smart boards in classroom instruction between female and male faculty in B-Schools in Punjab, with a higher percentage of male faculty using smart boards rarely or never compared to a higher percentage of female faculty using smart boards sometimes. The usage of smart boards also varies greatly among different age-groups, with older faculty being less likely to adopt technology in their classroom instruction methods. The use of smart board in classroom instruction across management, commerce, and economics departments was reported to be low, with never and rarely being the most common responses. The faculty in the economics department reported the highest usage of the smart board in their classroom instruction among all departments.

5.6.5 Practical implications

The findings on the usage of smart boards in classroom instruction by faculty in B-Schools in Punjab have several future implications for these institutions. Some of these implications are:

a) **Technology adoption:** The low usage of smart boards by some faculty, particularly older faculty, suggests that there may be a need for training and support in the adoption of technology in classroom instruction. B-Schools may need to invest in providing resources and support to help faculty become more comfortable and proficient in using technology in their teaching.

b) **Tech. integration:** The results show that there is a wide range of usage patterns among different departments and age-groups, indicating that there may not be a consistent approach to the integration of technology in classroom instruction across B-Schools. Strategies need to be developed for consistent and effective integration of technology in teaching to ensure that it is used to its full potential.

c) **Student Engagement:** Smart boards have the potential to enhance student engagement and learning outcomes by providing access to interactive and multimedia materials. However, the low usage of smart boards among some faculty suggests that some students may not be receiving these benefits. B-Schools should consider ways to increase the usage of smart boards among faculty to provide students with the full benefits of technology-enhanced learning.

d) **Professional Development:** B-Schools may also need to invest in professional development opportunities for faculty to keep up with the latest trends and best practices in technology-enhanced teaching. This will help ensure that faculty are equipped with the skills and knowledge needed to effectively integrate technology into their classroom instruction.

5.7 Television

The following section provides an overview of how business faculties use television in their classroom instruction, with a focus on their gender, age-group, and department. The section also includes a detailed analysis of the findings and their potential implications for the future of teaching and learning in B-Schools.

5.7.1 Gender-wise usage of television

The table 36 represents the frequency of television usage by female and male faculty at B-Schools in Punjab during classroom instruction. The results indicate that there is a disparity in television usage between the two groups of faculty. A larger proportion of female faculty, at 29.17%, use televisions sometimes in teaching, compared to male faculty, at 13.92%. Meanwhile, a greater number of male faculty (48.73%) rarely use televisions in teaching compared to female faculty (14.06%). Furthermore, no male faculty reported always using televisions in teaching, while 4.17% of female faculty do. On the contrary, a higher percentage of male faculty (20.89%) use televisions often in teaching compared to female faculty (18.23%). Additionally, a higher proportion of male faculty (16.46%) reported never using televisions in teaching compared to female faculty (34.38%). These results suggest that there is a difference in the utilization of televisions by female and male faculty in B-Schools in Punjab during classroom instruction.

Table 36. Gender-Wise Frequency of Usage of Television by Business Faculties

Frequency	**Female**	**Male**
Always	4.17%	0.00%
Never	34.38%	16.46%
Often	18.23%	20.89%
Rarely	14.06%	48.73%
Sometimes	29.17%	13.92%
Grand Total	**100.00%**	**100.00%**

5.7.2 Age-wise usage of television

The table 37 presents results on the frequency of television usage in classroom instruction by faculty of B-Schools in Punjab, classified according to their age-groups. The data shows that among the faculty who are 30 years old and younger, 5% reported that they always use television in their classroom instruction, while 26.03% reported that they rarely use it. In the age-group of 31–35 years, 7.14% reported always using television, while 22.32% reported rarely using it. In the age-group 36–40 years, 2.67% reported always using it, and 14% reported rarely using it. For the age-group of 40–45 years, 5.04% reported always using television, and 26.60% reported rarely using it. Finally, among those above 45 years of age, 4.32% reported always using television, and 41.82% reported rarely using it. According to the table, it appears that the usage of television in classroom instruction varies among different age-groups of the faculty of B-Schools in Punjab.

Table 37. Gender-Wise Frequency of Usage of Television by Business Faculties

Frequency	**Age-Group**				
	30 Years and Below	**31-35 Years**	**36-40 Years**	**40-45 Years**	**Above 45 Years**
Always	5.00%	7.14%	2.67%	5.04%	4.32%
Rarely	26.03%	22.32%	14.00%	26.60%	41.82%
Often	10.90%	29.46%	18.33%	13.05%	9.09%
Never	27.03%	18.75%	43.33%	36.17%	25.45%
Sometimes	31.03%	22.32%	21.67%	19.15%	20.32%
Grand Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

5.7.3 Department-wise usage of television

The table 38 below represents the frequency of usage of television in classroom instruction by the faculty of management, commerce, and economics departments of B-Schools in Punjab. According to the data, the faculty of commerce uses television the least among all three departments, with only 3.33% of faculty reporting to use it always. The Faculty of Economics uses television somewhat frequently, with 1.01% of faculty using it always and 17.74% using it sometimes. The faculty of management has the highest percentage of members using television, with 2.94% of them using it always and 15.85% using it sometimes. The most frequently reported frequency of television usage among all three departments is rarely, with 45.05% of faculty from the Commerce department, 32.65% of faculty from the Economics department, and 30.15% of faculty from the Management department reporting to use it rarely.

Table 38. Gender-Wise Frequency of Usage of Television by Business Faculties

Frequency	**Department**		
	Commerce	**Economics**	**Management**
Always	3.33%	1.01%	2.94%
Never	29.20%	34.74%	24.26%
Often	20.30%	13.86%	22.79%
Rarely	45.05%	32.65%	30.15%

Sometimes	2.12%	17.74%	15.85%
Grand Total	**100.00%**	**100.00%**	**100.00%**

5.7.4 Findings

The findings show a disparity in television usage in classroom instruction between female and male faculty in B-Schools in Punjab, with female faculty using televisions more frequently in teaching than male faculty. There is also a variation in television usage among different age-groups of faculty, with older faculty using televisions less frequently. Finally, the frequency of television usage varies among the faculty of different departments, with the faculty of commerce using television the least, the faculty of economics using it somewhat frequently, and the faculty of management using it the most.

5.7.5 Future implications

Some possible suggestions as per the findings are:

a) **Gender differences:** The disparity in television usage between female and male faculty at B-Schools in Punjab during classroom instruction could be an indication of different teaching styles and preferences. This difference could lead to the development of gender-specific teaching and training programs to improve the utilization of technology in teaching.

b) **Age differences:** The variability in the use of television in classroom instruction among different age-groups of faculty at B-Schools in Punjab suggests that the adoption of technology in teaching may depend on age, experience, and personal preferences. B-Schools can take this into consideration while incorporating technology into their curriculum and training programs.

c) **Department differences:** The difference in the usage of television in classroom instruction among the faculty of different departments of B-Schools in Punjab suggests that the utilization of technology may depend on the subject area and teaching style. B-Schools can tailor their technology-based teaching and training programs to cater to the specific needs of different departments.

5.8 Digital cameras

The following section provides an overview of how business faculties use digital cameras in their classroom instruction, with a focus on their gender, age-group, and department. The section also includes a detailed analysis of the findings and their potential implications for the future of teaching and learning in B-Schools.

5.8.1 Gender-wise usage of digital cameras

The table 39 represents the frequency of usage of a camera in teaching by the female and male faculties of B-Schools in Punjab. According to the data, male faculty have a higher usage rate of the camera compared to their female counterparts, with 49.37% of the male faculty indicating that they use the camera often in their teaching, compared to 34.90% of the female faculty. On the contrary, a lower percentage of male faculty indicated that they never use the camera in their teaching compared to female faculty (12.66% and 5.52%, respectively). The overall usage of cameras in teaching by both female and male faculty appears to be diverse, with some using them often, some using them sometimes, some rarely using them, and some never using them.

Table 39. Gender-Wise Frequency of Usage of Digital Cameras by Business Faculties

Frequency	**Female**	**Male**
Always	7.29%	10.13%
Never	5.52%	12.66%
Often	34.90%	49.37%
Rarely	24.48%	15.19%
Sometimes	27.81%	12.66%
Grand Total	**100.00%**	**100.00%**

5.8.2 Age-wise usage of digital cameras

Table 40 depicts the frequency of usage of digital cameras among faculty of B-Schools, who have been segmented into various age-groups. For the age-group of 30 years and below, 6.9% of the faculty exhibit consistent usage of digital cameras, while 3.45% are observed to use them frequently. On the flip side, 31.03% of the faculty in this age-group do not use digital cameras, while 17.24% use them occasionally. Furthermore, 41.38% of the faculty in this age-group are found to use digital cameras rarely. A similar pattern can be observed in the subsequent age-groups, with varying percentages of faculty exhibiting different frequencies of usage of digital cameras. However, the data suggests that the overall trend is that as the age of the faculty increases, their usage of digital cameras decreases.

Table 40. Age-Wise Frequency of Usage of Digital Cameras by Business Faculties

Frequency	**Age-Group**				
	30 Yearsi and Below	**31-35i Yearsi**	**36-40i Yearsi**	**40-45i Yearsi**	**Above 45i Yearsi**
Always	6.90%	13.39%	3.33%	2.13%	6.36%
Often	3.45%	0.89%	6.67%	13.83%	3.64%
Never	31.03%	45.54%	35.00%	50.00%	70.91%
Sometimes	17.24%	26.79%	33.33%	8.51%	12.45%
Rarely	41.38%	13.39%	21.67%	25.53%	16.65%
Grand Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

5.8.3 Department-wise usage of digital cameras

The table 41 below depicts the frequency of usage of digital cameras in classroom instruction by faculty members belonging to the management, commerce, and economics departments of B-Schools in Punjab. From the results, it can be observed that a low percentage of faculty in all three departments always use digital cameras in their classroom instruction, with 7.08% in commerce, 8.91% in economics, and 9.56% in management. On the contrary, a larger proportion of faculty in the Economics and Management departments never use digital cameras, with 50.5% in Economics and 39.71% in Management. The percentage of faculty who never use digital cameras in commerce is 35.4%. A moderate percentage of faculty in all three departments often use digital cameras, with 25.66% in commerce, 13.86% in economics, and 20.59% in management. The proportion of faculty who sometimes use digital cameras is 2.65% in commerce, 5.94% in economics, and 8.82% in management. Finally, the percentage of faculty who rarely use digital cameras is 29.2% in commerce, 20.79% in economics, and 21.32% in management. Overall, the results of this survey suggest that the usage of digital cameras in classroom instruction varies among faculty belonging to different departments of B-Schools in Punjab. It can also be inferred that the adoption of digital cameras in classroom instruction is still at a moderate level and has room for improvement.

Table 41. Department-Wise Frequency of Usage of Digital Cameras by Business Faculties

Frequency	**Department**		
	Commerce	**Economics**	**Management**
Always	7.08%	8.91%	9.56%
Sometimes	2.65%	5.94%	8.82%
Never	35.40%	50.50%	39.71%
Often	25.66%	13.86%	20.59%
Rarely	29.20%	20.79%	21.32%
Grand Total	**100.00%**	**100.00%**	**100.00%**

5.8.4 Findings

The usage of digital cameras in classroom instruction among faculty of B-Schools in Punjab is influenced by gender, age-group, and department. Malei faculty have a higher usage rate compared to female faculty, while younger faculty use it more frequently than older ones. Usage of digital cameras also varies among faculty belonging to different departments, with Commerce having the highest percentage of faculty who often use the camera and Economics having the largest proportion of faculty who never use it. Overall, the adoption of digital cameras in classroom instruction is moderate, with room for improvement and variations among different faculty member groups.

5.8.5 Future implications

As per the findings, it can be concluded that there is a need for B-Schools to adopt a more comprehensive and uniform approach to the usage of digital cameras in classroom instruction. Future suggestions for B-Schools include providing training and support to faculty to help them better utilize digital cameras in their classroom instruction. This can involve providing workshops and tutorials on the effective use of digital cameras as well as offering technical support to help faculty overcome any challenges they may face. In addition, B-Schools should consider providing the necessary equipment, such as digital cameras and related accessories, to help faculty deliver engaging and interactive lessons. Moreover, it may be helpful for B-Schools to regularly survey their faculty to understand their needs and preferences with respect to the usage of digital cameras in classroom instruction. According to the results of these surveys, B-Schools can then make data-driven decisions on how to further promote and support the use of digital cameras in classroom instruction. In conclusion, the findings suggest that there is a need for B-Schools to prioritize the adoption of digital cameras in classroom instruction and to provide the necessary support to help faculty effectively utilize these tools.

5.9 Educational websites

The following section provides an overview of how business faculties use educational websites in their classroom instruction, with a focus on their gender, age-group, and department. The section also includes a detailed analysis of the findings and their potential implications for the future of teaching and learning in B-Schools.

5.9.1 Gender-wise usage of desktop educational websites

The table 42 depicts the frequency of usage of educational websites in teaching by female and male faculty of B-Schools in Punjab. It can be observed that the frequency of usage of educational websites is high among both female and male faculty, with 54.17% of female faculty and 43.67% of male faculty reporting never using educational websites. On the contrary, 12.50% of female faculty and 12.66% of male faculty reported always using educational websites. Usage of educational websites is least among both female and male faculty, with 3.13% of female faculty and 17.09% of male faculty reporting sometimes using them. The total usage of educational websites among the faculty can be considered moderate.

Table 42. Gender-Wise Frequency of Usage of Educational Websites by Business Faculties

Frequency	**Female**	**Male**
Always	12.50%	12.66%
Never	54.17%	43.67%
Often	7.29%	5.06%
Rarely	22.92%	21.52%
Sometimes	3.13%	17.09%
Grand Total	**100.00%**	**100.00%**

5.9.2 Age-wise usage of desktop educational websites

Table 43 below presents the frequency of usage of educational websites by the faculty of B-Schools in Punjab, categorized according to their age-groups. The data shows that most of the faculty in the age-groups of 30 years and below and 31–35 years used educational websites either never or rarely. The percentage of faculty who have never used educational websites is 51.72% for the age-group of 30 years and below and 38.39% for the 31–35 age-group. On the contrary, faculty aged 36–40 years have the highest percentage of usage of educational websites, which is 6.00%. The percentage of faculty aged 40–45 years who use educational websites always is 7.45%. The data reveals that the older the faculty, the less frequently they use educational websites. This information implies that younger faculty are more likely to use technology and digital resources for classroom instruction compared to older faculty.

Table 43. Age-Wise Frequency of Usage of Educational Websites by Business Faculties

Frequency	**Age-Group**				
	30 Years and Below	**31-35 Years**	**36-40 Years**	**40-45 Years**	**Above 45 Years**
Always	6.90%	26.79%	6.00%	7.45%	9.09%
Never	51.72%	38.39%	60.00%	48.94%	54.55%
Often	17.24%	2.68%	5.00%	1.06%	18.18%
Rarely	22.12%	25.00%	22.00%	23.40%	10.91%
Sometimes	2.02%	7.14%	8.00%	19.15%	7.27%
Grand Total	**100.00%**	**100.00%**	**101.00%**	**100.00%**	**100.00%**

5.9.3 Department-wise usage of desktop educational websites

The table 44 show results on the frequency of educational websites usage in classroom instruction by the faculty of management, commerce, and economics departments of B-Schools in Punjab. The data shows that most of the faculty in the departments of commerce and economics use educational websites rarely (20.35% and 5.94%, respectively), while most of the faculty in the management department use them often (30.15%). The faculty who never use educational websites account for 53.10% in commerce, 46.53% in economics, and 23.53% in management. The faculty who always use educational websites account for 13.27% in commerce, 9.90% in economics, and 13.97% in management. The data suggests that the usage of educational websites in classroom instruction varies across the departments, with management being the most frequent user and economics being the least frequent user.

Table 44. Department-Wise Frequency of Usage of Educational Websites

Frequency	**Department**		
	Commerce	**Economics**	**Management**
Always	13.27%	9.90%	13.97%
Never	53.10%	46.53%	23.53%
Often	7.96%	20.79%	30.15%
Rarely	20.35%	5.94%	25.00%
Sometimes	5.31%	16.84%	7.35%
Grand Total	**100.00%**	**100.00%**	**100.00%**

5.9.4 Findings

The frequency of usage of educational websites by faculty of B-Schools in Punjab is moderate, with a higher percentage of female faculty using these websites compared to male faculty. The data shows that younger faculty are more likely to use educational websites in classroom instruction compared to older faculty. Additionally, the usage of educational websites in classroom instruction also varies across different departments, with management being the most frequent user and economics being the least frequent user. Overall, the data implies that the usage of educational websites in classroom instruction is moderate and is dependent on factors such as gender, age, and department.

5.9.5 Practical implications

B-Schools can take several steps to improve the usage of educational websites among their faculty, including encouraging the usage of these websites, promoting technology-enhanced teaching, offering incentives for using these websites, providing resources and support for departments with low usage, and evaluating the usefulness of using educational websites in classroom instruction. By doing so, they can improve the quality of education and enhance the usefulness of technology-enhanced teaching practices.

5.10 Smart phones

The following section provides an overview of how business faculties use smart phones in their classroom instruction, with a focus on their gender, age-group, and department. The section also includes a detailed analysis of the findings and their potential implications for the future of teaching and learning in B-Schools.

5.10.1 Gender-wise usage of smart phones

Table 45. Gender-Wise Frequency of Usage of Smart Phones by Business Faculties

Frequency	**Female**	**Male**
Always	4.17%	1.27%
Never	62.50%	55.06%
Often	6.77%	6.96%
Rarely	18.23%	15.82%
Sometimes	8.33%	20.89%
Grand Total	**100.00%**	**100.00%**

The table 45 shows the utilization of smart phones in teaching by female and male faculty of B-Schools in Punjab. It reveals that 62.50% of female faculty never use smart phones in teaching, compared to 55.06% of male faculty. Meanwhile, 8.33% of female faculty sometimes use smart phones, compared to 20.89% of male faculty. A higher proportion of female faculty rarely use smart phones in teaching, at 18.23%, compared to 15.82% of male faculty. The lowest utilization is seen among female and male faculty who use smart phones always, at 4.17% and 1.27%, respectively.

5.10.2 Age-wise usage of smart phones

The table 46 shows the frequency of usage of smart phones in classroom instruction by the faculty of B-Schools in Punjab, who have been categorized into various age-groups. It appears that most of the faculty in all age-groups never use smart phones in their classroom instruction, with a percentage ranging from 39% to 60%. On the contrary, the lowest usage of smart phones in classroom instruction is seen in the "often" category, which ranges from 7% to 16%. There are slight differences in the usage of smart phones in classroom instruction according to the age-group of the faculty. For instance, the faculty in the age-group of 31–35 years have the highest percentage (7.14%) of always using smart phones in their classroom instruction, while the faculty who are above 45 years have the lowest (6.09%) percentage of usage. Additionally, the faculty in the age-group of 36–40 years have the highest percentage (29.57%) of using smart phones "rarely" in their classroom instruction, while the faculty who are 31–35 years old have the lowest (10.64%) percentage of "rare" usage. Overall, it can be concluded that while some faculty use smart phones in their classroom instruction, the majority do not, and the usage varies slightly according to the age-group of the faculty. Further research may be necessary to determine the reasons behind this pattern of usage and to identify potential areas for improvement.

Table 46. Age-Wise Frequency of Usage of Smart Phones by Business Faculties

Frequency	**Age-Group**				
	30 Years and Below	**31-35 Years**	**36-40 Years**	**40-45 Years**	**Above 45 Years**
Always	6.20%	7.14%	7.10%	8.10%	6.09%
Never	59.32%	60.11%	39.00%	59.47%	54.55%
Often	17.24%	13.10%	16.00%	7.45%	12.09%
Rarely	6.90%	10.64%	29.57%	10.64%	16.36%
Sometimes	10.34%	9.30%	8.33%	22.34%	10.91%
Grand Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

5.10.3 Department-wise usage of smart phones

As per table 47, 66.37% of the faculty in the Commerce department never use smart phones in their classroom instruction, while only 3.54% always use them. In the economics department, 50.5% of the faculty never use smart phones in their teaching, while only 1.98% always use them. The management department has the highest percentage of faculty who never use smart phones in their classroom instruction (59.56%), while only 2.94% always use them. On the contrary, the Economics department has the highest percentage of faculty who sometimes use smart phones in their classroom instruction (20.79%), followed by the Management department (13.24%) and Commerce department (8.85%). It can be concluded that there is a low usage of smart phones among the faculty of B-Schools in Punjab for classroom instruction, with the majority never using them. The usage is also inconsistent across different departments, with some departments having a higher usage rate than others.

Table 47. Department-Wise Frequency of Usage of Smart Phones by Business Faculties

Frequency	**Department**		
	Commerce	**Economics**	**Management**
Always	3.54%	1.98%	2.94%
Never	66.37%	50.50%	59.56%
Often	5.31%	6.93%	16.18%
Rarely	15.93%	19.80%	8.09%
Sometimes	8.85%	20.79%	13.24%
Grand Total	**100.00%**	**100.00%**	**100.00%**

5.10.4 Findings

The data on the utilization of smart phones in classroom instruction by faculty of B-Schools in Punjab showed that most of faculty do not use smart phones in teaching, with male faculty having a higher usage rate of sometimes using smart phones compared to female faculty. The usage of smart phones in teaching also varied among different age-groups and departments, with the economics department having the highest usage rate of sometimes using smart phones and the commerce department having the highest rate of never using smart phones. Most of the faculty in all age-groups never use smart phones in classroom instruction, with the faculty in the age-group of 36–40 years having the highest rate of rarely using smart phones. The data suggests that there is low utilization of smart phones in classroom instruction by faculty in Punjab.

5.10.5 Practical implications

As per the findings, it is suggested that B-Schools create a culture that values the integration of technology in teaching, which can help increase the adoption of smart phones in the classroom. By taking these steps, B-Schools can support their faculty in incorporating technology into their classroom instruction and enhance the learning experience for students.

5.11 Video conferencing systems

The following section provides an overview of how business faculties use video conferencing systems in their classroom instruction, with a focus on their gender, age-group, and department. The section also includes a detailed analysis of the findings and their potential implications for the future of teaching and learning in B-Schools.

5.11.1 Gender-wise usage of video conferencing systems

The table 48 shows the frequency of usage of video conferencing systems in classroom instruction by the female and male faculty of B-Schools in Punjab. According to the data, most of both female and male faculty use video conferencing systems sometimes, accounting for 50.31% of female faculty and 41.46% of male faculty. Around 19.79% of female faculty and 26.48% of male faculty always use video systems in their classroom instruction. A small percentage of faculty—2.08% of female faculty and 2.53% of male faculty—often use video conferencing systems. On the contrary, only 3.6 percent of female faculty and 2.0 percent of male faculty never use video conferencing systems in their classroom instruction.

Table 48. Gender-Wise Frequency of Usage of Video Conferencing Systems by Business Faculties

Frequency	**Female**	**Male**
Never	3.65%	2.00%
Sometimes	50.31%	41.46%
Often	20.08%	25.53%
Always	19.79%	26.48%
Rarely	4.17%	2.53%
Grand Total	**100.00%**	**100.00%**

5.11.2 Age-wise usage of video conferencing systems

The results in the table 49 below show that almost half of the faculty (46.01%) in the 30 years and younger age-group never use video conferencing systems for classroom instruction. The same holds true for the 31–35-year-old and above 45 year old age-groups, with 62.01% and 50.71%, respectively, who never use video conferencing systems. The 36–40 year old and 40–45 year old age-groups have a slightly lower proportion of faculty who never use video conferencing systems (69.50% and 63.83%, respectively). On the contrary, 19.89% of the faculty in the 30 years and below age-group always use video conferencing systems in classroom instruction, which is the highest among all the age-groups. The usage of video conferencing systems is relatively low in the other age-groups, with the 31–35 age-group having the second-highest usage rate of 10.25% in the 31–35 age-group. In terms of sometimes and rarely using video conferencing systems, the 40-45 year old age-group has the highest proportion (27.21%) of faculty who rarely use the system for classroom instruction. The 36–40-year-old age-group has the highest proportion (11.44%) of faculty who often use video systems for classroom instruction. The remaining age-groups have a relatively low proportion of faculty who sometimes and rarely use video conferencing systems for classroom instruction. In conclusion, the table shows that the usage of video conferencing systems is relatively low among faculty of B-Schools in Punjab, with most of the faculty never using the system for classroom instruction. The 30-and-under age-group has the highest usage rate of video conferencing systems for classroom instruction among all the age-groups.

Table 49. Gender-Wise Frequency of Usage of Video Conferencing Systems

Frequency	**Age-group**				
	30 Years and Below	**31-35 Years**	**36-40 Years**	**40-45 Years**	**Above 45 Years**
Always	19.89%	10.25%	7.36%	3.76%	6.43%
Never	46.01%	62.01%	69.50%	63.83%	50.71%
Often	5.90%	7.14%	11.44%	0.16%	4.55%
Rarely	24.00%	12.13%	9.20%	27.21%	34.66%
Sometimes	4.20%	8.47%	2.50%	5.04%	3.65%
Grand Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

5.11.3 Department-wise usage of video conferencing systems

Table 50 displays the usage frequency of video conferencing systems among faculty belonging to the management, commerce, and economics departments. The data reveals that a significant portion of faculty in the commerce department (17.70%) and economics department (51.11%) seldom utilize video conferencing systems for their classroom instruction. Conversely, a majority of the management department faculty (61.2%) frequently employ video conferencing systems in their teaching practices. On the contrary, a significant number of faculty from commerce (66.0%) and economics (31.98%) departments never use video conferencing systems in their classroom instruction, while very few from the management department (2.94%) never use it. The use of video conferencing systems is the least among the faculty of the management, commerce, and economics departments. Overall, the data indicates that there is a disparity in the usage of video conferencing systems among faculty of different departments.

Table 50. Department-Wise Frequency of Usage of Video Conferencing Systems by Business Faculties

Frequency	**Department**		
	Commerce	**Economics**	**Management**
Always	11.88%	2.97%	22.06%
Never	66.00%	31.98%	2.94%
Often	2.65%	5.99%	61.12%
Rarely	17.70%	51.11%	2.20%
Sometimes	1.77%	7.95%	12.68%
Grand Total	**100.00%**	**100.00%**	**100.00%**

5.11.4 Findings

In conclusion, the data analyzed shows a disparity in the usage of video conferencing systems among the female and male faculty of B-Schools in Punjab. Most ofboth female and male faculty use video conferencing systems sometimes, with a slightly higher percentage of male faculty always using it. The usage of video conferencing systems is lowest among the faculty in the 30 years and below age-group, with 19.89% always using the system for classroom instruction. The usage of video conferencing systems also varies among different departments, with most of the faculty from the commerce and economics departments rarely using it and most of the faculty from the management department often using it. These findings indicate a need for B-Schools to encourage and facilitate the use of video conferencing systems among faculty.

5.11.5 Practical implications

As per the findings of the frequency of usage of video conferencing systems by faculty in B-Schools in Punjab, it can be suggested that B-Schools should prioritize the implementation of effective training programs for all faculty to ensure efficient and effective use of video conferencing systems in classroom instruction. Additionally, the schools can provide incentives for faculty who frequently use video conferencing systems to encourage widespread adoption of this technology. Furthermore, the schools can also consider investing in better technology infrastructure to ensure seamless and uninterrupted video conferencing experiences for faculty and students. In conclusion, by addressing the current disparities in usage and promoting widespread adoption, B-Schools can fully harness the potential of video conferencing technology to enhance the quality of teaching and learning experiences.

5.12 Digital portfolios or professional networking tools

The following section provides an overview of how business faculties use digital portfolios like LinkedIn, Hired, Opportunity, etc. in their classroom instruction, with a focus on their gender, age-group, and department. The section also includes a detailed analysis of the findings and their potential implications for the future of teaching and learning in B-Schools.

5.12.1 Gender-wise usage of digital portfolios

Table 51 shows the frequency of usage of digital portfolios in classroom instruction by female and male faculty of B-Schools in Punjab. It appears that most ofboth female and male faculty either never use digital portfolios or only use them sometimes. Around 42.50% of women who are part of the faculty and 35.06% of men who are part of the faculty stated that they never utilize digital portfolios in their teaching practices. In contrast, 14.58% of female faculty and 18.52% of male faculty indicated that they consistently incorporate digital portfolios in their classroom instruction. It is worth noting that there is a relatively small proportion of faculty who often use digital portfolios in their classroom instruction, with only 3.13% of female faculty and 10.14% of male faculty reporting that they often use digital portfolios.

Table 51. Gender-Wise Frequency of Usage of Digital Portfolios by Business Faculties

Frequency	**Female**	**Male**
Never	42.50%	35.06%
Often	3.13%	10.14%
Always	14.58%	18.52%
Rarely	20.52%	25.05%
Sometimes	19.27%	11.23%
Grand Total	**100.00%**	**100.00%**

5.12.2 Age-wise usage of digital portfolios

The table 52 shows the frequency of usage of digital portfolios in classroom instruction by faculty of B-Schools in Punjab, who have been categorized into different age-groups. The results show that most of the faculty in the age-group of 36–40 years (85%) always use digital portfolios in their classroom instruction, while a smaller portion (14.29%) of faculty in the age-group of 31–35 years often use them. The usage of digital portfolios decreases as the age-group increases, with the lowest usage being in the age-group above 45 years, where only 47.49% of faculty always use it. In contrast, a small percentage of faculty in all age-groups never use digital portfolios (ranging from 1.67% to 8.93%). A significant portion of faculty in the age-group of 24.11% sometimes use it, which is the second highest after the always-usage rate of 61.64% in the age-group of 36–40 years. The results also indicate that there is moderate usage of digital portfolios among faculty in the age-groups of 30 years and below and 40-45 years, with usage rates of 61.64% and 35.69%, respectively.

Table 52. Age-Wise Frequency of Usage of Digital Portfolios by Business Faculties

Frequency	**Age-Groups**				
	30 Years and Below	**31-35 Years**	**36-40 Years**	**40-45 Years**	**Above 45 Years**
Always	61.64%	44.78%	85.00%	35.69%	47.49%
Never	2.01%	8.93%	1.67%	17.02%	5.02%
Often	29.02%	14.29%	8.33%	18.09%	27.04%
Rarely	3.10%	7.89%	9.47%	11.11%	15.00%
Sometimes	4.23%	24.11%	5.00%	18.09%	5.45%
Grand Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

5.12.3 Department-wise usage of digital portfolios

The table 53 shows the frequency of usage of digital portfolios in classroom instruction by the faculty of management, commerce, and economics departments of B-Schools in Punjab. In the Commerce department, 15.04% of the faculty always use digital portfolios in their classroom instruction, 5.31% never use them, 15.01% often use them, 47.83% rarely use them, and 16.81% sometimes use them. In the Economics department, 37.47% of the faculty always use digital portfolios in their classroom instruction; 13.86% never use them, 21.78% often use them, 16.00% rarely use them, and 10.89% sometimes use them. In the management department, 60.29% of the faculty always use digital portfolios in their classroom instruction, 7.35% never use them, 16.91% often use them, 0.74% rarely use them, and 14.71% sometimes use them. Overall, we can see that the usage of digital portfolios is more frequent among the faculty of the Management department compared to the other two departments.

Table 53. Department-Wise Frequency of Usage of Digital Portfolios by Business Faculties

Frequency	**Department**		
	Commerce	**Economics**	**Management**
Always	15.04%	37.47%	60.29%
Never	5.31%	13.86%	7.35%
Often	15.01%	21.78%	16.91%
Rarely	47.83%	16.00%	0.74%
Sometimes	16.81%	10.89%	14.71%
Grand Total	**100.00%**	**100.00%**	**100.00%**

5.12.4 Findings

The results show varying levels of usage across departments, age-groups, and genders. In terms of departments, the highest usage of digital portfolios is found in the management department, with 60.29% of the faculty always using it in their classroom instruction. The results also indicate that younger faculty, specifically those in the age-group of 36–40 years, are more likely to always use digital portfolios. Meanwhile, both female and male faculty reported a high proportion of never using digital portfolios, with female faculty having a slightly higher percentage of 42.50% compared to male faculty at 35.06%. Overall, the usage of digital portfolios in classroom instruction is still moderate among faculty in B-Schools in Punjab.

5.12.5 Future implications

As per the findings, there are several future suggestions for B-Schools to consider in order to enhance the usage of digital portfolios in classroom instruction. Firstly, B-Schools can invest in training and professional development programs for faculty to improve their digital skills and increase their confidence in using digital portfolios. Secondly, B-Schools can provide support and resources to faculty to help them effectively integrate digital portfolios into their teaching practices. Additionally, B-Schools can encourage inter-departmental collaboration and sharing of best practices in using digital portfolios to foster a culture of innovation and tech. integration. Furthermore, B-Schools can recognize and reward faculty who are using digital portfolios in innovative and effective ways to further encourage their widespread adoption. Finally, B-Schools can collect feedback from students and faculty to continually assess and improve the use of digital portfolios in their classroom instruction.

5.13 Digital writing pads

The following section provides an overview of how business faculties use digital writing pads in their classroom instruction, with a focus on their gender, age-group, and department. The section also includes a detailed analysis of the findings and their potential implications for the future of teaching and learning in B-Schools.

5.13.1 Gender-wise usage of digital writing pads

The table 54 shows the frequency of usage of digital writing pads in classroom instruction by female and male faculty of B-Schools in Punjab. According to the data, 52.08% of the female faculty and 50% of the male faculty reported using the digital writing pads sometimes. 28.13% of the female faculty and 31.01% of the male faculty reported using the technology often. Meanwhile, 12.50% of the female faculty and 14.56% of the male faculty reported always using the technology. On the contrary, only 1.04% of the female faculty and 1.90% of the male faculty reported rarely using the digital writing pads. The least reported usage was never, with 6.25% of the female faculty and 2.53% of the male faculty reporting the same.

Table 54. Gender-Wise Frequency of Usage of Digital Writing Pads by Business Faculties

Frequency	**Female**	**Male**
Always	12.50%	14.56%
Never	6.25%	2.53%
Often	28.13%	31.01%
Rarely	1.04%	1.90%
Sometimes	52.08%	50.00%
Grand Total	**100.00%**	**100.00%**

5.13.2 Age-wise usage of digital writing pads

From the table 55 below, the largest percentage of faculty who used digital writing pads in classroom instruction is in the "Sometimes" category, which accounts for 40.18%. The second-highest percentage is in the "always" category, which accounts for 13.79%. The "often" category accounts for 10.00%, and the "rarely" category accounts for 15.69%. The "Never" category has the lowest percentage, accounting for 20.34%. It is also observed that there is a significant difference in the usage of digital writing pads between the various age-groups. The highest usage of digital writing pads in classroom instruction is by faculty who are 31–35 years old, with a percentage of 25.11%. The second-highest usage is by faculty who are 36–40 years old, with a percentage of 15.67%. The lowest usage is by faculty who are over 45, with a percentage of only 1.82%. In conclusion, the usage of digital writing pads in classroom instruction among the faculty of B-Schools in Punjab is relatively high, with most of the faculty using them sometimes or always. However, there is a clear difference in usage patterns based on the age of the faculty, with younger faculty having a higher usage rate compared to their older counterparts.

Table 55. Age-Wise Frequency of Usage of Digital Writing Pads by Business Faculties

Frequency	**Age-Group**				
	30 Years and Below	**31-35 Years**	**36-40 Years**	**40-45 Years**	**Above 45 Years**
Always	13.79%	25.11%	15.67%	25.38%	1.82%
Never	20.34%	12.82%	18.20%	8.13%	15.03%
Often	10.00%	23.93%	31.67%	22.38%	23.64%
Rarely	15.69%	7.78%	11.23%	1.02%	5.42%
Sometimes	40.18%	30.36%	23.23%	43.09%	54.09%
Grand Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

5.13.3 Department-wise usage of digital writing pads

The table 56 shows the frequency of usage of digital writing pads in classroom instruction by the faculty of management, commerce, and economics departments of

B-Schools in Punjab. The results suggest that most of the faculty in the commerce and management departments use digital writing pads "always" (15.04% and 60.29%, respectively), whereas in the economics department the majority use digital writing pads "often" (37.57%). The usage of digital writing pads is "rarely" used by most of the faculty in the commerce department (47.83%) and least used in the management department (0.74%). In terms of the "never" category, the lowest percentage of faculty in the commerce department (5.31%) and the highest in the economics department (13.86%) reported never using digital writing pads in their classroom instruction.

Table 56. Department-Wise Frequency of Usage of Digital Writing Pads by Business Faculties

Frequency	**Department**		
	Commerce	**Economics**	**Management**
Always	15.04%	37.47%	60.29%
Never	5.31%	13.86%	7.35%
Often	15.01%	21.78%	16.91%
Rarely	47.83%	16.00%	0.74%
Sometimes	16.81%	10.89%	14.71%
Grand Total	**100.00%**	**100.00%**	**100.00%**

5.13.4 Findings

The frequency of usage of digital writing pads in classroom instruction among business school faculty in Punjab is influenced by factors such as age, gender, and department. While most of the faculty use the technology sometimes or always, their usage patterns differ according to age, with younger faculty having a higher usage rate compared to their older counterparts. There is also a difference in usage between female and male faculty, with both groups reporting similar usage patterns. The usage of digital writing pads also varies among different departments, with the highest being in the commerce and management departments and the least in the economics department.

5.13.5 Future implications

B-Schools can expand on the use of digital writing pads in teaching by implementing several key strategies. Firstly, they should provide training and support to faculty who are not yet using digital writing pads. This could be achieved through workshops, online training programs, or one-on-one assistance. Secondly, investment in modern, user-friendly technology is crucial to cater to the needs of a younger generation of faculty. Thirdly, by tailoring technology adoption strategies to meet the specific needs of each department, B-Schools can ensure that the technology is effectively integrated into each department's classroom instruction. Additionally, ongoing support is crucial to ensure that faculty are confident in using digital writing pads. This could involve providing technical assistance, providing opportunities for faculty to share best practices, and conducting regular check-ins to address any challenges or concerns. Finally, B-Schools can incentivize the use of digital writing pads in teaching by recognizing and rewarding innovative faculty and providing opportunities for faculty to showcase their use of technology. By implementing these strategies, B-Schools can ensure that they are effectively utilizing technology to enhance their classroom instruction and provide a modern, effective learning experience for their students.

5.14 Application softwares

The following section provides an overview of how business faculties use application software like word processing software, spreadsheets, power point, PDF viewers and editors, image editors, etc. in their classroom instruction, with a focus on their gender, age-group, and department. The section also includes a detailed analysis of the findings and their potential implications for the future of teaching and learning in B-Schools.

5.14.1 Gender-wise usage of application softwares

The table 57 shows that a higher percentage of male faculty (57.66%) always use application softwares in their classroom instruction compared to female faculty (40.63%). Conversely, a lower percentage of male faculty (10.13%) never use application software compared to female faculty (10.42%). A slightly higher percentage of female faculty (24.48%) often use application softwares in teaching compared to male faculty (13.92%). The percentage of those who rarely use application software in teaching is similar for both female and male faculty (around 11%). The lowest usage frequency of application softwares in teaching is seen among male faculty (6.90%) compared to female faculty (12.50%), who sometimes use it. In conclusion, the data suggests that male faculty tend to use application softwares more frequently in their classroom instruction compared to female faculty.

Table 57. Gender-Wise Frequency of Usage of Application Softwares by Business Faculties

Frequency	Female	Male
Always	40.63%	57.66%
Never	10.42%	10.13%
Often	24.48%	13.92%
Rarely	11.98%	11.39%
Sometimes	12.50%	6.90%
Grand Total	**100.00%**	**100.00%**

5.14.2 Age-wise usage of application softwares

According to the table 58 below, the highest percentage of faculty who use application softwares in classroom instruction fall into the age-groups of 31–35 years and 36–40 years, with 50% and 48.32%, respectively. This is followed by the age-group of 40–45 years with 53.19%. The age-group of 30 years and below has the fourth highest usage of application software in classroom instruction with 44.83%. The lowest usage is in the age-group above 45 years, at 52.76%. On the contrary, the age-group of 30 years and below has the highest percentage of faculty who rarely use application softwares in classroom instruction (27.59%). The age-group above 45 years has the lowest percentage of faculty who rarely use application softwares in classroom instruction, at 3.64%. Overall, it can be concluded that most of the faculty use application softwares in their classroom instruction, with the highest usage being among the younger age-groups.

Table 58. Age-Wise Frequency of Usage of Application softwares by Business Faculties

Frequency	Age-Group				
	30 Years and Below	**31-35 Years**	**36-40 Years**	**40-45 Years**	**Above 45 Years**
Always	44.83%	50.00%	48.32%	53.19%	52.76%
Never	10.34%	8.93%	13.34%	8.51%	12.70%
Often	13.79%	21.43%	16.67%	18.09%	25.45%

Rarely	27.59%	11.80%	20.00%	8.51%	3.64%
Sometimes	3.45%	7.84%	1.67%	11.70%	5.45%
Grand Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

5.14.3 Department-wise usage of application softwares

Table 59 shows the frequency of usage of application softwares in classroom instruction by the faculty of B-Schools in Punjab, who have been categorized into various departments. The results indicate that, overall, most of the faculty in all three departments use application softwares "always" (commerce: 51.33%, economics: 49.50%, management: 50.74%) in their classroom instruction. The second most common frequency of usage is "often" (Commerce: 21.24%, Economics: 20.79%, Management: 17.65%), while "rarely" is the third most common frequency of usage (Commerce: 10.62%, Economics: 11.88%, Management: 12.50%). The least common frequency of usage is "sometimes" (Commerce: 7.08%, Economics: 7.92%, Management: 8.09%). A relatively low percentage of faculty in all departments reported "never" using application software in their classroom instruction.

Table 59. Department-Wise Frequency of Usage of Application Softwares

	Department		
Frequency	**Commerce**	**Economics**	**Management**
Always	51.33%	49.50%	50.74%
Never	9.73%	9.90%	11.03%
Often	21.24%	20.79%	17.65%
Rarely	10.62%	11.88%	12.50%
Sometimes	7.08%	7.92%	8.09%
Grand Total	**100.00%**	**100.00%**	**100.00%**

5.14.4 Findings

The findings indicate that there is a difference in the frequency of application software usage in classroom instruction between female and male faculty, with male faculty tending to use it more frequently. It also suggests that most faculty use application software in their classroom instruction, with the highest usage being among the younger age-groups (31–35 years and 36–40 years). Additionally, the results show that most of the faculty in all departments always use application software in their classroom instruction.

5.14.5 Practical implications

As per the findings, it can be recommended that B-Schools invest in providing training and resources to facilitate the use of application software in classroom instruction among all faculty, regardless of their gender, age, or department. This can include workshops and seminars, as well as providing access to the latest technology and software. Additionally, the B-Schools could also encourage inter-departmental collaboration to share best practices and resources, promoting a culture of innovation and tech. integration in teaching. Furthermore, B-Schools could also create a mentorship program for older faculty to provide support and guidance in adapting to new technology. By taking these steps, B-Schools can ensure that their faculty are well equipped to effectively integrate technology into their teaching, leading to a more engaging and interactive learning experience for students.

5.15 Educational softwares

The following section provides an overview of how business faculties use educational software like Tally, SPSS, R, AMOS, Power BI, Tableau, etc. in their classroom instruction, with a focus on their gender, age-group, and department. The section also includes a detailed analysis of the findings and their potential implications for the future of teaching and learning in B-Schools.

5.15.1 Gender-wise usage of educational softwares

Table 60 shows that a higher percentage of female faculty (45.69%) often use educational softwares in their classroom instruction compared to male faculty (50.76%). Conversely, a lower percentage of female faculty (5.52%) never use educational softwares compared to male faculty (10.00%). A slightly higher percentage of male faculty (22.91%) always use educational softwares in teaching compared to female faculty (30.94%). The percentage of those who rarely use educational softwares in teaching is much higher among male faculty (12.53%) compared to female faculty (2.08%). The lowest usage frequency of educational softwares in teaching is seen among male faculty (3.8%) compared to female faculty (15.77%), who sometimes use it. In conclusion, the data suggests that there is a higher usage frequency of educational softwares in classroom instruction among both female and male faculty in the B-Schools of Punjab, with female faculty using it slightly more frequently.

Table 60. Gender-Wise Frequency of Usage of Educational Softwares by Business Faculties

Frequency	**Female**	**Male**
Always	30.94%	22.91%
Never	5.52%	10.00%
Often	45.69%	50.76%
Rarely	2.08%	12.53%
Sometimes	15.77%	3.80%
Grand Total	**100.00%**	**100.00%**

5.15.2 Age-wise usage of educational softwares

The table 61 shows the frequency of usage of educational softwares in classroom instruction by the faculty of B-Schools in Punjab, categorized by various age-groups. The results indicate that there is a significant difference in the usage of educational softwares between different age-groups. For faculty aged 30 years and below, the highest usage frequency was recorded as "always" with 48.28% of the respondents. The second highest usage frequency was recorded as "often," with 27.59%. The lowest usage frequency was recorded as "never," with only 3.44%. For faculty aged 31–35 years, the highest usage frequency was recorded as "often," with 40.93% of the respondents. The second highest usage frequency was recorded as "Always" with 33.04 percent. The lowest usage frequency was recorded as "sometimes" with only 3.89%.

For faculty aged 36–40 years, the highest usage frequency was recorded as "often," with 19.55% of the respondents, followed by "always," with 30.98%. The lowest usage frequency was recorded as "sometimes" with 8.60%. The highest usage frequency was recorded as "often" with 34.91% of the respondents, followed by "always" with 15.96% for the faculty aged 40–45 years. The lowest usage frequency was recorded as "sometimes" with 2.60%. For faculty aged above 45 years, the highest usage frequency was recorded as "often," with 39.73% of the respondents, followed by "always," with 29.02%. The lowest usage frequency was recorded as "never" with 12.07%. In conclusion, the results show that the usage of educational softwares varies significantly among different age-groups of the faculty in B-Schools in Punjab. However, most of the faculty in all age-groups reported using educational softwares "often" or "always."

Table 61. Age-Wise Frequency of Usage of Educational Softwares by Business Faculties

Frequency	**Age-Group**				
	30 Years and Below	**31-35 Years**	**36-40 Years**	**40-45 Years**	**Above 45 Years**
Always	48.28%	33.04%	30.98%	15.96%	29.02%
Never	3.44%	15.09%	21.33%	27.21%	12.07%
Often	27.59%	40.93%	19.55%	34.91%	39.73%
Rarely	0.00%	7.05%	19.54%	19.32%	1.00%
Sometimes	20.69%	3.89%	8.60%	2.60%	18.18%
Grand Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

5.15.3 Department-wise usage of educational softwares

Table 62. Department-Wise Frequency of Usage of Educational Softwares

Frequency	**Department**		
	Commerce	**Economics**	**Management**
Always	38.94%	31.34%	59.56%
Never	10.00%	4.44%	9.00%
Often	42.21%	41.40%	24.09%
Rarely	3.54%	5.89%	2.94%
Sometimes	5.31%	16.93%	4.41%
Grand Total	**100.00%**	**100.00%**	**100.00%**

The table 62 provides the frequency of usage of educational softwares in classroom instruction by faculty in the management, commerce, and economics departments of B-Schools in Punjab. Most of the faculty in the management department (59.56%) reported using educational software always, while only 10% reported never using it.

The commerce and economics departments had 38.94% and 31.34% of faculty reporting usage always, respectively. On the contrary, the lowest usage of always was recorded in the commerce department (3.54%), and the highest usage of never was recorded in the economics department (16.93%). Overall, it can be concluded that the usage of educational softwares in classroom instruction by faculty in the management department is higher compared to the commerce and economics departments. Additionally, most of the faculty in all departments reported using these tools often or always in their classroom instruction.

5.15.4 Findings

The results from the study of educational software usage by faculty in B-Schools in Punjab reveal significant differences according to gender, age-group, and department. Overall, most of the faculty reported using educational software often or always in their classroom instruction. Female faculty were found to use educational software more frequently compared to their male counterparts. The usage of educational software also varied among different age-groups, with younger faculty reporting higher usage rates. Additionally, faculty in the Management department reported a higher usage rate compared to the Commerce and Economics departments. The results suggest that educational software is widely used by faculty in B-Schools in Punjab, but the frequency of use may vary as per individual characteristics.

5.15.5 Practical implications

As per the findings, it is clear that the use of educational software in classroom instruction is becoming increasingly prevalent among faculty in B-Schools in Punjab. However, there are still disparities in usage patterns according to gender, age, and department. These findings suggest that B-Schools should consider providing more training and support to faculty who are less likely to use educational software, such as older faculty or those in the Economics and Commerce departments. By doing so, the schools can help ensure that all faculty have the necessary skills and confidence to use these tools effectively. Additionally, schools should consider investing in updated and user-friendly educational software to keep pace with technological advancements and meet the changing needs of students and faculty. This could include virtual and augmented reality technology, online collaboration tools, and data analysis software.

By staying ahead of the curve in terms of technology, B-Schools can enhance the quality of their teaching and provide students with engaging and interactive learning experiences. Furthermore, it may be beneficial for B-Schools to conduct regular surveys and evaluations to monitor the usefulness of educational software. This information can be used to continuously improve and update their technology offerings, as well as provide meaningful feedback to faculty on their usage patterns. In conclusion, the findings suggest that B-Schools in Punjab should make a concerted effort to promote and support the use of educational software among their faculty. By doing so, they can help ensure that they are providing students with a high-quality, technologically advanced education and preparing them for success in a rapidly changing world.

5.16 Virtual meeting platforms

The following section provides an overview of how business faculties use virtual meeting platforms like Google Meet, Skype, Zoom, Go to Webinar, etc. in their classroom instruction, with a focus on their gender, age-group, and department. The section also includes a detailed analysis of the findings and their potential implications for the future of teaching and learning in B-Schools.

5.16.1 Gender-wise usage of virtual meeting platforms

The data presented in the table 63 reflects the frequency of usage of virtual meeting platforms in classroom instruction by female and male faculty of B-Schools in Punjab. It is observed that the male faculty consistently demonstrate a higher usage rate of virtual meeting platforms compared to their female counterparts. Specifically, 32.28% of male faculty always utilize virtual meeting platforms in their classroom instruction, while 22.30% of female faculty exhibit the same behaviour. On the contrary, a higher proportion of female faculty (12.08%) indicate that they never utilize virtual meeting platforms in their teaching, compared to 20.53% of male faculty. A greater percentage of female faculty (35.83%) often employ virtual meeting platforms in their classroom instruction compared to male faculty (16.08%). A similar proportion of both female and male faculty (around 15%) rarely use virtual meeting platforms in their classroom instruction. Finally, the highest usage frequency of virtual meeting platforms in teaching is demonstrated by male faculty (21.78%), while female faculty display the lowest usage frequency (14.69%). In conclusion, the data suggests that male faculty tend to utilize virtual meeting platforms more frequently in their classroom instruction compared to female faculty.

Table 63. Gender-Wise Frequency of Usage of Virtual Meeting Platforms

Frequency	**Female**	**Male**
Always	22.30%	32.28%
Never	12.08%	20.53%
Often	35.83%	16.08%
Rarely	15.10%	9.33%
Sometimes	14.69%	21.78%
Grand Total	**100.00%**	**100.00%**

5.16.2 Age-wise usage of virtual meeting platforms

The table 64 presents the frequency of usage of virtual meeting platforms by faculty of B-Schools in Punjab, who have been categorized into various age-groups. The data shows that faculty aged 31–35 have the highest rate of utilization of virtual meeting platforms, with 59.82% reporting usage "often." The second highest rate of usage is among faculty aged 40–45, with 40.83% reporting "always" usage. Conversely, faculty aged 36–40 have the highest rate of non-usage, with 17.67% reporting "never" using virtual meeting platforms. Meanwhile, 5.59% of faculty aged 40–45 report "never" usage.

Table 64. Age-Wise Frequency of Usage of Virtual Meeting Platforms by Business Faculties

Frequency	**Age-Group**				
	30 Years and Below	**31-35 Years**	**36-40 Years**	**40-45 Years**	**Above 45 Years**
Always	31.03%	25.00%	21.25%	40.83%	21.09%
Never	11.09%	7.14%	17.67%	5.59%	14.00%

Often	23.38%	59.82%	32.26%	15.28%	32.18%
Rarely	7.01%	7.14%	15.15%	24.47%	9.09%
Sometimes	27.49%	0.90%	13.67%	13.83%	23.64%
Grand Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

5.16.3 Department-wise usage of virtual meeting platforms

The table 65 shows the frequency of usage of virtual meeting platforms in classroom instruction by the faculty of management, commerce, and economics departments of B-Schools in Punjab. The results indicate that a majority of the faculty in all departments use virtual meeting platforms often or always. Specifically, 28.32% of commerce faculty, 31.62% of economics faculty, and 36.62% of management faculty always use virtual meeting platforms. On the contrary, only a small percentage of faculty in all departments never use virtual meeting platforms, with the highest percentage being 3.54% in the commerce department. In conclusion, the usage of virtual meeting platforms is widespread among the faculty of management, commerce, and economics departments of B-Schools in Punjab, with a majority of faculty using them often or always.

Table 65. Department-Wise Frequency of Usage of Virtual Meeting Platforms

Frequency	**Department**		
	Commerce	**Economics**	**Management**
Always	28.32%	31.62%	36.62%
Never	3.54%	16.01%	2.94%
Often	46.90%	27.62%	34.71%
Rarely	11.51%	9.90%	11.76%
Sometimes	9.73%	14.85%	13.97%
Grand Total	**100.00%**	**100.00%**	**100.00%**

5.16.4 Findings

The findings suggest that male faculty tend to utilize virtual meeting platforms more frequently in their classroom instruction compared to female faculty. Faculty aged 31–35 have the highest rate of utilization of virtual meeting platforms, with 59.82% reporting usage "often." A majority of faculty in management, commerce, and economics departments use virtual meeting platforms often or always. The use of virtual meeting platforms is widespread among the faculty of these departments. The data also indicates that a small percentage of faculty in all departments never use virtual meeting platforms.

5.16.5 Practical implications

As per the findings, it can be suggested that B-Schools should promote the usage of virtual meeting platforms in classroom instruction among all faculty, regardless of gender and age. Training programs and workshops can be organized to enhance faculty' familiarity with these platforms and their integration into classroom instruction. Additionally, ensuring equal access to technology and resources can reduce the gender gap in virtual meeting platform usage. These steps can lead to a more effective and efficient use of virtual meeting platforms in teaching, ultimately benefiting the students and the institutions.

5.17 Digital libraries

The following section provides an overview of how business faculties use digital libraries like Google Books, Scribd, NDLI, Open Library, etc. in their classroom instruction, with a focus on their gender, age-group, and department. The section also includes a detailed analysis of the findings and their potential implications for the future of teaching and learning in B-Schools.

5.17.1 Gender-wise usage of digital libraries

The table 66 presents results on the frequency of digital libraries usage in classroom instruction by female and male faculty of B-Schools in Punjab. The data shows that male faculty (17.71%) are more likely to always use digital libraries in their teaching compared to female faculty (9.49%). Conversely, female faculty (16.53%) are more likely to never use digital libraries compared to male faculty (8.08%). A similar proportion of female and male faculty (around 32%) often utilize digital libraries in their classroom instruction. The proportion of those who rarely use digital libraries in classroom instruction is also similar for both female and male faculty (around 10%). The highest usage frequency of digital libraries in classroom instruction is demonstrated by male faculty (40.10%), while female faculty exhibit a slightly lower usage frequency (31.57%). In conclusion, the data suggests that male faculty tend to use digital libraries more frequently in their classroom instruction compared to female faculty.

Table 66. Gender-Wise Frequency of Usage of Digital Libraries by Business Faculties

Frequency	Female	Male
Always	9.49%	17.71%
Never	16.53%	8.08%
Often	32.28%	24.21%
Rarely	10.13%	9.90%
Sometimes	31.57%	40.10%
Grand Total	**100.00%**	**100.00%**

5.17.2 Age-wise usage of digital libraries

Table 67 shows the frequency of usage of digital libraries by business school faculty in Punjab, categorized by age-group. The largest proportion of faculty (55.17%) reported using digital libraries "sometimes" in their classroom instruction. The next largest group (27.68%) reported using digital libraries "often." 18.69% of faculty aged 30 years and below reported using digital libraries "always," while 20.00% of those aged 36–40 years reported "never" using digital libraries. The percentage of faculty who reported "rarely" using digital libraries was highest (29.09%) among those aged over 45 years. Overall, the usage of digital libraries in classroom instruction by business school faculty in Punjab varied according to their age-group.

Table 67. Age-Wise Frequency of Usage of Digital Libraries by Business Faculties

Frequency	Age-Group				
	30 Years and Below	**31-35 Years**	**36-40 Years**	**40-45 Years**	**Above 45 Years**
Always	18.69%	16.96%	13.33%	12.67%	7.27%
Never	2.01%	7.14%	20.00%	9.09%	9.01%
Often	13.79%	27.68%	4.35%	39.94%	5.45%
Rarely	10.34%	10.71%	15.65%	5.32%	29.09%
Sometimes	55.17%	37.50%	46.67%	32.98%	49.18%
Grand Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

5.17.3 Department-wise usage of digital libraries

Table 68 presents the usage frequency of digital libraries in classroom instruction among the faculty of management, commerce, and economics departments in B-Schools in Punjab. The results show that, among the three departments, the faculty of economics uses digital libraries the least, with only 9.90% of the faculty always using them. On the contrary, the faculty of management uses digital libraries the most, with 34.56% of them using them often. In general, 40.71% of the faculty across the three departments use digital libraries sometimes, while 25.66% of them use them often. Overall, the usage of digital libraries in classroom instruction among the faculty is moderate.

Table 68. Department-Wise Frequency of Usage of Digital Libraries by Business Faculties

Frequency	**Department**		
	Commerce	**Economics**	**Management**
Always	10.62%	9.90%	12.50%
Never	3.54%	20.96%	2.94%
Often	25.66%	33.66%	34.56%
Rarely	19.47%	4.98%	11.76%
Sometimes	40.71%	30.50%	38.24%
Grand Total	**100.00%**	**100.00%**	**100.00%**

5.17.4 Findings

The data presented in the table reflects the frequency of usage of digital libraries in classroom instruction by female and male faculty of B-Schools in Punjab. The results indicate that male faculty tend to use digital libraries more frequently compared to female faculty. The usage frequency also varies according to the age-group of faculty, with the youngest age-group (30 years and below) having the highest percentage of "always" usage and the oldest age-group (above 45 years) having the highest percentage of "rarely" usage. Among the management, commerce, and economics departments, the faculty of management uses digital libraries the most, while the faculty of economics uses it the least. Overall, the usage of digital libraries in classroom instruction is moderate among the faculty of B-Schools in Punjab.

5.17.5 Practical implications

As per the findings presented in the tables, B-Schools in Punjab could make several suggestions to improve the utilization of digital libraries in classroom instruction. Firstly, the gender discrepancy in usage frequency could be addressed through targeted training and support for female faculty to ensure they are comfortable and confident in using digital libraries. Secondly, the differences in usage frequency among different age-groups could be addressed through continuous training and support for faculty to keep them updated on the latest technology and digital resources. Thirdly, the faculty in the economics department could benefit from targeted training to increase their usage of digital libraries in classroom instruction. Finally, the moderate overall usage of digital libraries among the faculty could be increased through initiatives such as incorporating digital libraries into the curriculum and encouraging their usage as a teaching tool. To ensure the success of these initiatives, it would be important for B-Schools to assess their impact and make continuous improvements.

5.18 Online educational video platforms or Edtech platforms

The following section provides an overview of how business faculties use edtech platforms like NPTEL, Coursera, Udemy, edX, LinkedIn Learning, etc. in their classroom instruction, with a focus on their gender, age-group, and department. The section also includes a detailed analysis of the findings and their potential implications for the future of teaching and learning in B-Schools.

5.18.1 Gender-wise usage of edtech platforms

The table 69 presents results on the frequency of online educational video platforms usage in classroom instruction by female and male faculty of B-Schools in Punjab. The data shows that male faculty (25.66%) are more likely to always use online educational video platforms in their classroom instruction compared to female faculty (16.14%). Conversely, female faculty (11.46%) are more likely to never use these platforms compared to male faculty (4.63%). Approximately equal proportions of female and male faculty (around 29%) often utilize online educational video platforms in their classroom instruction. A similar proportion of both groups (around 15%) rarely use these platforms. The highest usage frequency of online educational video platforms in classroom instruction is demonstrated by male faculty (41.57%), while female faculty exhibit a slightly lower usage frequency (28.15%). In conclusion, the data suggests that male faculty tend to use online educational video platforms more frequently in their classroom instruction compared to female faculty.

Table 69. Gender-Wise Frequency of Usage of Edtech Platforms by Business Faculties

Frequency	Female	Male
Always	16.14%	25.66%
Never	11.46%	4.63%
Often	29.17%	20.55%
Rarely	15.08%	7.59%
Sometimes	28.15%	41.57%
Grand Total	**100.00%**	**100.00%**

5.18.2 Age-wise usage of edtech platforms

The table 70 presents the results on the frequency of educational video platforms usage among the faculty of B-Schools in Punjab, separated by age-group. According to the data, most of the faculty (37.93%) utilize online educational video platforms "rarely" in their classroom instruction. The second largest group (41.07%) reported using the platforms "sometimes." 20.69% of those aged 30 years and below reported "never" using the platforms, while 32.33% of those aged 36–40 years reported using them "often." Overall, the usage of online educational video platforms among business school faculty in Punjab varies according to their age-group.

Table 70. Age-Wise Frequency of Usage of Edtech Platforms by Business Faculties

Frequency	Age-Group				
	30 Years and Below	**31-35 Years**	**36-40 Years**	**40-45 Years**	**Above 45 Years**
Never	20.69%	23.21%	15.40%	26.04%	7.27%

Always	16.00%	9.36%	5.11%	18.09%	25.45%
Often	14.38%	12.09%	32.33%	14.89%	31.09%
Sometimes	11.00%	14.27%	18.49%	13.64%	23.18%
Rarely	37.93%	41.07%	28.67%	27.34%	13.01%
Grand Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

5.18.3 Department-wise usage of edtech platforms

Table 71 represents the frequency of usage of online educational video platforms in classroom instruction by the faculty of management, commerce, and economics departments of B-Schools in Punjab. The data indicates that the faculty in the Economics department have the highest usage of these platforms, with 48.51% reporting "Sometimes" usage, followed by 34.65% from the commerce department and 26.47% from the management department. meanwhile, the commerce and management departments have the lowest "always" usage at 8.91% and 15.44%, respectively, compared to 18.58% in economics. On the contrary, the "never" usage is highest in the commerce department at 7.97%, followed by the management department at 16.62% and the economics department at 4.95%. Overall, the faculty in the economics department appear to have the highest utilization of these platforms, followed by the commerce and management departments.

Table 71. Department-Wise Frequency of Usage of Edtech Platforms by Business Faculties

Frequency	**Department**		
	Commerce	**Economics**	**Management**
Always	18.58%	8.91%	15.44%
Never	7.97%	4.95%	16.62%
Often	33.63%	34.65%	26.47%
Rarely	5.31%	12.97%	5.15%
Sometimes	34.51%	48.51%	36.32%
Grand Total	**100.00%**	**100.00%**	**100.00%**

5.18.4 Findings

The data suggests that male faculty of B-Schools in Punjab tend to use online educational video platforms more frequently in their classroom instruction compared to female faculty. The usage of these platforms also varies according to the faculty' age-group, with the majority using them rarely. The utilization of these platforms among the faculties of management, commerce, and economics departments in the B-Schools of Punjab varies, with the faculty of economics having the highest utilization followed by the commerce and management departments. B-Schools in Punjab may consider encouraging the use of online educational video platforms, especially among female faculty and those in the older age-group. They could also work towards providing more training and support to faculty to effectively incorporate these platforms into their classroom instruction.

5.18.5 Practical implications

As per the findings, it can be recommended that B-Schools in Punjab should prioritize the promotion of the utilization of online educational video platforms among all faculty, with a particular emphasis on female faculty and those belonging to the older age-group. This can be achieved through the provision of training programs, workshops, and technical support to ensure that faculty are adequately equipped to effectively integrate these platforms into their classroom instruction. Furthermore, the schools can incentivize the utilization of these platforms by recognizing and rewarding faculty who demonstrate proficiency in their use. To facilitate this initiative, the schools should make available resources such as guidelines and best practices, which can assist faculty in maximizing the benefits of these platforms. In order to guarantee the success of this endeavour, the schools should involve faculty in the decision-making process and gather their feedback to continually improve the use of these platforms. In conclusion, by fostering the use of online educational video platforms, B-Schools in Punjab can elevate the quality of their teaching and learning activities, ultimately resulting in a more engaging and effective educational experience for students.

5.19 Digital survey platforms

The following section provides an overview of how business faculties use digital survey platforms like Survey Monkey, Google Forms, SoGo Survey, etc. in their classroom instruction, with a focus on their gender, age-group, and department. The section also includes a detailed analysis of the findings and their potential implications for the future of teaching and learning in B-Schools.

5.19.1 Gender-wise usage of digital survey platforms

Table 72 presents information on the utilization of digital survey platforms in classroom instruction among female and male faculty of B-Schools in Punjab. The data suggests that female faculty exhibit a greater likelihood of consistently utilizing digital survey platforms in their classroom instruction, with a utilization rate of 14.17%. Conversely, male faculty are more likely to never utilize these platforms, with a rate of 29.61%. A slightly higher proportion of male faculty are reported to often utilize digital survey platforms in their classroom instruction, with a rate of 16.76% compared to female faculty, who have a rate of 11.46%. Meanwhile, both female and male faculty exhibit similar utilization rates, rarely utilizing these platforms, with rates of 18.35% and 32.21%, respectively. The utilization of digital survey platforms in classroom instruction among female and male faculty is recorded at 27.85% and 21.88%, respectively. In conclusion, the utilization of digital survey platforms in classroom instruction varies among female and male faculty in B-Schools in Punjab.

Table 72. Gender-Wise Frequency of Usage of Digital Survey Platforms by Business Faculties

Frequency	**Female**	**Male**
Always	14.17%	7.43%
Often	11.46%	16.76%
Never	20.29%	29.61%
Rarely	32.21%	18.35%
Sometimes	21.88%	27.85%
Grand Total	**100.00%**	**100.00%**

5.19.2 Age-wise usage of digital survey platforms

Table 73 offers insights into the frequency of digital survey platform usage among the faculty of B-Schools in Punjab, categorized by their age-group. Most of the faculty, 47.17%, reported never utilizing these platforms in their classroom instruction. The next largest group, 25.89%, reported using digital survey platforms sometimes. A higher percentage of those aged 31–35 years, 28.57%, reported using the platforms often compared to other age-groups. The least frequent usage of these platforms was reported by those aged 40–45 years, with only 4.99% reporting always using them. The utilization of digital survey platforms among business school faculty in Punjab appears to vary according to age.

Table 73. Age-Wise Frequency of Usage of Digital Survey Platforms by Business Faculties

Frequency	**Age-Group**				
	30 Years and Below	**31-35 Years**	**36-40 Years**	**40-45 Years**	**Above 45 Years**
Always	13.01%	13.39%	17.00%	4.99%	7.00%
Often	8.79%	28.57%	23.33%	12.83%	3.64%
Never	47.17%	10.72%	22.67%	38.30%	34.82%
Rarely	17.24%	21.43%	13.33%	20.40%	40.00%
Sometimes	13.79%	25.89%	23.67%	24.47%	14.54%
Grand Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

5.19.3 Department-wise usage of digital survey platforms

The table 74 depicts the utilization of digital survey platforms in the classroom instruction of faculty belonging to the management, commerce, and economics departments of B-Schools in Punjab. The results indicate that the usage of digital survey platforms is not very widespread in the faculties of management, commerce, and economics departments. Out of the three departments, the faculty of management has the highest usage, with 23.53% of the faculty indicating they always use digital survey platforms in their classroom instruction. The faculty of economics follows closely, with 12.97% of the members indicating they always use these platforms. The faculty of commerce has the lowest usage, with only 4.42% of the members indicating they always use digital survey platforms. When combined, the results suggest that the usage of digital survey platforms in classroom instruction by faculty is not very frequent. Most of the faculty indicate that they either rarely or sometimes use these platforms, while a significant portion of them (33.63%) indicate they never use them.

Table 74. Department-Wise Frequency of Usage of Digital Survey Platforms

Frequency	**Department**		
	Commerce	**Economics**	**Management**
Always	4.42%	12.97%	23.53%
Often	12.39%	4.95%	14.71%
Never	33.63%	25.66%	37.50%
Rarely	28.32%	20.78%	5.15%
Sometimes	21.24%	35.64%	19.11%
Grand Total	**100.00%**	**100.00%**	**100.00%**

5.19.4 Findings

The presented data provides insights into the utilization of digital survey platforms in classroom instruction among faculty in B-Schools in Punjab. The findings suggest that female faculty exhibit a higher likelihood of consistently utilizing digital survey platforms in their classroom instruction, while male faculty are more likely to never utilize them. Additionally, the usage of digital survey platforms among business school faculty in Punjab appears to vary according to age, with a higher percentage of those aged 31–35 years reporting frequent usage compared to other age-groups. Furthermore, the data indicates that the usage of digital survey platforms is not very widespread among the faculties of management, commerce, and economics departments, with most of the faculty reporting rare or infrequent usage. Overall, these findings suggest that there is significant variation in the utilization of digital survey platforms in classroom instruction among faculty in B-Schools in Punjab.

5.19.5 Practical implications

The presented findings on the utilization of digital survey platforms in classroom instruction among faculty in B-Schools in Punjab have important implications for the future of education in these institutions. Firstly, the higher utilization of digital survey platforms among female faculty suggests that there may be gender differences in the adoption and use of ICT in teaching. This could imply a need for targeted support and training for male faculty to increase their comfort and proficiency with digital platforms. Secondly, the variation in platform usage according to age indicates a potential generational divide in the adoption of technology in education. B-Schools may need to consider offering professional development programs and training to support faculty across all age-groups to enhance their digital competencies. Thirdly, the low overall usage of digital survey platforms among faculty in the management, commerce, and economics departments suggests a need for B-Schools to prioritize the integration of technology in teaching and encourage its adoption to improve the quality of education and the learning experience for students. In conclusion, the presented findings suggest a need for B-Schools in Punjab to invest in professional development programs, training, and support for faculty to enhance their digital competencies and promote the adoption of technology in teaching. By doing so, B-Schools can ensure that they remain competitive and relevant in the rapidly changing landscape of education.

5.20 Data storage and backup platforms

The following section provides an overview of how business faculties use data storage and backup platforms like Google Drive, Dropbox, Microsoft OneDrive, etc. in their classroom instruction, with a focus on their gender, age-group, and department. The section also includes a detailed analysis of the findings and their potential implications for the future of teaching and learning in B-Schools.

5.20.1 Gender-wise usage of data storage and backup platforms

The table 75 provides results on the frequency of data storage and backup platforms usage in classroom instruction among female and male faculty of B-Schools in Punjab. The data is presented as percentages of the total number of respondents in each gender category. According to the table, 28.65% of female faculty always use data storage and backup platforms in their classroom instruction, while 19.62% of male faculty indicate that they always use these platforms. On the contrary, 13.54% of female faculty never use data storage and backup platforms, while 5.70% of male faculty report that they never use these platforms. Furthermore, 22.40% of female faculty often use data storage and backup platforms, while 50.00% of male faculty indicate that they often use these platforms. 25.52 percent of female faculty sometimes use data storage and backup platforms, while 10.13 percent of male faculty report that they sometimes use these platforms. Finally, 9.90% of female faculty indicate that they rarely use data storage and backup platforms, while 14.56% of male faculty indicate that they rarely use these platforms. Overall, the table provides a general overview of the frequency of usage of data storage and backup platforms in classroom instruction among female and male faculty of B-Schools in Punjab.

Table 75. Gender-Wise Frequency of Usage of Data Storage and Backup Platforms

Frequency	**Female**	**Male**
Always	28.65%	19.62%
Never	13.54%	5.70%
Often	22.40%	50.00%
Sometimes	25.52%	10.13%
Rarely	9.90%	14.56%
Grand Total	**100.00%**	**100.00%**

5.20.2 Age-wise usage of data storage and backup platforms

The table 76 represents the frequency of data storage and backup platform usage by faculty of B-Schools in Punjab, categorized by their age-group. The highest usage of these platforms was reported by those aged 30 years and under and 31–35 years, with 28.57% and 28.33%, respectively, reporting they always use them. In contrast, the lowest usage was reported by those aged 40–45 years, with only 3.19% reporting often using these platforms. Most of the faculty, 37.93%, reported using these platforms sometimes in their classroom instruction, while 24.14% reported rarely using them. The utilization of data storage and backup platforms by business school faculty in Punjab appears to vary according to age, with the younger age-groups reporting a higher frequency of usage.

Table 76. Age-Wise Frequency of Usage of Data Storage and Backup Platforms

Frequency	**Age-group**				
	30 Years and Below	**31-35 Years**	**36-40 Years**	**40-45 Years**	**Above 45 Years**
Always	15.59%	28.57%	28.33%	19.15%	34.55%
Never	12.00%	16.07%	23.65%	23.40%	7.27%
Sometimes	37.93%	36.61%	29.69%	37.23%	20.00%
Rarely	24.14%	5.36%	13.33%	17.02%	29.09%
Often	10.34%	13.39%	5.00%	3.19%	9.09%
Grand Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

5.20.3 Department-wise usage of data storage and backup platforms

The table 77 depicts the frequency of usage of data storage and backup platforms in classroom instruction by the faculty of the management, commerce, and economics departments of B-Schools in Punjab. The data represents that the usage of these platforms varies across the three departments. In the commerce department, 26.55% of the faculty always use these platforms, 32.74% use them often, 17.70% rarely use them, and 13.27% sometimes use them. On the contrary, in the economics department, 17.82% of the faculty always use these platforms, 43.56% use them often, 19.78% rarely use them, and 8.88% sometimes use them. In the management department, 27.94% of the faculty always use these platforms, 30.15% use them often, 16.91% rarely use them, and 10.29% sometimes use them. The data also shows that 9.73% of the faculty in the commerce department, 9.96% in the economics department, and 14.71% in the management department never use these platforms in their classroom instruction. It is evident that the usage of data storage and backup platforms varies across the three departments, with the highest usage being seen in the economics department.

Table 77. Department-Wise Frequency of Usage of Data Storage and Backup Platforms

Frequency	**Department**		
	Commerce	**Economics**	**Management**
Always	26.55%	17.82%	27.94%
Never	9.73%	9.96%	14.71%
Often	32.74%	43.56%	30.15%
Rarely	17.70%	19.78%	16.91%
Sometimes	13.27%	8.88%	10.29%
Grand Total	**100.00%**	**100.00%**	**100.00%**

5.20.4 Findings

The presented data provides insights into the frequency of usage of data storage and backup platforms in classroom instruction among faculty of B-Schools in Punjab. The findings reveal that female faculty report a higher frequency of always using these platforms, while male faculty report a higher frequency of often using them. Furthermore, the younger age-groups report a higher frequency of always using these platforms compared to the older age-groups. The utilization of these platforms also varies across departments, with the economics department reporting the highest frequency of usage. These findings suggest the need for targeted interventions to encourage the adoption of data storage and backup platforms in classroom instruction, especially among male faculty and older age-groups. Additionally, the findings highlight the importance of departmental context in the usage of these platforms and suggest the need for tailored strategies to promote their usage in each department. Overall, these findings have significant implications for B-Schools in Punjab in terms of enhancing their classroom instruction through the effective utilization of data storage and backup platforms.

5.20.5 Practical implications

The findings have several implications for B-Schools. First, given the increasing importance of data storage and backup platforms in today's digital world, it is important for B-Schools to provide their faculty with adequate training and resources to effectively use these platforms in their classroom instruction. This can help improve the quality of education and enhance the learning experience for students. Second, the findings suggest that there are differences in the frequency of usage of data storage and backup platforms among female and male faculty, as well as among different age-groups and departments. B-Schools can use these insights to design targeted training programs to bridge any gaps and ensure that all faculty have equal access to the necessary tools and resources. Third, the findings can also help B-Schools identify areas where they need to invest in technology and infrastructure to support the use of data storage and backup platforms. For instance, if the data shows that faculty in certain departments or age-groups rarely use these platforms, it may be an indication that there is a lack of resources or support for these groups. Overall, the findings underscore the need for B-Schools to stay up-to-date with the latest technological trends and ensure that their faculty are equipped with the necessary skills and tools to deliver high-quality education in a digital world.

5.21 Online assessment tools

The following section provides an overview of how business faculties use online assessment tools like Kahoot, Quizizz, Mentimeter, Poll Everywhere, etc. in their classroom instruction, with a focus on their gender, age-group, and department. The section also includes a detailed analysis of the findings and their potential implications for the future of teaching and learning in B-Schools.

5.21.1 Gender-wise usage of online assessment tools

The table 78 provides results on the frequency of online assessment tools usage in classroom instruction among female and male faculty of B-Schools in Punjab. The data is presented as percentages of the total number of respondents in each gender category. According to the table, 39.58% of female faculty always use online assessment tools in their classroom instruction, while 46.20% of male faculty indicate that they always use these tools. On the contrary, 18.75% of female faculty never use online assessment tools, while 4.43% of male faculty report that they never use these tools. Furthermore, 20.31% of female faculty often use online assessment tools, while 25.32% of male faculty indicate that they often use these tools. 6.77% of female faculty report that they rarely use online assessment tools, while 5.06% of male faculty report that they rarely use these tools.

Table 78. Gender-Wise Frequency of Usage of Online Assessment Tools by Business Faculties

Frequency	**Female**	**Male**
Always	39.58%	46.20%
Never	18.75%	4.43%
Often	20.31%	25.32%
Rarely	6.77%	5.06%
Sometimes	14.58%	18.99%
Grand Total	**100.00%**	**100.00%**

Finally, 14.58% of female faculty sometimes use online assessment tools, while 18.99% of male faculty indicate that they sometimes use these tools. Overall, the table provides a general overview of the frequency of usage of online assessment tools in classroom instruction among female and male faculty of B-Schools in Punjab. The data shows that a higher proportion of male faculty use online assessment tools compared to female faculty, with most of the male faculty indicating that they always use these tools in their classroom instruction.

5.21.2 Age-wise usage of online assessment tools

The table 79 presents results on the frequency of online assessment tools usage by faculty of B-Schools in Punjab, who have been divided into various age-groups. It appears that most of the faculty (38.83%) in the age-group of 31–35 years and below use these tools always in their classroom instruction. On the contrary, the least frequent usage is recorded in the age-group above 45 years, with only 6% of faculty never utilizing the tools in their classroom instruction. The frequency of usage is relatively similar in the age-groups of 36–40 years and 40–45 years, with 31.03% and 20.69% of faculty using the tools often and sometimes, respectively. Additionally, the age-group of 31–35 years has the lowest percentage (3.45%) of faculty using the tools rarely in their classroom instruction. Overall, the data suggests that online assessment tools are widely utilized by the faculty in their classroom instruction, with most of them using them often or always.

Table 79. Age-Wise Frequency of Usage of Online Assessment Tools by Business Faculties

Frequency	**Age-Group**				
	30 Years and Below	**31-35 Years**	**36-40 Years**	**40-45 Years**	**Above 45 Years**
Always	38.83%	44.64%	43.33%	42.40%	30.36%
Never	6.00%	5.20%	8.33%	21.01%	12.73%
Often	31.03%	24.21%	25.01%	13.83%	29.09%
Rarely	3.45%	7.14%	11.00%	9.99%	16.93%
Sometimes	20.69%	19.21%	12.33%	12.77%	10.89%
Grand Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

5.21.3 Department-wise usage of online assessment tools

The table 80 depicts the frequency of usage of online assessment tools in classroom instruction by the faculty of management, commerce, and economics departments of B-Schools in Punjab. The results show that in the commerce department, 40.71% of faculty always use online assessment tools in their classroom instruction. Meanwhile, in the economics department, 45.5% of faculty always use these tools. In the management department, 41.91% of faculty always use these tools. On the contrary, 8.65% of faculty in the commerce department never use online assessment tools, whereas 13.90% of faculty in the economics department and 16.18% of faculty in the management department never use these tools. The results also show that 23.89% of faculty in the Commerce department and 22.73% of faculty in the Economics department often use these tools. In comparison, the usage of online assessment tools is low in the management department, with only 9.38% of faculty using these tools often. Overall, the data indicates that the usage of online assessment tools is high among faculty of B-Schools in Punjab, particularly in the commerce and economics departments.

Table 80. Department-Wise Frequency of Usage of Online Assessment Tools

Frequency	**Department**		
	Commerce	**Economics**	**Management**
Always	40.71%	45.55%	41.91%
Never	8.65%	13.90%	16.18%

Often	23.89%	22.73%	9.38%
Rarely	7.08%	2.97%	11.35%
Sometimes	19.67%	14.85%	21.18%
Grand Total	**100.00%**	**100.00%**	**100.00%**

5.21.4 Findings

The three tables show results on the frequency of online assessment tools usage in classroom instruction among female and male faculty of B-Schools in Punjab, faculty in various age-groups, and faculty of different departments. Overall, the data suggests that online assessment tools are widely utilized by the faculty in their classroom instruction, with most of them using them often or always. However, there are variations in usage according to gender, age, and department, with male faculty, younger faculty, and those in the commerce and economics departments using these tools more frequently. The findings have implications for the adoption and implementation of online assessment tools in B-Schools and highlight the need for gender and age diversity in technology adoption and implementation.

5.21.5 Practical implications

The findings suggest that B-Schools in Punjab should focus on providing training and resources to female faculty to encourage them to use online assessment tools in their classroom instruction. Additionally, efforts could be made to address any perceived barriers or challenges that may be preventing female faculty from using these tools. B-Schools may also consider developing policies or guidelines to encourage faculty to use online assessment tools, particularly for those who are older or who work in departments where usage of these tools is lower. Finally, continued monitoring and evaluation of the usage of online assessment tools by faculty can help identify areas where improvements are needed and ensure that these tools are being used effectively and efficiently to enhance the teaching and learning experience for students.

5.22 Digital exit tickets

The following section provides an overview of how business faculties use digital exit tickets like Google Classroom, AnswerGarden, Socrative, iClicker, etc. in their classroom instruction for conducting the feedback of students, with a focus on their gender, age-group, and department. The section also includes a detailed analysis of the findings and their potential implications for the future of teaching and learning in B-Schools.

5.22.1 Gender-wise usage of digital exit tickets

The table 81 offers insight into the usage of digital exit tickets in classroom instruction among female and male faculty at B-Schools in Punjab. The information is displayed as the percentage of respondents from each gender group. It is evident from the table that a relatively low percentage of female and male faculty always utilize digital exit tickets in their teachings, with 8.29% and 7.43%, respectively. Conversely, a slightly higher percentage of female faculty never use digital exit tickets (14.0%) compared to male faculty (6.57%). Additionally, the data shows that a low percentage of female faculty, 3.14%, often use digital exit tickets, while a slightly higher percentage of male faculty, 14.57%, frequently utilize these tools. Furthermore, 8.86% of female faculty and 5.14% of male faculty report rarely using digital exit tickets. The percentage of faculty who sometimes use digital exit tickets is relatively similar between both genders, with 20.57% of female faculty and 11.43% of male faculty indicating this usage frequency. In conclusion, although a lower percentage of both genders use digital exit tickets, there is still a considerable proportion of faculty who use these tools in their classroom instruction.

Table 81. Gender-Wise Frequency of Usage of Digital Exit Tickets by Business Faculties

Frequency	Female	Male
Always	8.29%	7.43%
Never	14.00%	6.57%
Often	3.14%	14.57%
Rarely	8.86%	5.14%

Sometimes	20.57%	11.43%
Grand Total	**54.86%**	**45.14%**

5.22.2 Age-wise usage of digital exit tickets

The table 82 represents the frequency of usage of digital exit tickets in classroom instruction by the faculty of B-Schools in Punjab, who have been categorized into different age-groups. The results indicate that the usage of digital exit tickets varies according to the age-group of the faculty. The highest usage frequency of digital exit tickets has been recorded in the age-group of 30 years and below, at 41.38%. On the contrary, the age-group of 45 years and older has recorded the least usage of digital exit tickets, at 18.18%. The age-group of 36–40 years has recorded moderate usage of digital exit tickets, at 31.67%. In conclusion, the frequency of usage of digital exit tickets varies according to the age-group of the faculty, with the younger age-groups using the tool more frequently compared to the older age-groups.

Table 82. Age-Wise Frequency of Usage of Digital Exit Tickets by Business Faculties

Frequency	**Age-Group**				
	30 Years and Below	**31-35 Years**	**36-40 Years**	**40-45 Years**	**Above 45 Years**
Never	24.14%	18.75%	11.67%	10.64%	18.18%
Always	10.34%	13.39%	31.67%	27.66%	16.36%
Often	6.90%	19.64%	10.00%	30.85%	5.45%
Sometimes	17.24%	9.82%	29.33%	12.77%	12.73%
Rarely	41.38%	38.39%	17.33%	18.09%	47.27%
Grand Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

5.22.3 Department-wise usage of digital exit tickets

The table 83 represents the frequency of usage of digital exit tickets in classroom instruction by the faculty of management, commerce, and economics departments of the B-Schools of Punjab. The results indicate that the usage of digital exit tickets is not very frequent among the faculty, with most of them either never using it (35.40% in commerce, 26.83% in economics, and 32.79% in management) or using it rarely

(25.09% in commerce, 13.86% in economics, and 11.24% in management). On the contrary, a small percentage of faculty always use it (13.27% in commerce, 16.83% in economics, and 16.91% in management) or sometimes use it (21.20% in commerce, 23.68% in economics, and 18.68% in management). The usage of digital exit tickets is least frequent in the economics department and highest in the management department.

Table 83. Department-Wise Frequency of Usage of Digital Exit Tickets by Business Faculties

Frequency	**Department**		
	Commerce	**Economics**	**Management**
Always	13.27%	16.83%	16.91%
Never	35.40%	26.83%	32.79%
Often	5.04%	18.80%	20.38%
Rarely	25.09%	13.86%	11.24%
Sometimes	21.20%	23.68%	18.68%
Grand Total	**100.00%**	**100.00%**	**100.00%**

5.22.4 Findings

The provided tables offer insights into the usage of digital exit tickets in classroom instruction among female and male faculty at B-Schools in Punjab, categorized by gender and age-group, as well as by department. The findings indicate that a relatively low percentage of both female and male faculty always utilize digital exit tickets in their teaching. However, there is still a considerable proportion of faculty who use these tools in their classroom instruction. Additionally, the frequency of usage of digital exit tickets varies according to the age-group of the faculty, with younger age-groups using the tool more frequently compared to the older age-groups. Lastly, the usage of digital exit tickets is not very frequent among the faculty of management, commerce, and economics departments, with the majority either never using it or using it rarely. The management department has the highest usage frequency, and the economics department has the least.

5.22.5 Practical implications

The findings suggest that there is a low frequency of usage of digital exit tickets in classroom instruction among faculty at B-Schools in Punjab. This presents an opportunity for these schools to promote and encourage the use of these tools among their faculty, especially their younger and female members, who are less likely to use them. Implementing training programs, workshops, and providing resources on how to effectively use digital exit tickets in classroom instruction could help increase their usage and promote student engagement and learning outcomes. Additionally, further research could explore the potential impact of increased usage of digital exit tickets on student achievement and learning outcomes in the context of B-Schools.

5.23 Online class calendars

The following section provides an overview of how business faculties use online class calendars like Google Calendar, TimeTree, Gizmoa, Canva, etc. for organizing class schedules, with a focus on their gender, age-group, and department. The section also includes a detailed analysis of the findings and their potential implications for the future of teaching and learning in B-Schools.

5.23.1 Gender-wise usage of online class calendars

The data presented in the table 84 offers insights into the usage patterns of online class calendars among female and male faculty in B-Schools in Punjab. The frequency of usage is expressed as a percentage of the total number of respondents from each gender. It can be observed that while a larger percentage of male faculty (31.6%) report using online class calendars "always,", the highest percentage of female faculty (31.4%) reported "never" using them. On the contrary, a relatively small number of both female and male faculty (10.74% and 19.79%, respectively) reported using the tool "often". The usage of online class calendars was reported "sometimes" by 19.27% of female faculty and 9.49% of male faculty, and "rarely" by 18.75% of female faculty and 12.66% of male faculty.

Table 84. Gender-Wise Frequency of Usage of Online Class Calendars by Business Faculties

Frequency	Female	Male
Always	19.79%	31.65%
Never	31.45%	10.76%
Often	10.74%	35.44%

Rarely	18.75%	12.66%
Sometimes	19.27%	9.49%
Grand Total	**100.00%**	**100.00%**

5.23.2 Age-wise usage of online class calendars

Table 85 represents the frequency of usage of the online class calendar in classroom instruction by the faculty of B-Schools in Punjab, grouped by age. The data shows that most of the faculty who are between 31 and 35 years old and 36 and 40 years old use the online class calendar either sometimes or very often. Around 35.48% of the faculty who are 30 years old and below never use the online class calendar in their classroom instruction, which is the highest percentage among all age-groups. On the contrary, only 6.4% of the faculty in the same age-group use it always. Faculty above 45 years old use the online class calendar most often, with a percentage of 20.37. Meanwhile, only 19.08% of faculty in the same age-group never use the tool. In conclusion, the usage of the online class calendar in classroom instruction varies among different age-groups of the faculty in B-Schools in Punjab. Most of the faculty use it sometimes or often, while some never use it.

Table 85. Age-Wise Frequency of Usage of Online Class Calendars by Business Faculties

Frequency	**Age-Group**				
	30 Years and Below	**31-35 Years**	**36-40 Years**	**40-45 Years**	**Above 45 Years**
Never	35.48%	25.89%	20.88%	27.66%	19.08%
Always	6.40%	7.04%	26.33%	26.60%	26.19%
Sometimes	14.29%	42.07%	11.32%	24.47%	18.00%
Rarely	27.59%	5.25%	24.80%	11.83%	16.36%
Often	16.24%	19.75%	16.67%	9.45%	20.37%
Grand Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

5.23.3 Department-wise usage of online class calendars

The table 86 show results on the frequency of utilization of the online class calendar in classroom instruction by faculty of management, commerce, and economics departments in B-Schools in Punjab. After examining the data, it becomes apparent that a mere 3.89% of faculty in the commerce department, 11.76% in the economics department, and 30.88% in the management department consistently employed the tool in their teaching endeavors. Conversely, a significant portion of faculty, namely 37.70% in the commerce department, 14.85% in the economics department, and 15.44% in the management department, rarely made use of the tool. In conclusion, the use of the online class calendar in classroom instruction varies among the three departments, with a higher usage rate in the management department and a lower usage rate in the economics department.

Table 86. Department-Wise Frequency of Usage of Online Class Calendars

Frequency	**Department**		
	Commerce	**Economics**	**Management**
Always	3.89%	11.76%	30.88%
Never	30.35%	40.83%	22.79%
Often	13.01%	22.76%	19.85%
Rarely	37.70%	14.85%	15.44%
Sometimes	15.05%	9.80%	11.04%
Grand Total	**100.00%**	**100.00%**	**100.00%**

5.23.4 Findings

As per the data presented in the tables, the overall usage of online class calendars in classroom instruction among faculty in B-Schools in Punjab is relatively low. Most of the faculty use the tool sometimes or rarely, while a small percentage use it often or always. The usage also varies among different age-groups and departments, with higher usage rates among younger faculty and those in management departments. Overall, the findings suggest that there is potential for increased adoption and integration of online class calendars in classroom instruction among faculty in B-Schools in Punjab.

5.23.5 Practical implications

The findings suggest that there is a wide variation in the usage of online class calendars among faculty in B-Schools in Punjab, with differences observed by gender, age, and department. These findings have several implications for B-Schools. Firstly, there may be a need for greater training and support to ensure that faculty are aware of the benefits of online class calendars and how to use them effectively. This could involve providing more resources and training opportunities for faculty, as well as promoting the benefits of online class calendars. Secondly, there may be a need to explore and address any potential gender or age-related barriers to using online class calendars. For example, if female faculty are less likely to use online class calendars, it may be useful to investigate the reasons for this and address any potential barriers. Thirdly, the findings suggest that there may be differences in the usage of online class calendars among different departments. This could indicate a need for more targeted interventions or support for certain departments to ensure that all faculty are able to use the tool effectively. Overall, the findings suggest that there is a need for B-Schools to continue to promote and support the use of online class calendars, while also addressing any potential barriers to usage.

5.24 Social media

The following section provides an overview of how business faculties use social media like Twitter, Blogger, Instagram, Facebook, etc. in their classroom instruction, with a focus on their gender, age-group, and department. The section also includes a detailed analysis of the findings and their potential implications for the future of teaching and learning in B-Schools.

5.24.1 Gender-wise usage of social media

The table 87 represents the frequency of usage of social media in classroom instruction by female and male faculty of B-Schools in Punjab. The results of the survey indicate that 20.83% of female faculty and 31.99% of male faculty always use social media in their classroom instruction. On the contrary, 28.44% of female faculty and 17.09% of male faculty never use social media in their classroom instruction. Furthermore, 17.71% of female faculty and 11.68% of male faculty often use social media in their classroom instruction. 10.94% of female faculty and 8.23% of male faculty rarely use social media in their classroom instruction, while 22.08% of female faculty and 31.01% of male faculty sometimes use social media in their classroom instruction. The results of the survey indicate that male faculty are more likely to use social media in their classroom instruction than female faculty. However, it is important to note that a considerable percentage of both female and male faculty never use social media in their classroom instruction.

Table 87. Gender-Wise Frequency of Usage of Social Media by Business Faculties

Frequency	**Female**	**Male**
Always	20.83%	31.99%
Never	28.44%	17.09%
Often	17.71%	11.68%
Rarely	10.94%	8.23%
Sometimes	22.08%	31.01%
Grand Total	**100.00%**	**100.00%**

5.24.2 Age-wise usage of social media

The table 88 represents the frequency of usage of social media in classroom instruction by faculty of B-Schools in Punjab, categorized by age-groups. It appears that faculty who are 30 years and below, and 31-35 years use social media in classroom instruction "Often" and "Sometimes" the most, with 18.25% and 26.77% respectively. The least frequent usage is "never,", with 13.78% and 14.18%, respectively. The groups 36–40 years and 40–45 years also show similar trends in usage, with the most frequent being "Sometimes" and "Often". The group above 45 years has the highest percentage of "often" usage, with 25.45%, and the lowest "never" usage, with 16.36%.

Table 88. Age-Wise Frequency of Usage of Social Media by Business Faculties

Frequency	**Age-Group**				
	30 Years and Below	**31-35 Years**	**36-40 Years**	**40-45 Years**	**Above 45 Years**
Never	13.78%	16.00%	27.00%	27.66%	16.36%
Often	18.25%	14.18%	19.78%	21.65%	25.45%
Always	23.15%	28.46%	20.55%	12.77%	21.00%
Rarely	14.79%	14.59%	15.67%	12.64%	9.92%
Sometimes	30.03%	26.77%	17.00%	25.28%	27.26%
Grand Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

5.24.3 Department-wise usage of social media

The following table 89 depicts the frequency of usage of social media in classroom instruction by the faculty of the management, commerce, and economics departments of B-Schools in Punjab. The data shows that the highest usage of social media in classroom instruction can be observed among the faculty of the Management department, with a frequency of 38.38%. Meanwhile, the lowest frequency of usage of social media in classroom instruction can be seen among the faculty of the Economics department, with a frequency of 12.87% "never" usage. The overall frequency of "always" usage is 16.81%, and "sometimes" usage is 7.96%. The usage of social media in classroom instruction is moderately high, with a frequency of 19.47% "Often". The frequency of "rarely" usage is 31.86%.

Table 89. Department-Wise Frequency of Usage of Social Media by Business Faculties

Frequency	**Department**		
	Commerce	**Economics**	**Management**
Always	16.81%	25.74%	38.38%
Never	23.89%	12.87%	23.53%
Often	19.47%	19.80%	22.80%
Rarely	31.86%	30.69%	10.29%
Sometimes	7.96%	10.90%	5.00%
Grand Total	**100.00%**	**100.00%**	**100.00%**

5.24.4 Findings

The survey results on the usage of social media in classroom instruction by faculty of B-Schools in Punjab reveal that a significant percentage of both female and male faculty never use social media in their classroom instruction. However, male faculty are more likely to use social media than female faculty. Usage of social media in classroom instruction varies across different age-groups, with the highest usage among faculty who are 30 years of age and younger or older than 45 years. The management department has the highest frequency of social media usage in classroom instruction, while the economics department has the lowest. These findings suggest that B-Schools should consider promoting the use of social media in classroom instruction and provide training for faculty to effectively integrate social media into their teaching pedagogy.

5.24.5 Practical implications

The findings suggest that social media is being used to a moderate extent in classroom instruction by faculty of B-Schools in Punjab, with significant differences observed in usage patterns according to gender, age, and department. The higher usage of social media by male faculty, younger age-groups, and those in the management department indicates a need for more training and support for female faculty, older age-groups, and faculty in other departments to integrate social media effectively into their classroom instruction. B-Schools can provide training and resources to help faculty develop skills and knowledge in the effective use of social media to enhance teaching and learning. Additionally, these findings highlight the need for further research to understand the factors that influence the adoption and effective use of social media in classroom instruction in B-Schools.

5.25 Simulation games

The following section gives an overview of how business faculties use simulation games in their classroom instruction, with a focus on their gender, age-group, and department. The section also includes a detailed analysis of the findings and their potential implications for the future of teaching and learning in B-Schools.

5.25.1 Gender-wise usage of simulation games

Table 90 represents the frequency of usage of simulation games in classroom instruction gender-wise. It indicates that most of the male faculty, 42.61%, always use simulation games in their classroom instruction. While 26.04% of female faculty always use simulation games, on the contrary, the least usage of simulation games is seen among the female faculty who never use them, which is 12.38%. It is to be noted that the overall usage of simulation games in classroom instruction among both female and male faculty is quite high, with over 60% of the total faculty using them either often or always.

Table 90. Gender-Wise Frequency of Usage of Simulation Games by Business Faculties

Frequency	**Female**	**Male**
Never	12.38%	3.16%
Sometimes	24.60%	16.46%
Often	22.40%	15.62%
Rarely	14.58%	22.15%
Always	26.04%	42.61%
Grand Total	**100.00%**	**100.00%**

5.25.2 Age-wise usage of simulation games

The table 91 provides results on the frequency of utilization of simulation games in classroom instruction by faculty of B-Schools in Punjab, categorized by age-groups. The results show that the utilization of simulation games in classroom instruction among faculty is not consistent, as the frequency of utilization varies among different age-groups. The age-group of 31–35 years has the highest frequency of utilization recorded as "often," at 21.43%. The highest frequency of utilization recorded as "sometimes" is in the age-group above 45 years, at 38.07%. The age-group of 36–40 years has the highest frequency of utilization recorded as "rarely," with 28.00%. The age-group of 30 years and below has the highest frequency of utilization recorded as "always," with 19.86%. The age-group of 40–45 years has the lowest frequency of utilization recorded as "always," with 7.45%.

Table 91. Age-Wise Frequency of Usage of Simulation Games by Business Faculties

Frequency	**Age-Group**				
	30 Years and Below	**31-35 Years**	**36-40 Years**	**40-45 Years**	**Above 45 Years**
Always	19.86%	18.29%	10.09%	7.45%	11.14%
Never	13.22%	25.46%	11.67%	21.99%	25.00%
Often	24.14%	21.43%	28.24%	16.22%	13.04%
Rarely	28.50%	14.29%	28.00%	20.30%	12.72%
Sometimes	14.28%	20.54%	21.00%	34.04%	38.07%
Grand Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

5.25.3 Department-wise usage of simulation games

Table 92 shows results on the frequency of usage of simulation games in classroom instruction by the faculty of management, commerce, and economics departments of B-Schools in Punjab. The data indicates that the percentage of faculty who use simulation games "always" is highest in the management department (32.35%), followed by the commerce department (17.08%), and the economics department (25.74%). On the contrary, the percentage of faculty who "never" use simulation games is highest in the commerce department (25.66%), followed by the management department (20.59%), and the economics department (3.96%). Additionally, the percentage of faculty who use simulation games "often" or "sometimes" is highest in the Economics department (22.77% and 28.71%, respectively), followed by the management department (22.79% and 16.18%, respectively), and the commerce department (19.35% and 24.64%, respectively). The percentage of faculty who use simulation games "rarely" is highest in the economics department (18.82%), followed by the commerce department (13.27%), and the management department (8.09%). In conclusion, the data suggests that the frequency of usage of simulation games varies across different departments, with the highest usage seen in the management department and the lowest usage in the commerce department.

Table 92. Department-Wise Frequency of Usage of Simulation Games by Business Faculties

Frequency	**Department**		
	Commerce	**Economics**	**Management**
Always	17.08%	25.74%	32.35%
Never	25.66%	3.96%	20.59%
Often	19.35%	22.77%	22.79%
Rarely	13.27%	18.82%	8.09%
Sometimes	24.64%	28.71%	16.18%
Grand Total	**100.00%**	**100.00%**	**100.00%**

5.25.4 Findings

Overall, the tables present results on the frequency of usage of simulation games in classroom instruction by faculty of B-Schools in Punjab. The results show that there is a high overall usage of simulation games in classroom instruction among both female and male faculty. The highest usage is seen in the management department, and the lowest usage is seen in the commerce department. These findings suggest that B-Schools should consider promoting the use of simulation games in classroom instruction and provide training and resources to ensure that faculty are equipped to effectively use them in their courses.

5.25.5 Practical implications

According to the findings provided in the three tables, there are several lessons that B-Schools can learn. Firstly, the use of simulation games in classroom instruction is quite common among faculty, with over 60% of total faculty using it either often or always. Therefore, it could be beneficial for B-Schools to promote the use of simulation games as an effective teaching method to improve student engagement and learning outcomes. Secondly, there is a variation in the frequency of utilization of simulation games among different age-groups and departments. B-Schools should explore the reasons behind these variations and develop strategies to encourage faculty in departments with lower utilization rates to incorporate simulation games in their classroom instruction. Thirdly, there is a gender difference in the usage of simulation games, with male faculty utilizing them more frequently than their female counterparts. This suggests that B-Schools should strive to promote gender equity in the utilization of innovative classroom instruction methods such as simulation games to ensure that all students benefit from effective teaching techniques. Overall, these findings indicate that simulation games are an effective teaching tool, and their usage can be optimized in B-Schools by promoting their adoption across departments, age-groups, and genders.

5.26 Peer assessment tools

The following section provides an overview of how business faculties use peer assessment tools like PeerGrade, PeerStudio, and TeamMates in their classroom instruction, with a focus on their gender, age-group, and department. The section also includes a detailed analysis of the findings and their potential implications for the future of teaching and learning in B-Schools.

5.26.1 Gender-wise usage of peer assessment tools

The table 93 represents the frequency of usage of peer assessment tools in classroom instruction by the female and male faculty of B-Schools in Punjab. The data shows that almost half of the female faculty (46.35%) never uses peer assessment tools, while only 41.14% of male faculty share the same stance. On the contrary, a higher percentage of male faculty (26.58%) often use peer assessment tools compared to female faculty (22.40%). A relatively small percentage of both female and male faculty (7.29% and 7.81%, respectively) always use peer assessment tools. The data suggests that female and male faculty in B-Schools in Punjab have varying frequencies of using peer assessment tools in their classroom instruction.

Table 93. Gender-Wise Frequency of Usage of Peer Assessment Tools by Business Faculties

Frequency	**Female**	**Male**
Always	7.29%	0.63%
Never	46.35%	41.14%
Often	22.40%	26.58%
Rarely	16.15%	10.13%
Sometimes	7.81%	21.52%
Grand Total	**100.00%**	**100.00%**

5.26.2 Age-wise usage of peer assessment tools

Table 94 present results on the frequency of utilization of peer assessment tools in classroom instruction by faculty of B-Schools in Punjab, categorized by age-groups. The results indicate that most of the faculty do not utilize peer assessment tools in their classroom instruction, as the highest frequency of utilization is recorded as "never," with 55.17% in the age-group of 30 years and below, 31.25% in the age-group of 31-35 years, 40.05% in the age-group of 36-40 years, 44.68% in the age-group of 40-45 years, and 39.36% in the age-group above 45 years. The age-group above 45 years has the highest frequency of utilization recorded as "always," with 17.00%. The lowest frequency of utilization recorded as "always" is in the age-group of 30 years and below, at 9.01%. The age-group of 31–35 years has the highest frequency of utilization recorded as "often," with 33.93%. The age-group of 40–45 years has the lowest frequency of utilization recorded as "rarely," with 3.19%.

Table 94. Age-Wise Frequency of Usage of Peer Assessment Tools by Business Faculties

Frequency	**Age-Group**				
	30 Years and Below	**31-35 Years**	**36-40 Years**	**40-45 Years**	**Above 45 Years**
Always	9.01%	7.14%	9.75%	14.45%	17.00%
Never	55.17%	31.25%	40.05%	44.68%	39.36%
Often	15.24%	33.93%	13.33%	21.72%	12.73%
Rarely	13.79%	14.29%	20.20%	3.19%	21.82%
Sometimes	6.79%	13.39%	16.67%	15.96%	9.09%
Grand Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

5.26.3 Department-wise usage of peer assessment tools

The table 95 present the results on the frequency of utilization of peer assessment tools in classroom instruction by faculty from the management, commerce, and economics departments of B-Schools in Punjab. The results indicate that the usage of peer assessment tools is not widespread among the faculty, as the highest frequency of utilization is recorded as "Never," with 49.67% in the commerce department, 35.62% in the economics department, and 44.85% in the management department. Conversely, the least frequent utilization is recorded as "always," with only 2.65% in the commerce department, 5.96% in the economics department, and 12.50% in the management department. The economics department has the highest frequency of utilization recorded as "often," with 34.65%, followed by the management department with 20.59%. The commerce department has the lowest frequency of utilization recorded as "often," with 19.47%.

Table 95. Department-Wise Frequency of Usage of Peer Assessment Tools

Frequency	**Department**		
	Commerce	**Economics**	**Management**
Always	2.65%	5.96%	12.50%
Never	49.67%	35.62%	44.85%
Often	19.47%	34.65%	20.59%

Rarely	11.40%	15.85%	5.88%
Sometimes	16.81%	7.92%	16.18%
Grand Total	**100.00%**	**100.00%**	**100.00%**

5.26.4 Findings

Overall, the findings suggest that the use of peer assessment tools in classroom instruction among faculty of B-Schools in Punjab is not yet widespread, with most of the faculty reporting that they never use these tools. The data also reveals that there are differences in the frequency of usage according to gender, age-group, and department, indicating a need for more targeted strategies to promote the adoption of these tools among different groups. As peer assessment can have significant benefits for student learning, it is important for B-Schools to consider ways to increase the uptake of these tools in their teaching practices.

5.26.5 Practical implications

The findings suggest that there is a low frequency of utilization of peer assessment tools in classroom instruction among the faculty of B-Schools in Punjab, regardless of their gender, age-group, or department. This highlights the need for increased awareness and training on the benefits of using peer assessment tools in teaching to enhance students' learning and development. B-Schools may consider incorporating such training programs into their faculty development plans to encourage and equip faculty with the necessary skills and knowledge to effectively integrate peer assessment tools into their classroom instruction. Additionally, B-Schools could conduct further research to identify the reasons behind the low utilization of peer assessment tools and explore ways to address any identified barriers or challenges.

This section highlighted the frequency of usage of various ICT tools and applications by business faculties. The following section highlights the frequency with which business faculties execute various tasks through ICT.

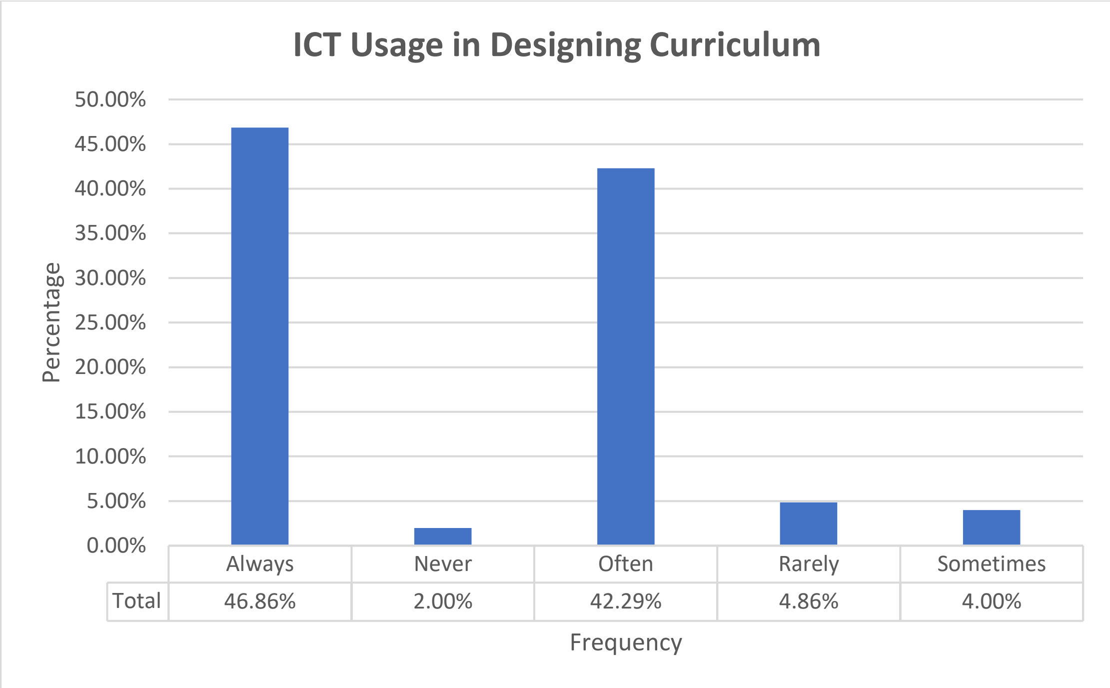
5.27 Tasks executed through ICT

This section presents the details of various tasks that the business faculties perform with the help of ICT. It also highlights the frequency with which such tasks are performed.

5.27.1 ICT usage in designing curriculum

The figure 11 below represents the frequency of usage of ICT by the faculty of B-Schools in various universities for designing curriculum. The data indicates that a majority of the faculty, 46.86%, always uses ICT for designing curriculum. Another 42.29% use ICT often, while only 4.86% use it rarely. Only 4.00% of the faculty use ICT sometimes for designing curriculum, and 2.00% never use ICT for this purpose. This indicates that a significant majority of the business school faculty in these universities use ICT frequently or always for designing the curriculum. The findings suggest that there is a high frequency of ICT usage by faculty in B-Schools for designing curricula in various universities. This underscores the importance of integrating ICT into the curriculum development process in B-Schools. B-Schools may consider investing in ICT infrastructure and providing training to faculty to enhance their ICT skills and knowledge. Additionally, these findings may encourage more universities to prioritize the integration of ICT in curriculum development and ultimately improve the quality of education provided to students.

Figure 11. Frequency of ICT Usage by Business Faculty in Designing Curriculum.

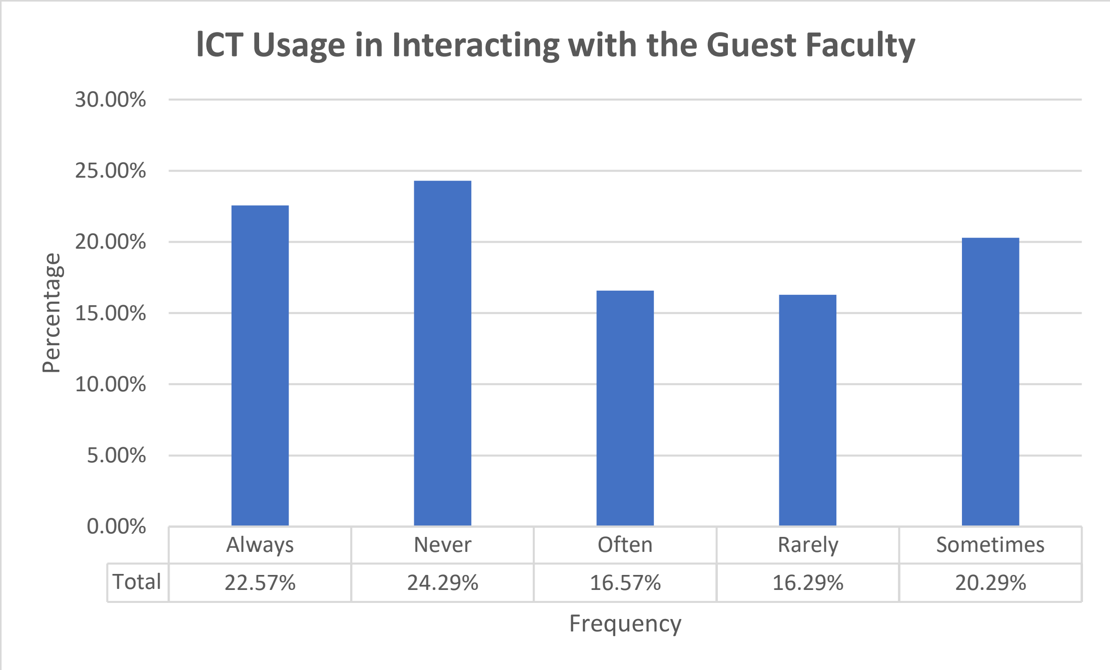


5.27.2 ICT usage in interacting with the guest faculty

The figure 12 represents the frequency of ICT usage by business school faculty in various universities for interacting with guest faculty. Approximately 46.86% of the faculty use ICT "often" or "always" when interacting with guest faculty, while around 25.58% never or rarely use ICT for this purpose. This suggests that while a significant portion of the faculty are taking advantage of technology for interacting with guest faculty, there is still a large segment that may not be using it as often. In terms of practical implications, this information can help educators understand the current level of technology adoption and utilization among their peers and make decisions about investing in or expanding the use of technology for guest faculty interactions in the future.

The findings suggest that while a considerable proportion of business school faculty in various universities are utilizing ICT for interacting with guest faculty, there is still a significant number of faculty who are not using it as frequently. This highlights the need for institutions to encourage and support faculty in adopting and utilizing ICT tools effectively, particularly for important academic activities like guest faculty interactions. By providing necessary training and resources, B-Schools can promote a culture of technology adoption and enhance the overall quality of education they provide.

Figure 12. *Frequency of ICT Usage by Business Faculty in Guest Interaction*

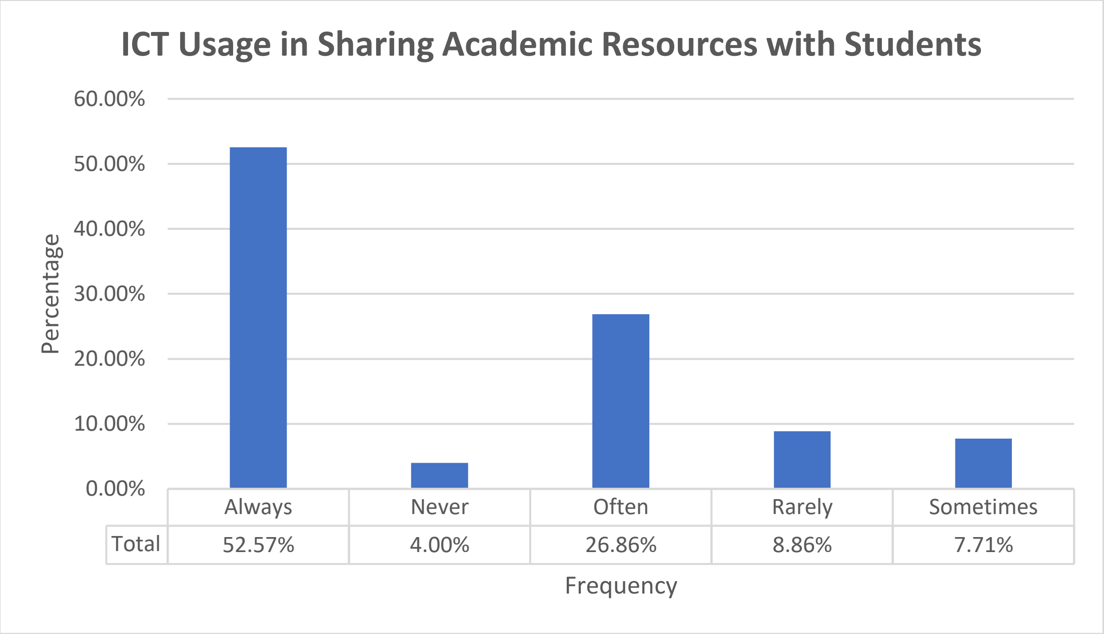


5.27.3 ICT usage in sharing academic resources with students

The figure 13 below represents the frequency of ICT usage by the faculty of B-Schools in various universities for sharing academic resources with students. According to the data, about 52.57% of the faculty always use ICT for sharing academic resources, 26.86% often use ICT for the same, 8.86% rarely use it, 7.71% sometimes use it, and only 4.00% never use it. The practical implications of this data suggest that a significant majority of the faculty in B-Schools use ICT for sharing lecture notes with their students. This indicates a high level of integration and adoption of technology in the education realm of these universities. The use of ICT in sharing academic resources can also provide students with access to digital materials that they can review and study at any time, improving their overall learning experience.

The data presented in the figure suggests that the integration and adoption of technology in the education systems of various universities are high, with a significant majority of faculty in B-Schools using ICT for sharing lecture notes with their students. The high frequency of ICT usage for this purpose can improve the overall learning experience of students by providing them with access to digital materials that they can review and study at any time. The findings highlight the importance of continued investment in ICT infrastructure and training for faculty to promote further adoption of technology in education.

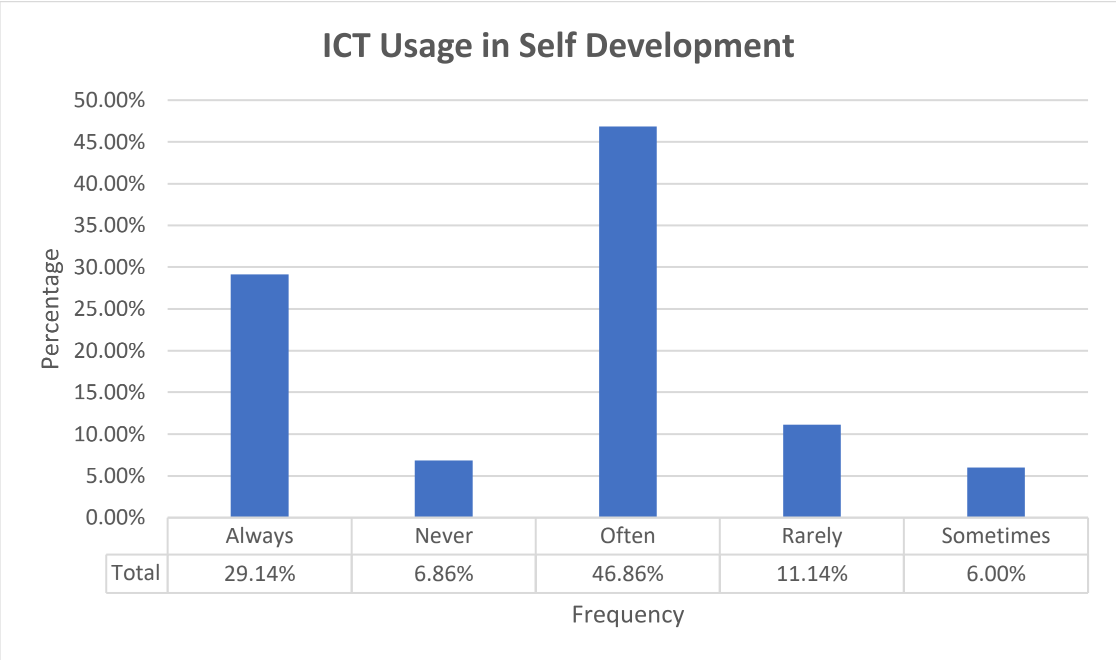
Figure 13. *Frequency of ICT Usage by Business Faculty in Sharing* Academic Resources



5.27.4 ICT usage in self-development

The frequency of usage of ICT by the faculty of B-Schools in various universities for attending online courses, faculty development programs (FDPs), workshops, etc. has been analyzed, and the results are shown in the figure 14. The data reveals that 29.14% of the faculty always use ICT for attending such events, 46.86% of them often use ICT, 11.14% rarely use ICT, 6.00% sometimes use ICT, and 6.86% never use ICT. This data has several practical implications. Firstly, it indicates that a significant number of faculty in B-Schools are open to using ICT for professional development. This is a positive trend, as it shows that these faculty are eager to learn and grow in their careers. Secondly, it also highlights the increasing availability of online courses, FDPs, workshops, etc. for faculty, which is a testament to the growth of technology in education. Thirdly, the high percentage of faculty who often use ICT for attending these events suggests that they value the convenience and accessibility that ICT provides. In conclusion, the results of this data analysis indicate that the faculty of B-Schools in various universities have adopted ICT as a tool for their professional development. This bodes well for the future of education, as it shows that faculty are taking advantage of technology to improve their skills and knowledge.

Figure 14. *Frequency of ICT Usage by Business Faculty in Self Development*

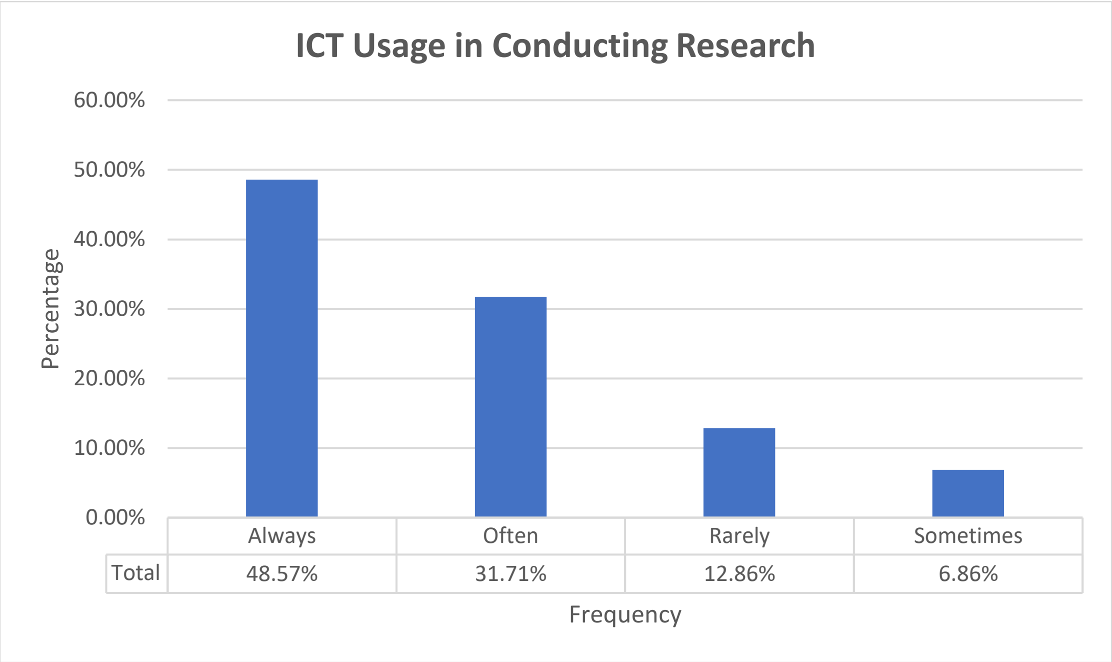


5.27.5 ICT usage in conducting research

Figure 15 provides a summary of the frequency of usage of ICT by the faculty of B-Schools at various universities for conducting research. The data indicates that 48.57% of the faculty always use ICT for research purposes, 31.71% use it often, 12.86% use it rarely, and 6.86% use it sometimes. The high usage of ICT for research purposes by the faculty of B-Schools demonstrates their adoption of technology in conducting research. In practical terms, this data suggests that most of the faculty are leveraging technology to aid their research work. They are likely utilizing online databases, research tools, and other relevant resources to gather and analyze information.

As technology continues to advance, the future prospects of ICT usage for research purposes in the field of B-School education look promising. It is likely that more advanced and user-friendly research tools will become available, further enhancing the faculty's ability to conduct research efficiently and effectively. Additionally, the increasing availability of online resources and the trend towards digitalization in academia will likely drive more widespread usage of ICT in research.

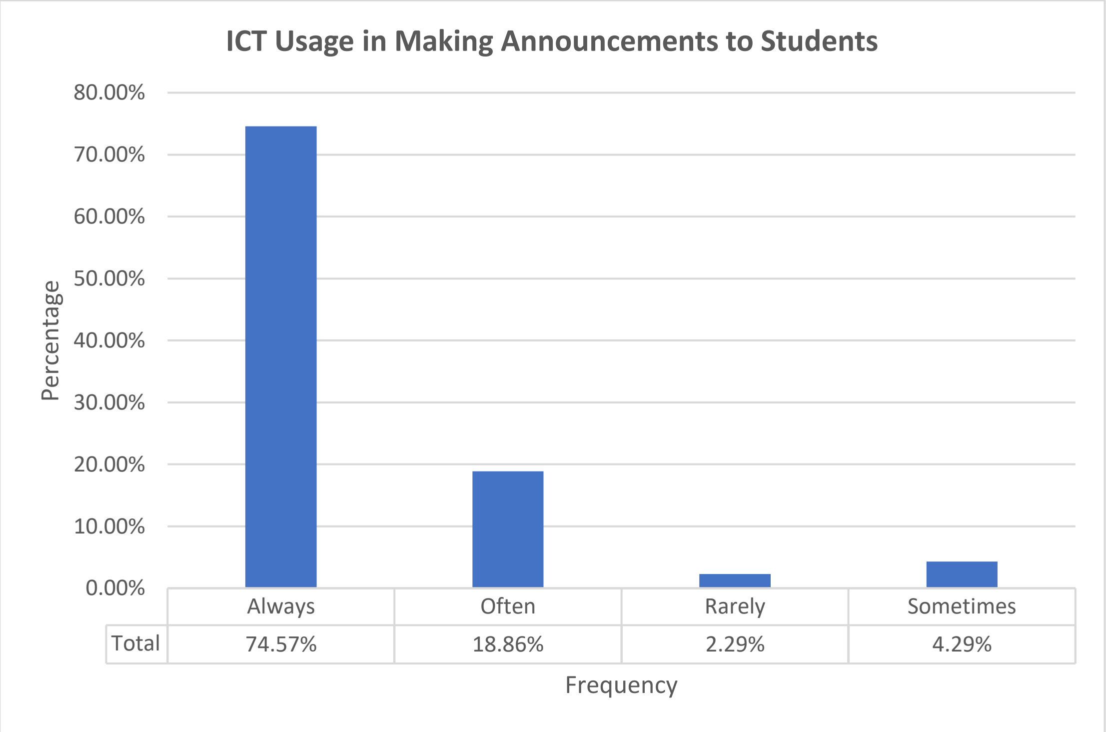
Figure 15. Frequency of ICT Usage by Business Faculty in Conducting Research



5.27.6 ICT usage in making announcements to students

The figure 16 highlights the frequency of ICT usage by the faculty of B-Schools in various universities for making announcements to students. As per the data, 74.57% of the faculty always make announcements to students using ICT, while 18.86% often do so. Only 2.29% of the faculty rarely make announcements using ICT, and 4.29% sometimes do so. This data has practical implications for the faculty, students, and institutions. With a majority of the faculty making announcements using ICT, students can expect to receive timely and accurate information about their courses and academic activities. This enhances their learning experience and helps with effective time management. Additionally, it allows institutions to keep their students informed of important updates, reducing the chances of misunderstandings or miscommunications. In terms of future prospects, it is likely that the trend of using ICT for making announcements will continue to grow as technology continues to advance and become more widely adopted. The use of ICT can help improve the efficiency and accuracy of communication between the faculty, students, and institutions, which can have a positive impact on the overall education experience.

Figure 16. Frequency of ICT Usage by Business Faculty in Making Announcements to Students

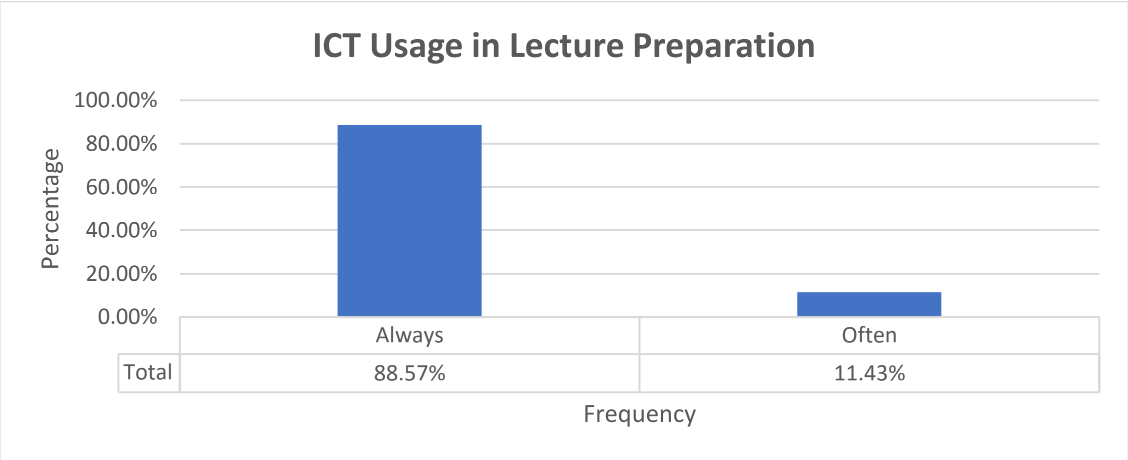


5.27.7 ICT usage in lecture preparation

Figure 17 represents the frequency of ICT usage by faculty in B-Schools for lecture preparation. The data shows that a significant majority of faculty (88.57%) use ICT for preparing lectures always, while a smaller proportion (11.43%) use it often for the same purpose. The high frequency of ICT usage by most of the faculty in preparing lectures suggests that they recognize the benefits of using technology to enhance their lecture delivery and preparation. This can lead to an increase in student engagement, an easier and more efficient lecture preparation process, and improved course content.

The practical implications of this data suggest that most of the faculty in B-Schools have embraced ICT as a tool for lecture preparation, enabling them to utilize digital resources and multimedia in the process. This indicates a growing trend towards technology-enhanced teaching in the HE sector. The future prospects of ICT usage in lecture preparation appear to be positive, with a majority of faculty already utilizing the technology in this manner. It is expected that as technology continues to evolve, its use in education will also expand, and ICT will play an even more significant role in enhancing the quality of teaching and learning experiences. It is, therefore, important for faculty to continually upgrade their technological skills to keep pace with advancements in the field.

Figure 17. Frequency of ICT Usage by Business Faculty in Lecture Preparation



5.28 Chapter summary

In conclusion, the study aimed to report the frequency of ICT usage by business faculties in their classroom instruction. The findings revealed that there was a high level of ICT usage in classroom instruction by business faculties, with most of them using a variety of ICT tools and platforms to enhance their teaching effectiveness. There are certain technologies that are frequently used, while others are used to a lesser extent. For example, technologies such as presentation software, learning management systems, and video conferencing platforms are commonly used by faculty for various classroom instruction. On the contrary, technologies such as smart boards, peer assessment tools, digital exit tickets, online class calendars, etc. are used to a lesser extent, as they may require specialized skills or resources. These results demonstrate the increasing importance of ICT in HE and the need for business faculties to continuously adapt and improve their skills to stay up-to-date with technological advancements. Overall, the study highlights the crucial role of ICT in education and its potential to improve the quality of teaching and learning outcomes.

CHAPTER-6

FACTORS SHAPING THE BEHAVIOURAL INTENTION OF BUSINESS FACULTIES TO USE ICT IN CLASSROOM INSTRUCTION

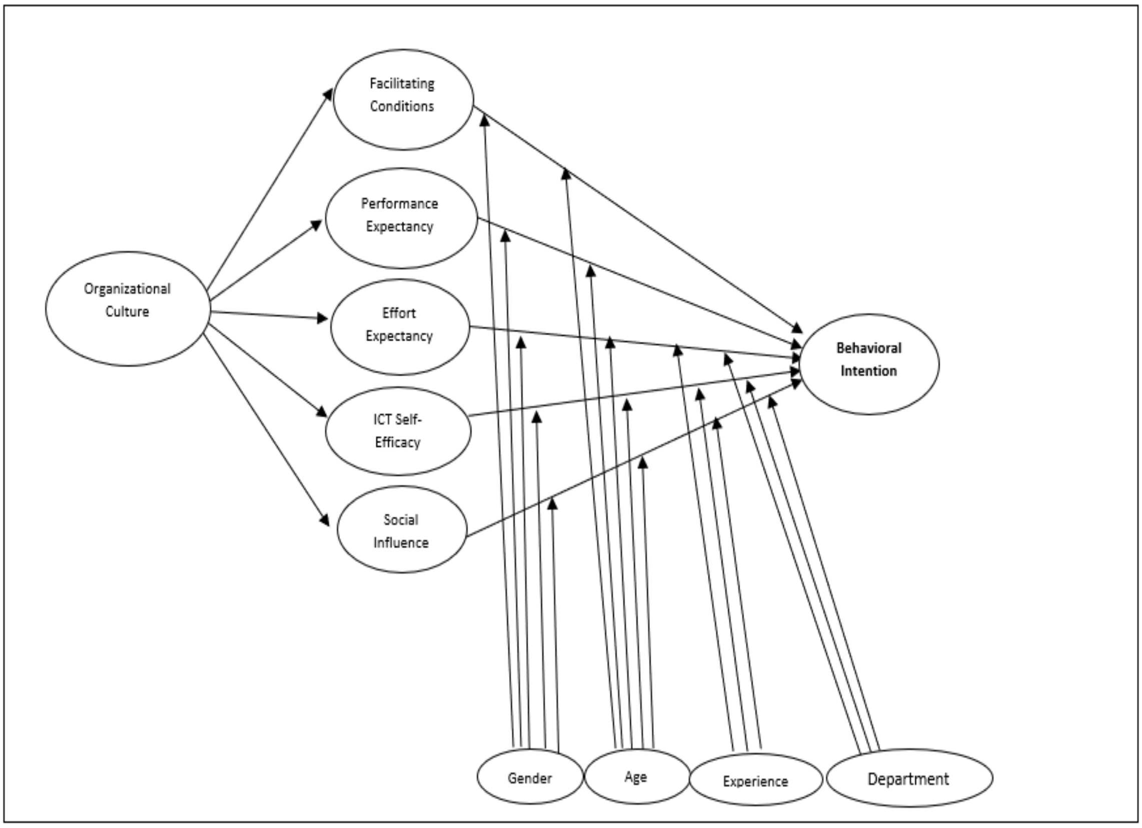
Chapter overview

The integration of technology in education has been rapidly progressing, and educators are increasingly embracing it to enhance the teaching and learning experiences within classrooms. However, the process of adopting and effectively utilizing technology in education is multifaceted and influenced by various factors. In response to this, several researchers have developed models to gain a better understanding of the factors that influence educators' intentions to use technology in classroom instruction. One extensively utilized model is the UTAUT, which identifies key factors such as OC, PE, EE, SE, SI, and FC that affect educators' intentions to use technology. The existing literature review highlights the importance of examining these factors and their relationships in-depth, with a specific focus on business schools. Thus, the purpose of this study is to investigate the relationships between the factors identified in the UTAUT model and their moderating effects on educators' intentions to use technology in classroom instruction within business schools. The findings of this study can offer valuable insights into strategies that business schools can employ to enhance the adoption and effective utilization of technology in education. Additionally, the findings contribute to the existing knowledge on technology adoption in education and provide researchers with a better understanding of the factors influencing educators' intentions to use technology. This study aims to present these findings and discuss their implications for B-Schools, educators, and researchers in the field of technology adoption in education.

6.1 Theoretical framework: Extended UTAUT model

The aim of this objective is to examine the factors that shape the BI of business faculties to use ICT in classroom instruction, as illustrated in Figure 18. Using the UTAUT model as a base, which was proposed by Venkatesh *et al.* (2003), it was further extended with new constructs, i.e., OC, ICT-self efficacy, and department. The UTAUT model is a highly regarded technology acceptance model that can accurately predict technology adoption in around 70% of cases, compared to the TAM, which can only predict adoption in approximately 40% of cases. Additionally, this model examines the influence of four moderating variables (age, gender, ICT experience in teaching, and department) on the relationship between its constructs and the intention to use technology.

Figure 18. Theoretical framework Used in the Study- Extended UTAUT model



6.2 Hypotheses of the study

Considering the literature, the following hypotheses have been proposed to achieve this objective:

H1: OC has a significant and positive impact on educators’ PE to use technology in classroom instruction.

H2: OC has a significant and positive impact on educators’ EE to use technology in classroom instruction.

H3: OC has a significant and positive impact on educators’ SI to use technology in classroom instruction.

H4: OC has a significant and positive impact on educators’ SE to use technology in classroom instruction.

H5: OC has a significant and positive impact on FC to use technology in classroom instruction.

H6: SI has a significant and positive effect on the educators’ BI to use technology in their classroom instruction.

H7: EE has a significant and positive effect on the educators’ BI to use technology in their classroom instruction.

H8: PE has a significant and positive effect on the educators’ BI to use technology in classroom instruction.

H9: ICT SE has a significant and positive impact on the educators’ BI to use technology in classroom instruction.

H10: FC have a significant and positive impact on the educators’ BI to use technology in classroom instruction.

6.3 Methodology

The SMART PLS 3 software was used to test the afore mentioned hypotheses through structural equation modeling. The PLS technique is best suited for research purposes involving prediction or exploratory modeling. It can model multiple dependents as well as multiple independents, handle multicollinearity among the independents, and make more accurate predictions. In general, SEM allows several relationships to be tested simultaneously in a single model with multiple relationships, rather than analyzing each relationship separately. Moreover, it is currently recognized and used in social science research as the best acceptable technique for multivariate analysis. Path diagrams are the most effective method for representing SEM models because they capture complex and dynamic relationships within a web of exogenous and endogenous variables. A path diagram is made up of nodes that represent variables and arrows that show the relationships between these variables. Henseler *et al.* (2009) suggest a two-step process in which the outer measurement model and the inner structural model are both evaluated.

6.4 Evaluation of measurement model

The purpose of the measurement model is to assess the internal consistency, reliability, and validity of both observed and unobserved variables. Evaluating consistency involves conducting tests for both single observed items and construct reliability, while validity is determined through convergent and discriminant validity assessments. The initial step in evaluating the reflective measurement model involves examining the indicator loadings. These loadings play a crucial role as they indicate the extent to which an item contributes to the assigned construct.

To evaluate single-item reliability, standardized outer loadings of indicators are analyzed, which reflect the degree of variation between individual items and their respective constructs. It is recommended that loadings exceeding 0.708 be considered, as they indicate that the construct explains more than 50% of the indicator's variance, demonstrating acceptable item reliability. In Table 96, the outer loadings ranged from 0.716 to 0.946, except for FC5 and FC6 items belonging to the FC construct, which exhibited low factor loadings and were subsequently removed.

To assess internal consistency and construct reliability, Cronbach's alpha and composite reliability measures were employed. According to Taber (2018), a Cronbach's alpha value above 0.60 is considered the minimum acceptable threshold, with values below this being deemed undesirable. While both Cronbach's alpha and composite reliability analyses serve the same purpose, composite reliability is considered a better indicator of internal consistency as it takes into account the standardized loadings of observed variables. High composite reliability suggests that all items belonging to a particular construct consistently measure the same underlying construct. In exploratory research, values ranging from 0.60 to 0.70 are considered acceptable, while values falling between 0.70 and 0.90 are regarded as "satisfactory to good." Values exceeding 0.95 indicate problematic response patterns that can undermine construct validity (Hair *et al.*, 2019). Based on the results presented in Table 96, the Cronbach's alpha and composite reliability values for all latent constructs demonstrate reasonably reliable internal consistency, as they surpass the minimum threshold level of 0.65.

Convergent validity pertains to the degree to which a construct effectively captures and explains the variance in its constituent items. To verify convergent validity, the average variance extracted (AVE) was calculated for all items within each latent construct. It is desirable for latent constructs to account for the majority of variance in observed variables. Therefore, the AVE values for all constructs should exceed 0.5. The data presented in Table 96 demonstrate that all AVE values surpassed 0.5, indicating that the study model successfully established convergent validity. These findings provide confirmation of the measurement model's convergent validity and its overall good internal consistency.

Table 96. Construct Reliability and Validity

Main Constructs	**Items**	**Outer Loadings**	**Composite Reliability**	**Cronbach's Alpha**	**AVE**
Effort Expectancy	EE1	0.845	0.903	0.858	0.700
	EE2	0.816			
	EE3	0.827			
	EE4	0.857			
Facilitating Conditions	FC1	0.841	0.797	0.663	0.501
	FC2	0.716			

	FC3	0.753			
	FC4	0.750			
Performance Expectancy	PE1	0.823	0.908	0.863	0.712
	PE2	0.885			
	PE3	0.907			
	PE4	0.752			
ICT Self Efficacy	SE1	0.787	0.848	0.761	0.583
	SE2	0.718			
	SE3	0.802			
	SE4	0.744			
Social Influence	SI1	0.918	0.956	0.939	0.846
	SI2	0.929			
	SI3	0.885			
	SI4	0.946			
Organizational Culture	OC1	0.734	0.711	0.653	0.509
	OC2	0.785			
	OC3	0.874			
	OC4	0.749			
	OC5	0.737			
	OC6	0.760			
	OC7	0.843			
	OC8	0.764			
Behavioural Intention	BI1	0.704	0.772	0.660	0.530

The subsequent phase involved assessing discriminant validity, which refers to the extent to which a manifest variable within any construct is distinct from other constructs in the structural model. The metric employed for this purpose was the HTMT ratio of correlations, proposed by Henseler *et al.* (2015). There is ongoing debate regarding the threshold for the HTMT ratio; however, most studies by Henseler *et al.* (2015) and Hair *et al.* (2019) suggest a value below 0.9.

Table 97 demonstrates that the HTMT values are below 0.90, indicating the establishment of discriminant validity between reflective constructs. Consequently, the suggested conceptual model demonstrated validity and reliability, as evidenced by satisfactory reliability, discriminant validity, and convergent validity, thereby validating the research model.

Table 97. Discriminant Validity through HTMT ratio

	BI	**EE**	**FC**	**OC**	**PE**	**SE**	**SI**
BI							
EE	0.728						
FC	0.829	0.666					
OC	0.893	0.704	0.615				
PE	0.666	0.532	0.479	0.641			
SE	0.697	0.314	0.578	0.425	0.290		
SI	0.496	0.271	0.283	0.672	0.353	0.048	

6.5 Evaluation of the Structural Model

After confirming the adequacy of the measurement model, the subsequent stage involves assessing the inner structural model. This evaluation entails examining several metrics, namely the coefficient of determination (R^2), path coefficient (ß value), T-statistic value, effect size (f^2), the predictive relevance of the model (Q^2), and the goodness-of-fit (GOF) index.

6.5.1 Assessing the model's explanatory power

The coefficient of determination (R^2) is a statistical measure used to assess how variations in one variable can be accounted for by differences in another variable. It quantifies the overall impact and amount of variance explained by the endogenous construct, serving as an indicator of the model's predictive accuracy (Shmueli & Koppius, 2011). R^2 is directly proportional to the number of predictor constructs; when there are more predictor constructs, the R^2 value increases. Ranging between 0 and 1, a higher R^2 value indicates a greater ability to explain the phenomenon under study. Henseler *et al.* (2009) and Hair *et al.* (2011) suggest that an R^2 value of 0.75 signifies a substantial explanatory power, 0.50 denotes a moderate level, and 0.25 represents a weak explanatory power.

The R^2 values for different latent constructs are displayed in Table 98 and Figure 19. For instance, the R^2 value for the SI construct was found to be 0.306, indicating that the OC construct accounted for 30.6% of the variability in SI, suggesting that approximately 30.6% of the changes in SI could be attributed to the OC construct within the model. Similarly, OC explained 27%, 17.7%, 14.4%, and 5.3% of the variance in EE, PE, FC, and ICT-SE, respectively. This indicates a relatively smaller percentage of change in these constructs as a result of OC. Furthermore, it was observed that EE, PE, FC, ICT-SE, and SI collectively accounted for a moderate 49.8% change in behavioral intention.

Table 98. Coefficient of Determination (R^2)

Constructs	**R^2**
Behavioural Intention	0.498
Effort Expectancy	0.270
Facilitating Conditions	0.144
Performance Expectancy	0.177
ICT Self-Efficacy	0.053
Social Influence	0.306

6.5.2 Estimation of path coefficients (ß) and t-statistics

Path analysis illustrates the hypothesized relationships and corresponds to standardized betas in a regression analysis. In the structural model, they compare the relative importance of exogenous constructs in explaining the endogenous constructs. The ß values of each path in the hypothesized model were calculated; the higher the ß value, the greater the significant effect on the endogenous latent construct. The paths with the highest weights are the most powerful. Weights close to zero represent the weakest paths. The ß value had to be validated for its significance level using the T-statistics test. A bootstrapping procedure was used to test the significance of the path coefficient and T-statistic values.

The findings of the same are shown in Table 99 and Figure 19 below.

Figure 19. Coefficient of Determination and Path Coefficients in the Structural Model

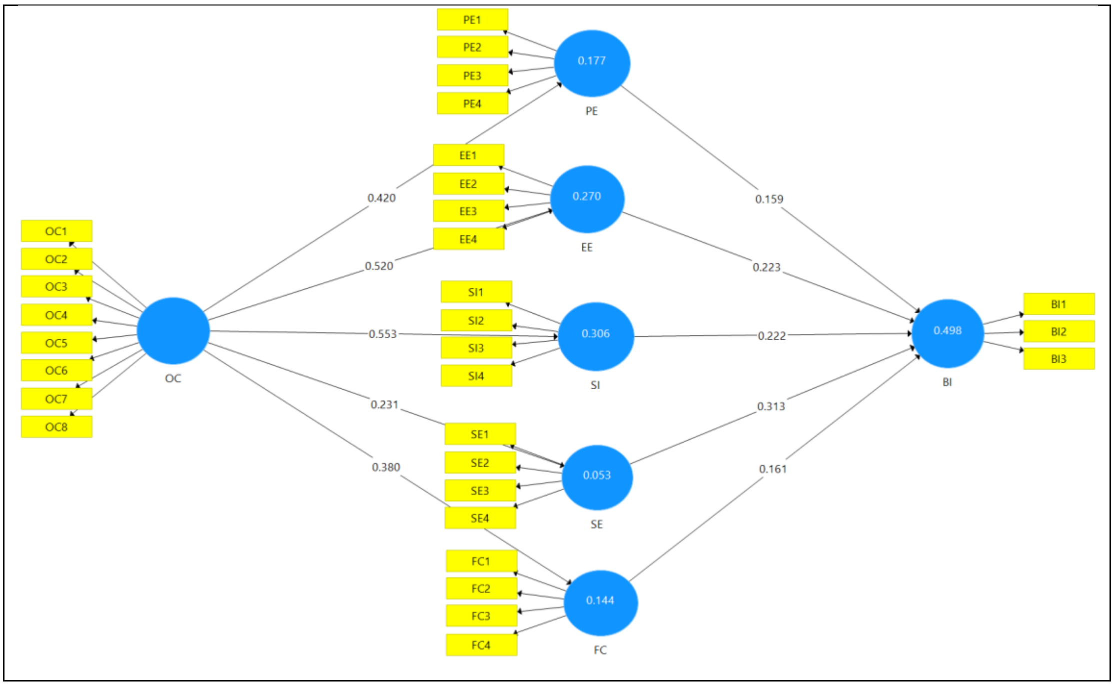


Table 99. Path Coefficients and T-Statistics

	Standardized Beta	T Statistics	P Values	Hypotheses
Organizational Culture -> Social Influence	0.553	14.472	0.000	Accepted
Organizational Culture -> Effort Expectancy	0.520	12.509	0.000	Accepted
Organizational Culture -> Self Efficacy	0.231	3.878	0.000	Accepted
Organizational Culture -> Performance Expectancy	0.420	7.370	0.000	Accepted
Organizational Culture -> Facilitating Conditions	0.380	7.240	0.000	Accepted

Performance Expectancy -> Behavioural Intention	0.159	2.744	0.006	Accepted
Self-Efficacy -> Behavioural Intention	0.313	5.695	0.000	Accepted
Facilitating Conditions -> Behavioural Intention	0.161	3.310	0.001	Accepted
Social Influence -> Behavioural Intention	0.222	5.365	0.000	Accepted
Effort Expectancy -> Behavioural Intention	0.223	4.572	0.000	Accepted

It was predicted in H3 that the OC would have a significant and positive impact on SI. The findings in Table 99 and Figure 19 confirmed, as predicted, that the OC-related factor had a significant influence on SI (ß = 0.553, T = 14.472, $p < 0.05$). As a result, H3 was strongly supported. Furthermore, while observing the direct and positive influence of OC on PE, EE, SE, and FC (H1, H2, H4, and H5), the findings from Table 99 confirmed H1, H2, H4, and H5 (refer to the standardized beta, T statistics, and P values for all these relationships in Table 5). Similarly, the impact of SI, EE, PE, FC, and SE on behavioral intention to use technology in classroom teaching (H6, H7, H8, H9, and H10) was further endorsed by the findings in Table 99 as the p-values for all these relationships were less than 0.05. Hence, all the hypotheses of the study have been accepted. The results also show that the effect of OC on SI is one of the strongest, with a path coefficient of ß = 0.553 when compared to other ß values in the model (Refer to Figure 19). Whereas, the effect of PE on behavioral intention was observed to be the weakest with ß = 0.159. Figure below depicts a graphical representation of all the model's path coefficients.

6.5.3 Measuring the effect size (f^2)

The f^2 is the change in R^2 caused by the removal of an independent construct from the model, which can further affect the dependent construct. The value of the coefficient of determination (R^2) changes when an independent variable is removed from the path model. This is represented by the effect size (f^2) which shows the total effect on the value of the dependent construct after the removal of the independent construct from the model. As per Cohen (1988), values greater than 0.02 show a small effect size, whereas values greater than 0.15 and 0.35 represent medium and large effect sizes, respectively. Table 6 shows that the size of the effect of organizational culture on social influence and effort expectancy was 0.441 and 0.370 respectively, which, as per Cohen's (1988) recommendation, shows a strong effect on the value of R^2. Similarly, organizational culture shows a moderate effect of 0.215 and 0.168 on performance expectancy and facilitating conditions, respectively. A moderate effect size was also observed between self-efficacy and behavioral intention ($f^2 = 0.156$). The effect size of the other relationships in the path model was observed to be small, as shown in the table 100 below.

Table 100. Effect Size of Path Relationships

Relationships	**f^2**	**Total Effect**
Organizational Culture -> Social Influence	0.441	Strong
Organizational Culture -> Self Efficacy	0.056	Small
Organizational Culture -> Performance Expectancy	0.215	Moderate
Organizational Culture -> Facilitating Conditions	0.168	Moderate
Organizational Culture -> Effort Expectancy	0.370	Strong
Performance Expectancy -> Behavioural Intention	0.036	Small
Self-Efficacy -> Behavioural Intention	0.156	Moderate
Facilitating Conditions -> Behavioural Intention	0.032	Small
Social Influence -> Behavioural Intention	0.084	Small
Effort Expectancy -> Behavioural Intention	0.063	Small

6.5.4 Model's predictive relevance (Q^2)

Geisser (1974) and Stone (1974) introduced the Q^2 value which is a metric derived from the blindfolding procedure. It serves as an evaluation tool to gauge the effectiveness of the PLS path model in terms of quality assessment. To indicate the predictive accuracy of the structural model for a specific endogenous construct, Q^2 values should be greater than zero. Q^2 values greater than zero, 0.25, and 0.50, respectively, represent the PLS-path model's small, medium, and large predictive relevance.

Figure 20. Path Model's Predictive Relevance Through Q²

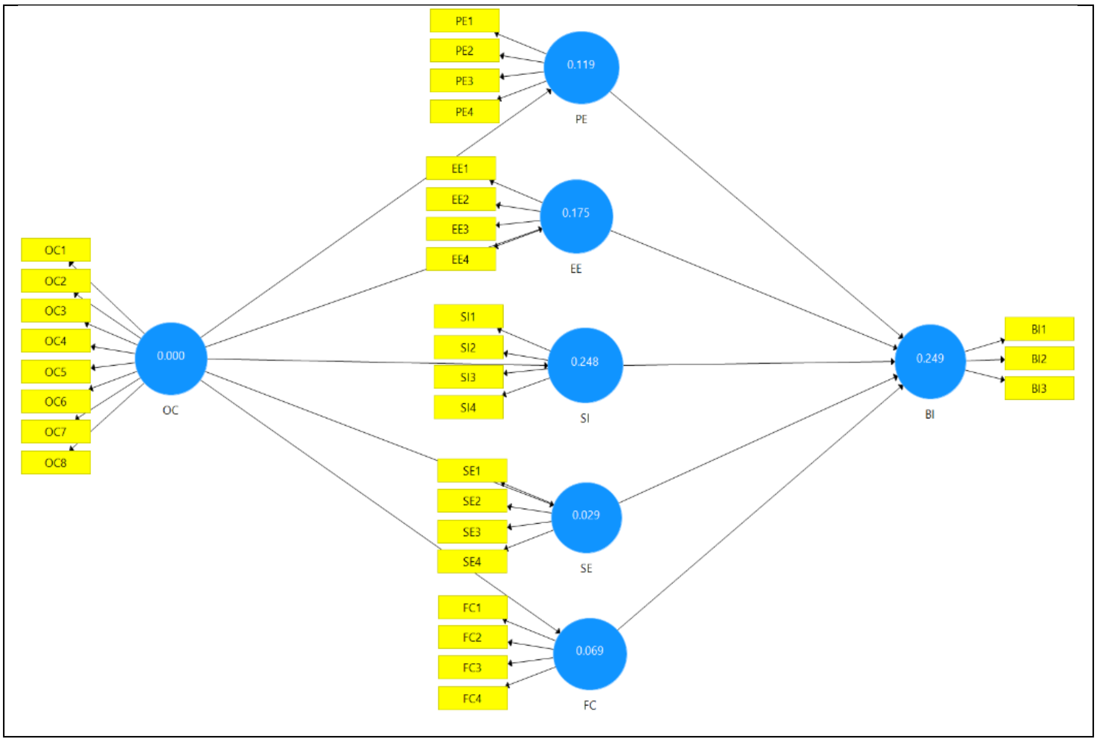


Figure 20 and Table 101 below show that the Q² values of SI and behavioral intention-related constructs are 0.249 and 0.248, respectively. This indicates that the path model's relevance was adequate for these endogenous constructs, as it shows nearly medium predictive relevance as per the rule of thumb. However, the path model's predictive relevance was observed to be small for the other constructs, as the Q² values for these endogenous constructs were quite small, as shown in the table below.

Table 101. Model's Predictive Relevance through Q²

Constructs	**Q²**	**Predictive Relevance**
Behavioural Intention	0.249	Medium
Effort Expectancy	0.175	Small
Facilitating Conditions	0.069	Small
Performance Expectancy	0.119	Small
Self-Efficacy	0.029	Small
Social Influence	0.248	Medium

6.5.5 Goodness of fit index (GOF)

To ensure that the model adequately explains the empirical data, Tenenhuaus *et al.* (2005) proposed a goodness-of-fit index that is used as an index for the overall model fit. The GOF values range from 0 to 1, with a 0.10 value indicating a small fit, 0.25 as a medium fit, and 0.36 as a large fit, indicating global validation of the path model. It is calculated by taking the geometric mean value of the average communality (AVE values) and the average R^2 values. Table 102 displays the GOF index for this study's model, which was calculated to be 0.388, indicating that the empirical data fits the model satisfactorily and possesses considerable predictive potential compared to baseline values.

Table 102. Calculation of Goodness-of-Fit index

Constructs	AVE	R Square
Organizational Culture	0.509	------
Facilitating Conditions	0.501	0.144
Effort Expectancy	0.700	0.270
Performance Expectancy	0.712	0.177
Social Influence	0.846	0.306
ICT Self-Efficacy	0.583	0.053
Behavioural Intention to use Technology	0.530	0.498
Average Values	**0.625**	**0.241**
Goodness of Fit = $\sqrt{(AVE \times R^2)}$	**0.388**	

6.6 Multi-group analysis

An efficient method for looking at moderation effects in a research model is to use multigroup analysis (MGA) in conjunction with partial least squares path modelling (Hair *et al.*, 2017). This approach takes the effects of heterogeneity into account and makes it possible to assess how significantly different distinct subgroups of the data are from one another. It does this by looking at variables like path coefficients, outer loadings, and outer weights. The study by Sarstedt and Ringle (2010) emphasizes how crucial it is to take heterogeneity into account when using partial least squares path modelling (PLSPM) in order to assure the accuracy of the findings and avoid making uninformed decisions. Assessing MGA in PLSPM significantly helps in finding meaningful differences among numerous relationships across various groups in the data (Schlagel & Sarstedt, 2016). To assess the interaction between two exogenous variables and an endogenous variable, standard moderation focuses on analyzing a single structural relationship at the specific interaction point. MGA, on the contrary, provides a more complete picture of the moderator's influence on the analysis outcomes because the focus shifts from evaluating the moderator's effect on a single modelled relationship to examining its effect on all modelled relationships (Hair *et al.*, 2018).

As per the theoretical framework, four moderating variables have been considered: gender, age, experience, and department, which moderate the various relationships in the structural model. The research questions and hypotheses for these variables are listed in table 103.

Table 103. Research Questions and Hypotheses for Moderating Relationships in the Structural Model

Moderating Variable	**Research Questions**	**Research Hypotheses**
Gender	Does the female and male faculty differ with regard to the effects of their PE on BI to use technology?	H1: Gender moderates the relationship between PE and BI to use technology.
	Does the female and male faculty differ with regard to the effects of their EE on BI to use technology?	H2: Gender moderates the relationship between EE and BI to use technology.
	Does the female and male faculty differ with regard to the effects of their SI on BI to use technology?	H3: Gender moderates the relationship between SI and BI to use technology.
	Does the female and male faculty differ with regard to the effects of	H4: Gender moderates the relationship between ICT-Self

	their ICT-Self Efficacy on BI to use technology?	Efficacy and BI to use technology.
	Does the female and male faculty differ with regard to the effects of their FC on BI to use technology?	H5: Gender moderates the relationship between FC and BI to use technology.
Age	Does the faculty falling under various age-groups differ with regard to the effects of their PE on BI to use technology?	H6: Age moderates the relationship between PE and BI to use technology.
	Does the faculty falling under various age-groups differ with regard to the effects of their EE on BI to use technology?	H7: Age moderates the relationship between EE and BI to use technology.
	Is there a variation in the impact of SI on the behavioral intention to use technology among faculty belonging to different age-groups?	H8: Age moderates the relationship between SI and BI to use technology.
	Does the faculty falling under various age-groups differ with regard to the effects of their ICT-Self Efficacy on BI to use technology?	H9: Age moderates the relationship between ICT-Self Efficacy and BI to use technology.
	Does the faculty falling under various age-groups differ with regard to the effects of FC on BI to use technology?	H10: Age moderates the relationship between FC and BI to use technology.
ICT Experience in Teaching	Does the faculty with different ICT experience differ with	H11: Experience moderates the relationship between EE and BI to use technology.

	regard to the effects of their EE on BI to use technology?	
	Does the impact of SI on BI to utilise technology differ between faculty with various ICT experience?	H12: Experience moderates the relationship between SI and BI to use technology.
	Does the faculty with different ICT experience differ with regard to the effects of their ICT-Self Efficacy on BI to use technology?	H13: Experience moderates the relationship between ICT-Self Efficacy and BI to use technology.
Department	Does the faculty across commerce, management, and economics departments differ with regard to the effects of their EE on BI to use technology?	H14: The department moderates the relationship between EE and BI to use technology.
	Is there a variation in the impact of SI on the behavioral intention to use technology among faculty across the departments of commerce, management, and economics?	H15: The department moderates the relationship between SI and BI to use technology.
	Does the faculty across commerce, management, and economics departments differ with regard to the effects of their ICT-Self Efficacy on BI to use technology?	H16: The department moderates the relationship between ICT-Self Efficacy and BI to use technology.

6.6.1 Measurement invariance test through MICOM

To make valid comparisons of model estimates for significant differences in multigroup analysis, it is essential to ensure that the construct measures are invariant across groups. This is critical to obtain reliable results and confidence that differences in model estimates between groups are not due to their individual interpretations of the latent variables. In order to achieve this, an invariance test through the MICOM procedure proposed by Henseler *et al.* (2016) must be performed. Invariance implies that the parameters examined, such as factor loadings, structural coefficients, means, or anything else, are equal across all groups. The MICOM procedure includes testing for configural invariance, compositional invariance, and an equal distribution of mean values and variances of composites.

6.6.2 Configural invariance

Configural invariance refers to the establishment of a measurement model that utilizes the same number of indicators across all data groups. While there is no standard procedure for testing configural invariance, it can be confirmed through qualitative research (Moore *et al.*, 2021) or face and/or expert validity evaluations (Hair *et al.*, 2019). It is important to note that configural invariance requires that the treatment of indicator data, data processing, and algorithm settings are identical or similar across all groups (Henseler *et al.*, 2016).

Additionally, it is essential to monitor straight-line patterns, which occur when respondents provide almost identical responses to all survey items. Such responses limit variability and can result in unrecognized moderator effects in multigroup analysis, necessitating their elimination during data cleaning (Hair *et al.*, 2019). Internal consistency was used to accomplish this, and values of 0.95 or higher were removed as suggested by Hair *et al.* (2019) since they indicated the possibility of undesirable response patterns.

6.6.3 Compositional invariance

To establish compositional invariance, the MICOM test is used to confirm that the latent variable scores are identical across groups. According to Henseler *et al.* (2016), if there is a perfect correlation between composite scores in different groups, it indicates that compositional invariance exists. Partial invariance can be confirmed through the permutation technique if the original correlation of various constructs is equal to or greater than the 5 percent quantile and the permutation p-values are not significant. The final step in establishing full measurement invariance is evaluating the equality of composite mean values and variances, although it is not mandatory for MGA, as recommended by Henseler *et al.* (2016). Firstly, the mean original differences between the groups are evaluated, and the "Mean-Original Difference" of every construct must be greater than its "Mean-Permutation Mean Difference," and the permutation p-value must be non-significant. If this condition is met, it implies that equality of means is achieved for that construct. The same process is repeated for variances. If the equality of composite mean values and variances is confirmed, this indicates that full measurement invariance has been established.

6.6.4 Interpretation of MGA comparisons

Once measurement invariance has been established, the next step is to conduct group comparisons using MGA. Initially, the path coefficients obtained from the original dataset were assessed by employing the permutation test. Subsequently, a comparative analysis was conducted to evaluate the disparities between the original dataset and the results obtained from the permutation test. To investigate group-specific differences further, the MGA test was re-run, and path coefficients were assessed as per significant p-values ($p<0.05$).

6.7 Moderating effect of gender

6.7.1 Data groups

Two data groups i.e., Females (Number: 192) and Males (Number: 158) were considered for multi group analysis.

6.7.2 Measurement invariance test using MICOM: Testing of configural invariance

Configural invariance is automatically confirmed while running MICOM in SmartPLS.

6.7.3 Measurement invariance test using MICOM: Testing of compositional invariance

To confirm the partial invariance through permutation testing, the original correlation of various constructs was checked, which showed that it was greater than the correlation permutation means and 5 percent quantile except for the BI construct. This represents that invariance was not found for the behavioral intention construct. As a remedy, outer loadings under the permutation test were examined that failed to achieve compositional invariance. Item BI2 was eliminated since it had significant outer loading differences and also indicated that both groups misinterpreted the item's meaning.

Upon doing this, a permutation test was again run in which the original correlation of all the constructs was found to be greater than the correlation permutation means and 5 percent quantile. Also, p-values were found to be insignificant, as shown in the table 104 below. So it can be concluded that partial measurement invariance was established.

Table 104. Results of Partial Measurement Invariance for Gender

	Original Correlation	**Correlation Permutation Mean**	**5.0%**	**Permutation p-Values**	**Partial Measurement Invariance**
BI	0.998	0.997	0.987	0.441	Established
EE	1.000	0.998	0.996	0.836	Established
FC	0.988	0.986	0.952	0.367	Established
PE	0.999	0.998	0.995	0.652	Established
SE	0.960	0.984	0.957	0.061	Established

SI	1.000	1.000	0.999	0.975	Established

The evaluation of mean values and variances was conducted to determine whether full measurement invariance had been achieved. The "Mean-Original Difference" for each construct was compared to the "Mean-Permutation Mean Difference" to verify that they fell within a 95% confidence interval. The results in table 105 showed that the mean original differences were greater than the mean permutation differences for all constructs, indicating preliminary evidence of invariance. Additionally, the p-values for the means were greater than 0.05, indicating no significant differences between female and male mean values. Thus, equality of means was established for all constructs. The next step involved checking the results of composite variances, with interpretations similar to those of mean differences. The variance original differences were found to be greater than the variance permutation differences for all constructs, and the permutation p-values for variances were greater than 0.05, indicating no significant differences between female and male composite variances.

Based on these findings, it can be concluded that full measurement invariance was achieved.

Table 105. Results of Full Measurement Invariance for Gender

	Equal Mean Value				Equal Variances				Full Measurement Invariance
Construct	Mean - Original Difference	2.5%	97.5 %	Permutation p-Values	Variance - Original Difference	2.5%	97.5 %	Permutation p-Values	
BI	-0.144	-0.184	0.207	0.129	0.258	-0.401	0.405	0.207	Established
EE	0.011	-0.177	0.188	0.914	0.122	-0.305	0.327	0.473	Established
FC	-0.103	-0.189	0.186	0.279	-0.095	-0.329	0.346	0.613	Established
PE	-0.144	-0.181	0.182	0.130	0.467	-0.563	0.533	0.108	Established
SE	-0.103	-0.186	0.212	0.289	0.157	-0.309	0.294	0.334	Established
SI	0.019	-0.193	0.186	0.844	-0.186	-0.336	0.356	0.277	Established

6.7.4 Evaluation of MGA comparisons

Once it was confirmed that full measurement invariance was achieved, the subsequent step involved examining group comparisons through multi-group analysis. The results of the permutation test conducted in the previous step, which assessed path coefficients, were initially taken into account. Table 106 presents the original path coefficients observed in Group 1 (female) and Group 2 (male), followed by the disparities between these coefficients in the original dataset and the permutation test. The results revealed that two path relationships between females and males demonstrated statistical significance ($p<0.05$): the association between FC and behavioral intention ($p = 0.045$) and the relationship between PE and behavioral intention ($p = 0.037$).

Table 106. Results of Gender-Specific Comparisons through Multi-Group Analysis

Relationship	Path Coefficients Original (Female)	Path Coefficients Original (Male)	Path Coefficients Original Difference (Female - Male)	Path Coefficients Permutation Mean Difference (Female - Male)	2.5%	97.5%	Permutation p-Values
EE -> BI	0.284	0.098	0.185	0.003	-0.212	0.213	**0.089**
FC -> BI	0.096	0.278	-0.181	0.000	-0.176	0.181	**0.045**
PE -> BI	0.143	0.377	-0.233	-0.008	-0.227	0.201	**0.037**
SE -> BI	0.144	0.013	0.131	0.003	-0.174	0.205	**0.190**
SI -> BI	0.278	0.195	0.083	0.001	-0.181	0.165	**0.365**

Another multi-group analysis was conducted to further examine the differences between the two groups. The results presented in Table 107 reveal that the effect of FC on behavioral intention was more pronounced in males than females, with a difference in path coefficients of -0.181. Similarly, the effect of PE on behavioral intention was stronger in males than females, with a difference in path coefficients of -0.233. To determine whether these differences are statistically significant, p-values were examined, indicating a significant difference between males and females in two relationships: FC on behavioral intention and PE on behavioral intention ($p < 0.05$). Therefore, it can be concluded that gender acts as a moderator in the relationships between FC and behavioral intention and PE and behavioral intention. As a result, hypotheses H1 and H5 are supported, while H2, H3, and H4 are rejected.

Table 107. Moderation Effect of Gender through Multi-Group Analysis

Relationship	Path Coefficients-diff (Female - Male)	p-Value (Female vs Male)	Moderation Effect
EE -> BI	0.185	0.077	No
FC -> BI	-0.181	0.043	Yes
PE -> BI	-0.233	0.045	Yes
SE -> BI	0.131	0.143	No
SI -> BI	0.083	0.385	No

6.8 Moderating effect of age

6.8.1 Number of data groups

Multigroup analysis was conducted using data from three different age categories: Group 1 consisted of individuals aged 31-35 years (with a count of 81), Group 2 consisted of individuals aged 36-40 years (with a count of 102), and Group 3 consisted of individuals aged 40-45 years (with a count of 90). However, for the purpose of this study, two age-groups - "30 years and below" and "above 45 years" - were not included in the MGA as the group sizes were too small to detect any moderating effect, as stated by Hair *et al.* (2017) and Becker *et al.* (2013).

6.8.2 Measurement invariance test using MICOM: Testing of configural invariance

Configural invariance is automatically confirmed while running MICOM in SmartPLS. Moreover, no standard procedure is available to test it.

6.8.3 Measurement invariance test using MICOM: Testing of compositional invariance

Initially, the comparison was done between Group 1 and Group 2, followed by the comparison of Group 2 and Group 3, and finally between Group 1 and Group 3. To confirm the partial invariance through permutation testing, the original correlation of various constructs was checked, which showed that it was greater than the correlation permutation means and 5 percent quantile for all the constructs, representing the presence of invariance (refer to Table 108). Also, p-values were found to be insignificant, as shown in the table below. So it can be concluded that partial measurement invariance was established.

Table 108. Results of Partial Measurement Invariance for Faculty with Different Age-Groups

Age-group	Construct	Original Correlation	Correlation Permutation Mean	5.00%	Permutation p-Values	Partial Measurement Invariance
Group 1 vs Group 2	BI	1.000	0.988	0.966	0.991	Established
	EE	0.997	0.998	0.994	0.327	Established
	FC	0.996	0.990	0.965	0.601	Established
	PE	0.998	0.995	0.987	0.734	Established
	SE	0.996	0.991	0.975	0.726	Established
	SI	0.999	0.997	0.992	0.457	Established
Group 2 vs Group 3	BI	1.000	0.995	0.984	0.923	Established
	EE	1.000	0.995	0.986	0.968	Established
	FC	0.991	0.975	0.913	0.623	Established
	PE	0.991	0.994	0.981	0.207	Established
	SE	0.992	0.992	0.979	0.377	Established
	SI	0.997	0.998	0.992	0.310	Established
Group 1 vs Group 3	BI	0.999	0.992	0.977	0.911	Established
	EE	0.999	0.997	0.992	0.701	Established
	FC	0.999	0.990	0.965	0.837	Established
	PE	0.997	0.997	0.992	0.271	Established
	SE	0.995	0.994	0.984	0.459	Established
	SI	1.000	0.999	0.996	0.829	Established

Table 109 was utilized to assess whether full measurement invariance was established by evaluating the equality of mean values and variances across groups. Initially, the "Mean-Original Difference" of each construct was examined, and it was observed to fall within the 95% confidence interval. A comparison between the mean original differences and the mean permutation differences revealed that the mean original differences were greater than the mean permutation differences for all constructs.

Additionally, the mean original differences were situated within the lower (2.5%) and upper (97.5%) limits for all constructs, thus indicating preliminary evidence of invariance. Additionally, the p-values for the means were greater than 0.05, indicating that there was no significant difference between the mean values of the three age-groups. This indicated that the equality of means was achieved for all constructs.

The subsequent step involved examining the composite variances, which had similar interpretations to the mean differences. The variance values and original differences were both determined to be within the 95% confidence interval. Additionally, the permutation p-values for variances were greater than 0.05, indicating that there was no significant difference between the composite variances of the three age-groups. As a result, it can be concluded that full measurement invariance was achieved.

Table 109. Results of Full Measurement Invariance for Faculty with Different Age-Groups

Age-group	Construct	Equal Mean Value				Equal Variances				Full Measurement Invariance
		Mean - Original Difference	2.50%	97.50 %	Permutation p-Values	Variance - Original Difference	2.50%	97.50 %	Permutation p-Values	
Age-group 1 vs Age-group 2	BI	0.048	-0.260	0.265	0.725	0.061	-0.590	0.627	0.840	Established
	EE	0.129	-0.277	0.280	0.356	0.078	-0.497	0.489	0.772	Established
	FC	0.083	-0.248	0.267	0.522	0.488	-0.546	0.553	0.088	Established
	PE	0.084	-0.257	0.255	0.547	0.118	-0.781	0.828	0.789	Established
	SE	0.083	-0.264	0.275	0.551	0.272	-0.398	0.419	0.174	Established
	SI	-0.084	-0.264	0.258	0.557	0.346	-0.458	0.533	0.197	Established
Age-group 2 vs Age-group 3	BI	0.060	-0.272	0.275	0.678	-0.171	-0.530	0.520	0.525	Established
	EE	-0.100	-0.276	0.274	0.454	0.131	-0.521	0.500	0.650	Established
	FC	-0.031	-0.274	0.265	0.845	-0.240	-0.442	0.418	0.282	Established
	PE	0.026	-0.288	0.254	0.851	-0.185	-0.781	0.878	0.676	Established
	SE	0.056	-0.278	0.276	0.674	-0.357	-0.425	0.401	0.086	Established
	SI	0.236	-0.257	0.273	0.093	-0.422	-0.465	0.468	0.082	Established
Age-group 1 vs Age-group 3	BI	0.106	-0.255	0.253	0.402	-0.122	-0.515	0.501	0.648	Established
	EE	0.042	-0.258	0.249	0.752	0.221	-0.435	0.423	0.339	Established
	FC	0.059	-0.262	0.246	0.645	0.254	-0.507	0.506	0.333	Established
	PE	0.102	-0.270	0.256	0.484	-0.056	-0.837	0.906	0.901	Established
	SE	0.132	-0.273	0.242	0.340	-0.110	-0.390	0.384	0.600	Established
	SI	0.143	-0.253	0.265	0.281	-0.069	-0.453	0.478	0.773	Established

6.8.4 Evaluation of MGA comparisons

Once full measurement invariance was confirmed, the next stage involved conducting multi-group analysis to investigate group comparisons. The permutation test results from the previous step were utilized to evaluate path coefficients. Table 110 is divided into three sections displaying path coefficients between Group 1 and Group 2, Group 2 and Group 3, and Group 1 and Group 3, respectively. The original path coefficients for different age-groups, along with their disparities in the original dataset and permutation test, are presented in the second and third columns of Table 110. The analysis revealed that none of the path relationships between the age-groups were statistically significant, as the p-values were found to be greater than 0.05.

Table 110. Results of Age-Specific Comparisons through Multi-Group Analysis

Age Group 1 vs Age Group 2							
Relationship	**Path Coefficients Original (AgeGroup_1)**	**Path Coefficients Original (AgeGroup_2)**	**Path Coefficients Original Difference (AgeGroup_1 - AgeGroup_2)**	**Path Coefficients Permutation Mean Difference (AgeGroup_1 - AgeGroup_2)**	**2.5%**	**97.5%**	**Permutation p-Values**
EE -> BI	0.161	0.216	-0.054	0.006	-0.239	0.249	0.696
FC -> BI	0.226	0.111	0.114	0.004	-0.250	0.258	0.386
PE -> BI	0.237	0.103	0.134	-0.005	-0.252	0.246	0.322
SE -> BI	0.292	0.412	-0.120	-0.006	-0.288	0.265	0.414
SI -> BI	0.184	0.306	-0.122	-0.003	-0.230	0.225	0.298
Age Group 2 vs Age Group 3							
Relationship	**Path Coefficients Original (AgeGroup_2)**	**Path Coefficients Original (AgeGroup_3)**	**Path Coefficients Original Difference (AgeGroup_2 - AgeGroup_3)**	**Path Coefficients Permutation Mean Difference (AgeGroup_2 - AgeGroup_3)**	**2.5%**	**97.5%**	**Permutation p-Values**
EE -> BI	0.216	0.175	0.041	-0.004	-0.246	0.252	0.762
FC -> BI	0.111	0.066	0.046	-0.007	-0.285	0.292	0.778
PE -> BI	0.103	0.200	-0.097	0.000	-0.323	0.305	0.544
SE -> BI	0.412	0.425	-0.013	0.006	-0.231	0.229	0.927
SI -> BI	0.306	0.259	0.048	0.002	-0.191	0.226	0.635
Age Group 1 vs Age Group 3							

Relationship	Path Coefficients Original (AgeGroup_1)	Path Coefficients Original (AgeGroup_3)	Path Coefficients Original Difference (AgeGroup_1 - AgeGroup_3)	Path Coefficients Permutation Mean Difference (AgeGroup_1 - AgeGroup_3)	2.5%	97.5%	Permutation p-Values
EE -> BI	0.161	0.175	-0.013	-0.005	-0.252	0.237	0.924
FC -> BI	0.226	0.066	0.160	-0.002	-0.236	0.261	0.202
PE -> BI	0.237	0.200	0.038	0.001	-0.258	0.263	0.773
SE -> BI	0.292	0.425	-0.133	0.000	-0.269	0.242	0.307
SI -> BI	0.184	0.259	-0.074	0.004	-0.185	0.186	0.464

To examine the differences among different age-groups, another MGA was conducted. Table 111 displays the results which indicate that the impact of EE on behavioral intention was more significant in Group 2 compared to Group 1, with a difference in path coefficients of -0.054. The same pattern was observed for two other relationships, i.e., between ICT SE and behavioral intention and SI on behavioral intention, indicating that these relationships were stronger in the older faculty compared to the younger one. This impact was also evident in the path coefficient differences between Group 1 and Group 3. However, a slight change in results was observed in the case of Group 2 and Group 3, as presented in Table 111.

To determine the significance of these differences, p-values were examined, which revealed that none of the relationships were statistically significant among different age-groups, as p-values were greater than 0.05. Therefore, it can be inferred that age does not moderate any of the relationships in the path model. Hence, hypotheses H6, H7, H8, H9, and H10 are rejected. This could be attributed to the fact that technology has become ubiquitous in our daily lives, and users, regardless of age, have adapted to the technological revolution.

Table 111. Moderation Effect of Age through Multi-Group Analysis

Age Groups	Group_1-Group_2)	(Group_1 - Group_3)	(Group_2 - Group_3)	(Group_1 - Group_2)		(Group_1 - Group_3)		(Group_2 - Group_3)	
Relationship	**Path Coefficients-Difference**	**Path Coefficients-Difference**	**Path Coefficients-Difference**	**p-Value**	**Moderation Effect**	**p-Value**	**Moderation Effect**	**p-Value**	**Moderation Effect**
EE -> BI	-0.054	-0.013	0.041	0.652	No	0.926	No	0.714	No

FC -> BI	0.114	0.160	0.046	0.340	No	0.215	No	0.747	No
PE -> BI	0.134	0.038	-0.097	0.285	No	0.791	No	0.507	No
SE -> BI	-0.120	-0.133	-0.013	0.349	No	0.294	No	0.934	No
SI -> BI	-0.122	-0.074	0.048	0.254	No	0.437	No	0.654	No

6.9 Moderating effect of ICT experience in teaching

6.9.1 Number of data groups

Multigroup analysis was performed using data sets from three different categories of ICT experience, namely Group 1: 1–5 years (with a count of 104), Group 2: 6–10 years (with a count of 91), and Group 3: 11–15 years (with a count of 85). In order to detect the moderating effect, two groups - "less than 1 year" and "more than 15 years" - were excluded for the purpose of MGA, as the size of these groups was deemed too small according to Hair *et al.* (2017) and Becker *et al.* (2013).

6.9.2 Measurement invariance test using MICOM: Testing of configural invariance

Configural invariance is automatically confirmed while running MICOM in SmartPLS. Moreover, no standard procedure is available to test it.

6.9.3 Measurement invariance test using MICOM: Testing of compositional invariance

The analysis started with a comparison between Experience Group 1 and Experience Group 2, then between Experience Group 2 and Experience Group 3, and lastly, between Experience Group 1 and Experience Group 3. The goal was to confirm partial invariance through permutation testing. To achieve this, the original correlation of various constructs was compared to the correlation permutation means and the 5 percent quantile.

Table 112. Results of Partial Measurement Invariance for ICT Experience in Teaching

Group	Construct	Original Correlation	Correlation Permutation Mean	5.00%	Permutation p-Values	Partial Measurement Invariance
Experience Group 1 vs Experience Group 2	BI	0.998	0.993	0.979	0.784	Established
	EE	0.987	0.995	0.986	0.068	Established
	FC	0.997	0.983	0.943	0.798	Established
	PE	0.999	0.997	0.990	0.861	Established
	SE	0.998	0.993	0.980	0.835	Established
	SI	0.998	0.998	0.994	0.277	Established
Experience Group 2 vs Experience Group 3	BI	0.995	0.995	0.985	0.380	Established
	EE	0.995	0.995	0.986	0.376	Established
	FC	0.963	0.962	0.878	0.362	Established
	PE	0.996	0.997	0.991	0.256	Established
	SE	0.989	0.990	0.974	0.319	Established
	SI	0.994	0.997	0.992	0.101	Established
Experience Group 1 vs Experience Group 3	BI	0.997	0.994	0.982	0.660	Established
	EE	0.998	0.998	0.995	0.243	Established
	FC	0.951	0.978	0.922	0.152	Established
	PE	0.998	0.997	0.993	0.506	Established
	SE	0.984	0.993	0.980	0.075	Established
	SI	0.999	0.999	0.996	0.539	Established

The results indicated that, except for the EE construct, the original correlation was greater than the permutation means and quantile (refer to Table 112). However, a significant difference was found when comparing Experience Group 1 and Experience Group 2, indicating that invariance was not achieved for this construct. As a remedy, outer loadings under the permutation test were examined that failed to achieve compositional invariance. Items EE1 and EE4 were eliminated since they had significant outer loading differences and also indicated that both groups misinterpreted the item's meaning. Upon doing this, a permutation test was again run in which the original correlation of all the constructs was found to be greater than the correlation permutation means and 5 percent quantile. Also, p-values were found to be insignificant, as shown in the table below. So, it can be concluded that partial measurement invariance was established.

The aim was to determine if full measurement invariance was achieved, which involved assessing the equality of mean values and variances across the three groups. Table 113 shows that the "Mean-Original Difference" of each construct was checked first and found to be within a 95% confidence interval, indicating preliminary evidence of invariance. Additionally, the p-values for the means were greater than 0.05, indicating no significant difference between the mean values of the three groups. This satisfied the requirement for equality of means between all groups. The composite variances were also evaluated, and the results were similar to those of mean differences. The variance and original differences were within a 95% confidence interval, except for FC (FC) between Experience Group 1 and Experience Group 2. The permutation p-values for variances between "Group 2 and Experience Group 3' and 'Experience Group 1 and Experience Group 3' were greater than 0.05, indicating no significant difference between the composite variances of these groups.

Therefore, it can be concluded that full measurement invariance was established for these groups. However, the permutation p-value for the FC construct was smaller than 0.05, indicating a significant difference between Experience Group 1 and Experience Group 2. Therefore, partial measurement invariance was supported for these two groups (Experience Group 1 vs. Experience Group 2).

Table 113. Results of Full Measurement Invariance for ICT Experience in Teaching

Group	Construct	Equal Mean Value				Equal Variances				Full Measurement Invariance
		Mean - Original Difference	2.50 %	97.50 %	Permutation p-Values	Variance - Original Difference	2.50 %	97.50 %	Permutation p-Values	
Experience Group 1 vs Experience Group 2	BI	-0.104	-0.283	0.290	0.464	-0.095	-0.622	0.623	0.781	Established
	EE	0.119	-0.282	0.261	0.376	-0.023	-0.470	0.441	0.918	Established
	FC	-0.153	-0.275	0.267	0.248	0.539	-0.508	0.495	0.034	Not Established
	PE	0.034	-0.253	0.264	0.817	0.131	-0.660	0.761	0.753	Established
	SE	-0.086	-0.261	0.267	0.514	0.043	-0.462	0.485	0.880	Established
	SI	-0.263	-0.266	0.270	0.056	0.350	-0.408	0.430	0.112	Established
Experience Group 2 vs	BI	0.055	-0.280	0.262	0.699	-0.029	-0.541	0.537	0.920	Established

Experience Group 3	EE	-0.106	-0.276	0.261	0.444	-0.159	-0.497	0.520	0.567	Established
	FC	-0.001	-0.253	0.259	0.998	-0.300	-0.521	0.533	0.261	Established
	PE	-0.059	-0.273	0.247	0.668	0.002	-0.854	0.873	1.000	Established
	SE	0.040	-0.280	0.250	0.766	-0.051	-0.376	0.334	0.786	Established
	SI	0.065	-0.288	0.265	0.643	0.041	-0.459	0.459	0.851	Established
Experience Group 1 vs Experience Group 3	BI	-0.047	-0.250	0.244	0.710	-0.119	-0.558	0.590	0.715	Established
	EE	-0.016	-0.250	0.254	0.913	-0.165	-0.452	0.453	0.459	Established
	FC	-0.171	-0.254	0.261	0.204	0.332	-0.470	0.489	0.174	Established
	PE	-0.024	-0.248	0.268	0.852	0.140	-0.896	0.919	0.753	Established
	SE	-0.052	-0.249	0.266	0.695	-0.011	-0.394	0.396	0.969	Established
	SI	-0.211	-0.265	0.247	0.099	0.407	-0.437	0.408	0.059	Established

6.9.4 Evaluation of MGA comparisons

Once full measurement invariance was confirmed, the next stage involved conducting multi-group analysis to investigate group comparisons. The permutation test results from the previous step, which evaluated the path coefficients, were used for this purpose. Table 114 is divided into three sections, depicting the path coefficients between Experience Group 1 and Experience Group 2, Experience Group 2 and Experience Group 3, and Experience Group 1 and Experience Group 3.

The original path coefficients for different experience groups, along with their discrepancies in the original dataset and the permutation test, are presented in the second and third columns of Table 114. The results indicated that there were no statistically significant path relationships observed between any of the experience groups, as the corresponding p-values were found to be greater than 0.05.

Table 114. Results of ICT Experience-Specific Comparisons through Multi-Group Analysis

Experience Group 1 vs Experience Group 2							
Relationship	**Path Coefficients Original (Experience Group_1)**	**Path Coefficients Original (Experience Group_2)**	**Path Coefficients Original Difference (Experience Group_1 - Experience Group_2)**	**Path Coefficients Permutation Mean Difference (Experience Group_1 – Experience Group_2)**	**2.50%**	**97.50 %**	**Permutation p-Values**
EE -> BI	0.246	0.168	0.079	0.012	-0.246	0.282	0.600
FC -> BI	0.188	0.122	0.066	-0.003	-0.231	0.224	0.590
PE -> BI	0.104	0.210	-0.106	-0.002	-0.333	0.319	0.542
SE -> BI	0.308	0.412	-0.104	-0.007	-0.259	0.256	0.437
SI -> BI	0.207	0.255	-0.047	-0.005	-0.226	0.222	0.683
Experience Group 2 vs Experience Group 3							
Relationship	**Path Coefficients Original (Experience Group_2)**	**Path Coefficients Original (Experience Group_3)**	**Path Coefficients Original Difference (Experience Group_2 – Experience Group_3)**	**Path Coefficients Permutation Mean Difference (Experience Group_2 – Experience Group_3)**	**2.50%**	**97.50 %**	**Permutation p-Values**
EE -> BI	0.153	0.233	-0.080	-0.007	-0.243	0.234	0.529
FC -> BI	0.123	0.108	0.015	0.007	-0.276	0.274	0.910
PE -> BI	0.218	0.179	0.039	-0.002	-0.334	0.361	0.839
SE -> BI	0.415	0.337	0.078	-0.004	-0.243	0.225	0.531
SI -> BI	0.257	0.202	0.055	0.006	-0.236	0.262	0.651
Experience Group 1 vs Experience Group 3							
Relationship	**Path Coefficients Original (Experience Group_1)**	**Path Coefficients Original (Experience Group_3)**	**Path Coefficients Original Difference (Experience Group_1 – Experience Group_3)**	**Path Coefficients Permutation Mean Difference (Experience Group_1 – Experience Group_3)**	**2.50%**	**97.50 %**	**Permutation p-Values**
EE -> BI	0.279	0.233	0.046	0.002	-0.280	0.282	0.760
FC -> BI	0.182	0.108	0.074	0.000	-0.261	0.233	0.595
PE -> BI	0.092	0.179	-0.087	0.000	-0.340	0.361	0.630
SE -> BI	0.310	0.337	-0.027	-0.004	-0.280	0.265	0.852
SI -> BI	0.198	0.202	-0.004	0.004	-0.225	0.205	0.985

Another multigroup analysis (MGA) was conducted to examine group-specific differences. The results depicted in Table 115 demonstrate that the impact of EE on behavioral intention was stronger in Group 1 when compared to the other two groups (refer to path coefficients in columns 2 and 3). This effect was also observed in the path relationship of 'FC on behavioral intention.' This indicates that these relationships had a stronger effect on faculty with less ICT experience than on those with more ICT experience. However, Table 115 shows that faculty with greater ICT experience in teaching tended to have a stronger impact of 'PE on behavioral intention,' 'SE on behavioral intention,' and 'SI on behavioral intention.'

To determine the significance of these differences, p-values were examined, and it was found that there was no significant difference between different groups in any of the relationships, as the p-values were greater than 0.05. Therefore, it can be concluded that the ICT experience in teaching does not moderate any of the relationships in the path model. As a result, hypotheses H11, H12, and H13 are rejected. This can be attributed to the fact that technology provides equal benefits to everyone, regardless of their level of experience.

Table 115. Moderation Effect of ICT Experience through Multi-Group Analysis

Experience Groups	**(Experience Group_1- Experience Group_2)**	**(Experience Group_1 – Experience Group_3)**	**(Experience Group_2 – Experience Group_3)**	**(Experience Group_1 – Experience Group_2)**		**(Experience Group_1 – Experience Group_3)**		**(Experience Group_2 – Experience Group_3)**	
Relationship	**Path Coefficients-Difference**	**Path Coefficients-Difference**	**Path Coefficients-Difference**	**p-Value**	**Moderation Effect**	**p-Value**	**Moderation Effect**	**p-Value**	**Moderation Effect**
EE -> BI	0.079	0.046	-0.080	0.589	No	0.739	No	0.502	No
FC -> BI	0.066	0.074	0.015	0.595	No	0.628	No	0.931	No
PE -> BI	-0.106	-0.087	0.039	0.531	No	0.592	No	0.809	No
SE -> BI	-0.104	-0.027	0.078	0.394	No	0.850	No	0.502	No
SI -> BI	-0.047	-0.004	0.055	0.682	No	0.962	No	0.648	No

6.10 Moderating effect of department

6.10.1 Number of data groups

Data groups representing three departments, i.e., Group 1: Management (Count: 136), Group 2: Commerce (Count: 113), and Group 3: Economics (Count: 101), were considered for multigroup analysis.

6.10.2 Measurement invariance test using MICOM: Testing of configural invariance

Configural invariance is automatically confirmed while running MICOM in SmartPLS. Moreover, no standard procedure is available to test it.

6.10.3 Measurement invariance test using MICOM: Testing of compositional invariance

Initially, the comparison was done between the commerce department and the economics department, followed by the comparison between the commerce department and the management department, and finally between the economics department and the management department. To confirm the partial invariance through permutation testing, original correlation of various constructs was checked, which showed that it was greater than the correlation permutation means and 5 percent quantile for all the constructs, representing the presence of invariance. Also, p-values were found to be insignificant, as shown in the table 116 below. So, it can be concluded that partial measurement invariance was established.

Table 116. Results of Partial Measurement Invariance for Department

Department	Construct	Original Correlation	Correlation Permutation Mean	5.00%	Permutation p-Values	Partial Measurement Invariance
Commerce vs Economics	BI	0.997173	0.991642	0.976149	0.722	Established
	EE	0.998921	0.99776	0.993791	0.659	Established
	FC	0.976577	0.98638	0.955216	0.177	Established
	PE	0.998968	0.996496	0.989053	0.758	Established
	SE	0.998534	0.995308	0.98707	0.801	Established
	SI	0.999885	0.999193	0.997082	0.841	Established
	BI	0.997107	0.99479	0.985259	0.595	Established

Commerce vs Management	EE	0.998322	0.998283	0.995623	0.402	Established
	FC	0.989167	0.982933	0.945217	0.469	Established
	PE	0.999612	0.998086	0.994282	0.885	Established
	SE	0.998594	0.99419	0.984975	0.859	Established
	SI	0.999062	0.998936	0.996388	0.349	Established
Economics vs Management	BI	0.999811	0.993718	0.981639	0.976	Established
	EE	0.997608	0.997023	0.992219	0.481	Established
	FC	0.996718	0.984837	0.950565	0.756	Established
	PE	0.999276	0.996825	0.990667	0.853	Established
	SE	0.998478	0.991214	0.975833	0.913	Established
	SI	0.998254	0.998488	0.994865	0.243	Established

Table 117 was used to assess whether full measurement invariance had been achieved by evaluating the equality of mean values and variances across different groups. For Group 1 (Commerce vs. Economics) and Group 2 (Commerce vs. Management), it was found that the "Mean-Original Difference" of every construct was within a 95% confidence interval, indicating preliminary evidence of invariance. In addition, the p-values for the means were greater than 0.05, suggesting that there was no significant difference in mean values between the groups. This indicated that equality of means had been achieved for all constructs between these two groups.

Table 117. Results of Full Measurement Invariance for Department

Department	**Construct**	**Equal Mean Value**				**Equal Variances**				**Full Measurement Invariance**
		Mean - Original Difference	**2.50 %**	**97.50 %**	**Permutation p-Values**	**Variance - Original iDifference**	**2.50%**	**97.50%**	**Permutation p-iValues**	
Commerce vs Economics	BI	-0.073	-0.228	0.224	0.544	0.231	-0.441	0.464	0.331	Established
	EE	-0.159	-0.221	0.228	0.162	0.293	-0.431	0.422	0.169	Established
	FC	-0.095	-0.239	0.242	0.424	0.002	-0.477	0.483	0.995	Established
	PE	0.028	-0.236	0.225	0.823	0.192	-0.673	0.645	0.584	Established
	SE	0.214	-0.247	0.232	0.080	0.221	-0.371	0.366	0.244	Established
	SI	-0.084	-0.225	0.220	0.486	0.211	-0.382	0.400	0.311	Established
Commerce vs	BI	0.049	-0.240	0.229	0.706	0.009	-0.474	0.505	0.976	Established
	EE	0.170	-0.253	0.238	0.168	0.025	-0.391	0.402	0.918	Established

Management	FC	0.071	-0.237	0.243	0.564	0.009	-0.377	0.377	0.965	Established
	PE	-0.012	-0.249	0.235	0.926	-0.023	-0.747	0.758	0.955	Established
	SE	0.026	-0.256	0.231	0.842	0.313	-0.396	0.398	0.129	Established
	SI	-0.134	-0.231	0.230	0.258	0.459	-0.468	0.431	0.047	Not Established
Economics vs Management	BI	0.122	-0.226	0.226	0.325	-0.215	-0.468	0.490	0.385	Established
	EE	0.342	-0.246	0.234	0.007	-0.280	-0.422	0.412	0.215	Not Established
	FC	0.175	-0.251	0.240	0.161	-0.027	-0.464	0.467	0.911	Established
	PE	-0.038	-0.219	0.226	0.756	-0.211	-0.693	0.670	0.572	Established
	SE	-0.197	-0.244	0.230	0.105	0.101	-0.302	0.317	0.518	Established
	SI	-0.046	-0.256	0.224	0.724	0.246	-0.419	0.389	0.262	Established

However, when comparing the economics and management departments in Group 3, the mean original difference for the EE construct was not within the 95% confidence interval. Additionally, the p-values for the means for the EE construct were less than 0.05, indicating a significant difference in mean values between the two departments. Therefore, it can be concluded that equality of means was not achieved for Group 3 (management vs. economics).

In the next step, the results of composite variances as shown in table 117, were checked whose interpretations are similar to those of mean differences. The values of original differences were found to be within 95% confidence interval except for SI construct while checking the variance between Commerce and Management department. Furthermore, the permutation p-value of SI construct in case of Group 2 (Commerce vs Management) was less than 0.05 which indicated that there is a significant difference between the composite variances in this case.

Hence, it can be concluded that partial measurement invariance was supported for Group 2 (Commerce vs Management) and Group 3 (Management vs Economics).

6.10.4 Test of MGA comparisons

Once full measurement invariance was confirmed, the next stage involved conducting multi-group analysis to investigate group comparisons. The first step involved referring to the permutation test results from the previous step, which evaluated the path coefficients. Table 118 was used for this purpose, which is divided into three parts showing the path coefficients between commerce and economics, commerce and management, and economics and management. The original path coefficients for different experience groups, along with their disparities in the original dataset and the permutation test, are presented in the second and third columns of Table 118.

The findings indicated that, with the exception of one path relationship (EE on behavioral intention in the commerce vs. management department), all other path relationships were not statistically significant, as the corresponding p-values were greater than 0.05.

Table 118. Results of Department-Specific Comparisons through Multi-Group Analysis

Commerce vs Economics							
Relationship	**Path Coefficients Original (Commerce)**	**Path Coefficients Original (Economics)**	**Path Coefficients Original Difference (Commerce - Economics)**	**Path Coefficients Permutation Mean Difference (Commerce - Economics)**	**2.50%**	**97.50%**	**Permutation p-Values**
EE -> BI	0.284	0.159	0.124	0.000	-0.224	0.252	0.300
FC -> BI	0.082	0.201	-0.119	-0.003	-0.219	0.212	0.299
PE -> BI	0.208	0.091	0.118	0.003	-0.277	0.300	0.441
SE -> BI	0.359	0.340	0.020	-0.005	-0.255	0.229	0.868
SI -> BI	0.216	0.266	-0.050	-0.002	-0.218	0.199	0.651
Commerce vs Management							
Relationship	**Path Coefficients Original (Commerce)**	**Path Coefficients Original (Management)**	**Path Coefficients Original Difference (Commerce - Management)**	**Path Coefficients Permutation Mean Difference (Commerce - Management)**	**2.50%**	**97.50%**	**Permutation p-Values**
EE -> BI	0.148	0.284	-0.136	0.004	-0.249	0.241	0.045
FC -> BI	0.082	0.255	-0.174	-0.001	-0.242	0.238	0.142
PE -> BI	0.208	0.206	0.002	-0.003	-0.273	0.265	0.993
SE -> BI	0.359	0.224	0.136	0.005	-0.236	0.248	0.296
SI -> BI	0.216	0.195	0.021	0.002	-0.187	0.201	0.867
Economics vs Management							
Relationship	**Path Coefficients Original (Economics)**	**Path Coefficients Original (Management)**	**Path Coefficients Original Difference (Economics - Management)**	**Path Coefficients Permutation Mean Difference (Economics - Management3)**	**2.50%**	**97.50%**	**Permutation p-Values**
EE -> BI	0.159	0.148	0.011	-0.005	-0.245	0.242	0.931

FC -> BI	0.201	0.255	-0.055	0.000	-0.223	0.229	0.665
PE -> BI	0.091	0.206	-0.116	0.004	-0.305	0.266	0.433
SE -> BI	0.340	0.224	0.116	0.002	-0.252	0.253	0.390
SI -> BI	0.266	0.195	0.071	-0.001	-0.216	0.189	0.485

In order to further examine the group-specific differences, another multi-group analysis (MGA) was conducted. The results presented in table 119 demonstrate that the impact of ICT SE on behavioral intention was stronger for Group 2 as compared to Group 1, as seen in the path coefficients in column 3. This stronger impact was also observed in the path relationship between FC and behavioral intention. These findings indicate that the impact was stronger for these relationships in the faculty of commerce department as compared to the faculty of management department. However, the reverse was observed in the relationship between FC and behavioral intention, as shown in table 119.

Table 119 Moderation Effect of Department through Multi-Group Analysis

Department	**(Commerce - Economics)**	**(Commerce - Management)**	**(Economics - Management)**	**(Commerce - Economics)**		**(Commerce - Management)**		**(Economics - Management)**	
Relationship	**Path Coefficients-Difference**	**Path Coefficients-Difference**	**Path Coefficients-Difference**	**p-Value**	**Moderation Effect**	**p-Value**	**Moderation Effect**	**p-Value**	**Moderation Effect**
EE -> BI	0.124	-0.136	0.011	0.283	No	0.027	Yes	0.937	No
FC -> BI	-0.119	-0.174	-0.055	0.308	No	0.124	No	0.635	No
PE -> BI	0.118	0.002	-0.116	0.357	No	0.983	No	0.356	No
SE -> BI	0.020	0.136	0.116	0.856	No	0.287	No	0.371	No
SI -> BI	-0.050	0.021	0.071	0.629	No	0.812	No	0.048	Yes

To determine the significance of these differences, p-values were examined, which revealed a significant difference between the commerce and management departments in terms of the relationship between EE and behavioral intention to use technology. Also, in case of the relationship between SI and behavioral intention, a significance difference was noted between economics and management departments. However, in no other case was a significant difference observed between any group as the p-values were greater than 0.05. Therefore, it can be concluded that the department moderates the relationship between EE and behavioral intention to use technology in the B-Schools, with a stronger effect of the faculty in the management department over the commerce department. Also, department moderates the relationship between SI and behavioral intention to use technology in the B-Schools, with a stronger effect of the faculty in the economics department over the management department. Hence, hypothesis H14 and H15 have been accepted, and hypotheses H16 has been rejected.

6.11 Chapter summary

The study indicates that the UTAUT model is useful for understanding the factors influencing educators' intention to use technology in teaching. According to the study, a positive and supportive OC has a significant and positive impact on all UTAUT constructs, including PE, EE, SI, SE, and FC, indicating that such culture is critical for promoting technology adoption among educators. Furthermore, the study shows that educators' behavioral intention to use technology is positively influenced by SI, EE, and PE, suggesting that their beliefs about technology's usefulness and ease of use, as well as their peers' and colleagues' influence, are significant factors in their decision-making process. The study also reveals that gender moderates the relationship between FC and behavioral intention, as well as PE and behavioral intention, indicating that B-Schools should tailor their technology adoption strategies to meet the different needs and preferences of female and male educators. On the contrary, age and ICT experience in teaching do not moderate any relationships in the path model, and department moderates only the relationship between EE and behavioral intention to use technology. Overall, the study underscores the importance of cultivating a positive and supportive OC and considering educators' beliefs and social networks to promote technology adoption, while also highlighting the need for tailored strategies for different genders.

CHAPTER-7

BUSINESS FACULTIES' PERCEPTIONS OF BARRIERS TO INTEGRATE ICT IN CLASSROOM INSTRUCTION

Chapter overview

This study aimed to investigate the perceptions of business faculty regarding the barriers to using and integrating ICT in classroom instruction. A 14-item instrument was developed to measure these barriers, and exploratory factor analysis was conducted to identify the factors that contributed to these barriers. The results indicated that faculty had a considerable amount of technical, infrastructural, training, and administrative support but lacked confidence and felt psychological pressure to use technology, which ultimately forced them to use traditional methods of teaching. The study also found that the most significant barriers to technology adoption were cognitive dissonance and classroom management issues. The study also explored the impact of gender and age-group on faculty' perceptions and found that different age-groups had different cognitive issues that restricted their use of ICT. Overall, this study provides valuable insights into the barriers to using and integrating ICT in classroom instruction and offers suggestions for addressing these barriers to enhance the quality of education.

7.1 Survey instrument

To address the lack of standardized measurement instruments on barriers to adopting technology for teaching and learning, a 14-item instrument was created. The existing research on difficulties in implementing new technologies, primarily from Western sources, served as the basis for identifying and targeting the most notable barriers. The specific barriers identified in this study are outlined in Table 120.

Table 120. Barriers to Technology adoption Explored by Previous Studies

Lack of time	Abrahams, 2010; Ihmeideh, 2009; Al-Senaidi *et al.*, 2009; Butler & Sellbom, 2002; Fabry and Higgs, 1997; Nicolle & Lou, 2008
Resistant to change and negative attitude	Alanoglu *et al.*, 2022; Hall & Oconnor, 2018; O'Doherty *et al.*, 2018; Watty *et al.*, 2016; Kler, 2014; Basak & Govender, 2015; Kim, 2002;

Lack of training	Zayim *et al.*, 2006; Zhou & Xu, 2007; Al-Senaidi *et al.*, 2009; Beggs, 2000; Rogers, 2000; Redmann & Kotrlik, 2008; Osei *et al.*, 2014
Lack of teacher confidence	Hashemi & Kew, 2021; Al-Senaidi *et al.*, 2009; Bingimlas, 2009; Nikolopoulou & Gialamas, 2016; Johnson *et al.*, 2012; Zayim *et al.*, 2006; Teo, 2009
Lack of institutional support	Latif, 2017; Reid, 2014; Sumner & Hostetler, 1999; Kotrlik & Redmann, 2009; Hassall & Lewis, 2017; Hannache-Heurteloup & Moustaghfir, 2020
Lack of access to ICT resources	Lawrence & Tar, 2018; Al-Senaidi *et al.*, 2009; Nyirongo, 2009; Mtebe & Raisamo, 2014; Singhavi & Basargekar, 2019; Nyirongo, 2009; Datt & Singh, 2021

The faculty members were given a questionnaire that consisted of statements, and they were instructed to indicate their level of agreement or disagreement with each statement using a five-point Likert scale. In order to analyze the questionnaire data in future studies, an exploratory factor analysis was performed using the principal axis factoring method, along with a varimax rotation technique.

7.2 Research technique

To identify underlying variables and reduce the number of observed variables, factor analysis was utilized. This approach enabled the determination of a more concise set of factors that accounted for a significant portion of the variability within a larger set of variables. Furthermore, a two-way ANOVA technique was employed to investigate potential differences between groups.

7.3 Preliminary analysis

Table 121 presents the means and standard deviation of individual items, revealing that the mean scores for most items were around 3.00, falling within the range of 2.26-3.75, with a standard deviation of approximately 1.00. Faculty members displayed the highest level of disagreement, ranked in descending order, on the following five items: item 1, which addressed the absence of technical support; item 4, which referred to inadequate ICT infrastructure; item 6, which pertained to insufficient ICT training; item

7, which reflected a lack of motivation among faculty to utilize ICT; and item 9, which highlighted issues related to overcrowded classrooms. Conversely, the top five items on which faculty agreed the most (in descending order) were item 14, indicating that ICT reduces students' attention to the lesson, item 11, indicating that ICT implementation results in the psychological pressure of missing syllabus content, item 2, reflecting a lack of confidence in using ICT, item 10, indicating that ICT integration limits the role of teachers in the classroom, and item 3, indicating a belief that traditional classroom instruction methods are always effective. These results suggest that while faculty enjoy significant technical, infrastructural, training, and administrative support, they lack confidence and experience psychological pressure to use ICT, ultimately resulting in their continued reliance on traditional teaching pedagogy.

Table 121. Mean and Standard Deviation of Items Reflecting Barriers to Technology Adoption

Items	**Statements**	**Mean**	**Std. Deviation**
1	Lack of technical support at my institute to address technological problems.	2.39	1.29
2	Lack of confidence in using ICT	3.72	1.27
3	Belief that traditional methods of instruction are always effective	3.71	1.26
4	Lack of proper ICT infrastructure in my institution.	2.26	1.22
5	Some courses don't allow flexibility to integrate ICT.	3.54	1.35
6	Lack of adequate ICT training to the faculty at my institute.	2.39	1.31
7	Lack of motivation to the faculty for using ICT.	2.36	1.30
8	Limited time frame to cover all topics of the syllabus using ICT.	3.61	1.32
9	The classrooms in my institute are usually crowdy.	2.38	1.28
10	ICT integration limits the role of teachers in the classroom	3.71	1.28
11	Psychological pressure of missing out syllabus content if ICT is implemented.	3.72	1.27
12	Classroom management is more difficult while using ICT.	3.67	1.28
13	Rapid developments in technology affects instruction plan.	3.67	1.29
14	ICT reduces students' attention to the lesson.	3.75	1.28

[Source: Adopted from Nikolopoulou & Gialamas, (2013); Franklin (2007), Al-Senaidi et al. (2009) and Ihmeideh (2009).]

To assess the suitability of conducting factor analysis, the initial step involved examining the correlation among variables. The results revealed a substantial correlation between the variables, suggesting their tendency to form a factor. Subsequently, the 14 items underwent exploratory factor analysis, employing the principal axis factoring method with varimax rotation. This analysis yielded the KMO statistics and determinant of the correlation matrix, which provided further insights into the appropriateness of the factor analysis. Only factors with eigenvalues greater than 1 were retained, and factors with coefficients less than 0.50 were suppressed. The preliminary solution included four factors, and all the communalities of the initial solution were retained because they were larger than 0.2.

Table 122: Results of KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.722
Bartlett's Test of Sphericity	Approx. Chi-Square	1784.087
	df	91
	Sig.	.000

The KMO statistic, ranging from 0 to 1, provides an indication of the compactness of correlation patterns, with a value closer to 1 suggesting distinct and reliable factors obtained through factor analysis. According to Kaiser (1974), values above 0.5 are considered acceptable. In the present dataset, the KMO value is 0.722, indicating a good level of compactness and suggesting the appropriateness of factor analysis. Bartlett's test of sphericity assesses whether the original correlation matrix is an identity matrix. A significant result indicates the presence of relationships among the variables. In this dataset, Bartlett's test yielded a highly significant result ($p = 0.00$), confirming the appropriateness of factor analysis. Table 122 provides an overview of the suitability of factor analysis based on the available data.

7.4 Factor extraction

The initial section of Table 123 presents the eigenvalues as a percentage of the total variance for each factor prior to extraction. Subsequently, SPSS extracted only those factors with eigenvalues exceeding 1, effectively reducing the number of factors to four. The "Extraction Sums of Squared Loadings" column in the table indicates the percentage of variance explained by each factor after extraction. Finally, the last column of the table, labeled "Rotation Sums of Squared Loadings," displays the eigenvalues of the factors after rotation. The rotation process aims to optimize the factor structure, resulting in equal relative importance among the four factors. Factor 1 accounted for significantly more variance than the other three before rotation (16.90%, 14.72%, and 8.43%, respectively); however, after extraction, it only accounts for 18.825% of variance (compared to 16.75%, 14.04%, and 13.44%, respectively).

Table 123. Results Showing Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	**% of Variance**	**Cumulative %**	**Total**	**% of Variance**	**Cumulative %**	**Total**	**% of Variance**	**Cumulative %**
1	3.221	23.010	23.010	3.221	23.010	23.010	2.636	18.825	18.825
2	2.367	16.905	39.915	2.367	16.905	39.915	2.345	16.750	35.575
3	2.062	14.725	54.640	2.062	14.725	54.640	1.967	14.048	49.623
4	1.180	8.431	63.071	1.180	8.431	63.071	1.883	13.448	**63.071**
5	.842	6.014	69.085						
6	.767	5.482	74.566						
7	.687	4.909	79.475						
8	.621	4.436	83.911						
9	.452	3.232	87.143						
10	.436	3.113	90.256						
11	.395	2.822	93.078						
12	.345	2.466	95.544						
13	.322	2.303	97.847						
14	.301	2.153	100.000						
Extraction Method: Principal Component Analysis.									

Table 124 presents the communalities, which signify the extent to which a variable shares its variance with other variables. The table showcases the communalities both before and after extraction. When communalities have small values, it suggests that variables do not fit well with the factor solution and should be possibly removed from analysis. According to Hair *et al.* (2006), values below 0.45 should be eliminated.

Initially, before extraction, all communalities are set to 1 because principal component analysis assumes that all variance is common. Under the "Extraction" column, the communalities indicate the shared variance within the data structure. For example, based on the provided results, the statement "Lack of proper ICT infrastructure in my institution" demonstrates a shared variance of 54.7% with the associated variables. Following extraction, the communalities represent the portion of variance in each variable that can be accounted for by the retained factors.

Table 124. Communalities Before and After Extraction

Items	Statements	Initial	Extraction
1	Lack of technical support at my institute to address technological problems.	1.000	.548
2	Lack of confidence in using ICT	1.000	.574
3	Belief that traditional methods of instruction are always effective	1.000	.691
4	Lack of proper ICT infrastructure in my institution.	1.000	.547
5	Some courses don't allow flexibility to integrate ICT.	1.000	.778
6	Lack of adequate ICT training to the faculty at my institute.	1.000	.621
7	Lack of motivation to the faculty for using ICT.	1.000	.485
8	Limited time frame to cover all topics of the syllabus using ICT.	1.000	.497
9	The classrooms in my institute are usually crowdy.	1.000	.772
10	ICT integration limits the role of teachers in the classroom	1.000	.572
11	Psychological pressure of missing out syllabus content if ICT is implemented.	1.000	.665
12	Classroom management is more difficult while using ICT.	1.000	.667
13	Rapid developments in technology affects instruction plan.	1.000	.776
14	ICT reduces students' attention to the lesson.	1.000	.637
	Extraction Method: Principal Component Analysis. **(Threshold limit 0.45 as per Hair *et al.*, 2006)**		

7.5 Factor rotation

Table 125 presents the rotated component matrix, exhibiting the factor loadings of each variable on each factor. Variables with factor loadings below 0.45 were omitted from the table, and they were arranged in order of magnitude based on configuration settings.

Table 125. Rotated Component Matrix

Sr. No.	Items	Component			
		1	2	3	4
6	Lack of adequate training to the faculty at my institute for using ICT.	.779			
4	Lack of proper ICT infrastructure in my institution.	.730			
1	Lack of technical support at my institute to address technological problems.	.722			
7	Lack of motivation to the faculty for using ICT.	.682			
9	The classrooms in my institute are usually crowdy.	.680			
8	Limited time frame to cover all topics of the syllabus using ICT.		.877		
5	Some courses don’t allow flexibility to integrate ICT.		.876		
13	Rapid developments in technology affects instruction plan.		.873		
3	Belief that traditional methods of instruction are always effective			.818	
11	Psychological pressure of missing out syllabus content if ICT is implemented.			.803	
2	Lack of confidence in using ICT			.707	
12	Classroom management is more difficult while using ICT.				.809
14	ICT reduces student’s attention to the lesson.				.782
10	ICT integration limits the role of teachers in the classroom				.694
	Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.				
	a. Rotation converged in 5 iterations.				

Following the suggestion by Hair *et al.* (2006), a cut-off value of 0.50 for structure coefficients was utilized. Accordingly, five items (1, 4, 6, 7, and 9) displayed significant coefficients with factor one, which was labeled as "lack of institutional support." These items were related to administrative, technical, and training support. Factor two, named "poor synchronization of ICT with curriculum," heavily weighed on three items (5, 8, and 13) that were about curriculum and pedagogy. Factor three, called "cognitive dissonance," loaded on items 2, 3, and 11, which were all related to teachers' disbelief in the value of ICT. Finally, factor four, named "classroom management issues," loaded on three items (10, 12, and 14) that concerned classroom management.

Table 126 displays the means of each factor, and it shows that the mean of the factor labelled "Lack of Institutional Support" was below the theoretical mean of 3.00, while the means of the other three factors were above 3.00: "Poor Synchronization of ICT with Curriculum," "Cognitive Dissonance," and "Classroom Management Issues." This implies that faculty members exhibited lower levels of agreement with the statements indicating that barriers to adopting ICT were attributed to insufficient infrastructure, technical training, and administrative support. On the contrary, they tended to agree that the major barriers were related to cognitive dissonance, classroom management issues, and poor synchronization of ICT with curriculum. The faculty's overall mean score was 3.20, slightly surpassing the theoretical mean. This suggests that they recognized the presence of certain obstacles to adopting ICT in teaching.

Table 126. Mean, Standard Deviation, and Cronbach Alphas for Factors

Factor	Renaming of Factors Identified	Cronbach's Alpha	Mean	Std. Deviation
F1	Lack of Institutional Support (5 Items)	.772	2.35	1.27
F2	Poor synchronization of ICT with curriculum (3 Items)	.852	3.60	1.31
F3	Cognitive Dissonance (3 Items)	.725	3.71	1.26
F4	Classroom Management Issues (3 Items)	.695	3.71	1.27
	Overall Scale	.721	3.20	1.28

Table 126 also presents the Cronbach's alpha coefficients, which indicate the internal consistency reliability, for the entire survey and its four factors. The coefficients were found to be 0.721, 0.772, 0.852, 0.725, and 0.695, respectively. Although the reliability coefficient for the last factor was relatively low, it was deemed acceptable for an exploratory study. The lower alpha coefficient for this factor could be attributed to the inclusion of fewer items, as internal consistency reliability tends to improve with a larger number of items in a factor. Descriptive statistics reveal that "Cognitive Dissonance" and "Classroom Management Issues" were perceived as the most significant barriers, with a mean score of 3.71, followed by "Poor Synchronization of ICT with Curriculum" with a mean of 3.60. Additionally, it can be observed that faculty members considered "Lack of Institutional Support" to be the least significant barrier to technology adoption in teaching, with a mean of 2.35.

7.6 Group differences

7.6.1 Hypothesis

As per the study by Al-Senaidi et al. (2009) certain group differences of perceptions of barriers to ICT adoption were observed on the basis of gender, academic rank, age-group, etc. As this study covers up the faculty of commerce, economics and management departments of business schools, so it is imperative to observe the group differences of perceptions of barriers apart from age-group and gender. So, to analyse the group differences, the following hypothesis were framed.

H1 (Main Effect): There is no difference between the mean perception of barriers to integrating ICT in classroom instruction by the female and male faculty.

H2 (Main Effect): There is no difference in the mean perception of barriers to integrating ICT in classroom instruction by the faculty of various age-groups.

H3 (Interaction Effect): There is no interaction effect between the gender and age-group of faculties regarding the perception of barriers to integrating ICT in classroom instruction.

H4 (Main Effect): There is no difference in the mean perception of barriers to integrating ICT in classroom instruction by the faculty of various departments.

H5 (Interaction Effect): There is no interaction effect between the gender and faculties of various departments regarding the perception of barriers to integrating ICT in classroom instruction.

H6 (Interaction effect): There is no interaction effect between the faculties of various departments and various age-groups regarding the perception of barriers to integrating ICT in classroom instruction.

7.6.2 Two-way ANOVA of gender by age-group

Two variables, namely gender and age-group, were examined to investigate group differences. A statistical analysis called a two-way ANOVA was performed to examine how gender and age-group influenced the average values of four factors. Based on the findings presented in Table 127, it can be concluded that age-group had a significant impact on two factors: "lack of institutional support" and "cognitive dissonance". This suggests that faculty from different age-groups have varying perceptions regarding the technical, infrastructural, and administrative support provided by the institute, as well as different cognitive issues that limit their use of ICT. Additionally, as indicated in Table 127, there was no significant influence of either gender or age-group, either individually or in combination, on the factor "poor synchronization of ICT with curriculum." This indicates that regardless of their gender or age-group, faculty had similar opinions about the issue of poor synchronization of ICT with the curriculum.

In this study, an interaction effect was observed for the factors of "cognitive dissonance" and "classroom management issues" in relation to group differences by gender and age-group: $F(4, 340) = 2.572$, $p < .05$, indicating a significance level of 0.038, and $F(4, 340) = 3.53$, $p < .05$, indicating a significance level of 0.008, respectively. The p-values of 0.038 and 0.008, both below the significance level of 0.05, suggest that the interaction effect between gender and age-group is significant for the factors of "cognitive dissonance" and "classroom management issues." This means that the effect of gender on faculties' perceptions of these barriers to using ICT depends on their age-group. In other words, the relationship between gender and these factors differs depending on the age-group of the faculty being studied.

In ANOVA models, Partial ETA squared (η^2) is a commonly utilized measure of effect size. It quantifies the proportion of variance associated with each main effect and interaction effect within the ANOVA model. A general guideline suggests that effect sizes of 0.01, 0.06, and 0.14 correspond to small, medium, and large effect sizes, respectively. According to the data presented in Table 127, all significant effects exhibited small effect sizes, ranging from 0.1% to 3.8%, following the criteria established by Cohen (1988). Therefore, the findings suggest that the observed effects in the study were relatively minor.

Table 127: ANOVA Table for the Group Difference on Gender by Age Group

Factors	**Sum of Squares**	**df**	**Mean Squares**	**F**	**Sig.**	**Effect Size η^2 (Partial ETA Squared)**
Lack of Institutional Support						
Gender	0.373	1	0.373	0.434	0.511	0.001
Age Group	11.413	4	2.853	3.315	**0.011**	0.038
Gender x Age Group	5.241	4	1.31	1.522	0.195	0.018
Error	292.651	340	0.861			
Total	308.907	349				
Poor synchronization of ICT with curriculum						
Gender	0.295	1	0.295	0.303	0.582	0.001
Age Group	7.097	4	1.774	1.823	0.124	0.021
Gender x Age Group	1.672	4	0.418	0.429	0.787	0.005
Error	330.844	340	0.973			
Total	339.186	349				
Cognitive Dissonance						
Gender	0.469	1	0.469	0.497	0.481	0.001

Age Group	9.078	4	2.269	2.408	**0.049**	0.028
Gender x Age Group	9.697	4	2.424	2.572	**0.038**	0.029
Error	320.456	340	0.943			
Total	338.89	349				
Classroom Management Issues						
Gender	0.843	1	0.843	0.898	0.344	0.003
Age Group	2.841	4	0.71	0.756	0.554	0.009
Gender x Age Group	13.258	4	3.314	3.53	**0.008**	0.04
Error	319.239	340	0.939			
Total	334.951	349				

7.6.3 Two-way ANOVA of gender by department

The study examined two grouping variables, namely gender and department, to compare differences among groups on four factor means. A two-way ANOVA was conducted on gender and department to investigate these differences.

Table 128. ANOVA Table for the Group Difference on Gender by Department

Factors	**Sum of Squares**	**df**	**Mean Squares**	**F**	**Sig.**	**Effect Size η^2 (Partial ETA Squared)**
Lack of Institutional Support						
Gender	.131	1	.131	.148	.701	.000
Department	4.044	2	2.022	2.290	.103	.013
Gender x Department	1.153	2	.576	.653	.521	.004
Error	303.702	344	.883			
Total	308.907	349				
Poor synchronization of ICT with curriculum						
Gender	.003	1	.003	.003	.958	.000
Department	1.414	2	.707	.725	.485	.004
Gender x Department	2.741	2	1.371	1.407	.246	.008
Error	335.240	344	.975			
Total	339.186	349				

Cognitive Dissonance						
Gender	.799	1	.799	.839	.360	.002
Department	6.963	2	3.481	3.658	**.027**	.021
Gender x Department	4.225	2	2.112	2.219	.110	.013
Error	327.441	344	.952			
Total	338.890	349				
Classroom Management Issues						
Gender	.257	1	.257	.285	.594	.001
Department	22.146	2	11.073	12.249	**.000**	.066
Gender x Department	1.875	2	.938	1.037	.356	.006
Error	310.962	344	.904			
Total	334.951	349				

The findings, presented in Table 128, indicated that there was a main effect of department on the factors "classroom management issues" and "cognitive dissonance" at a 0.05 significance level. This implies that the faculty from commerce, management, and economics departments had different perceptions of the issues faced in classroom management, and they also had varied cognitive issues that hindered their use of ICT. However, the table also revealed that there was neither a main effect nor an interaction effect of gender and department on the factors "Poor synchronization of ICT with curriculum" and "Lack of Institutional Support." This implies that male and female faculty members from various departments held comparable views regarding the challenges associated with the alignment of ICT with curriculum and level of institutional support.

Partial ETA squared (η^2), a frequently employed effect size measure in ANOVA models, gauges the amount of variance attributed to individual main effects and interaction effects within the model. Following the general guideline, effect sizes of 0.01, 0.06, and 0.14 correspond to small, medium, and large magnitudes, respectively. According to Cohen (1988) and depicted in Table 128, the significant effects exhibited small (0.02) and medium (0.06) effect sizes.

7.6.4 Two-way ANOVA of department by age-group

The study examined two grouping variables - department and age-group - and performed a two-way ANOVA on four factor means to analyze group differences. The findings revealed a noteworthy impact of age-group on the variables "lack of institutional support" and "cognitive dissonance". This implies that faculty members belonging to different age-groups hold distinct viewpoints regarding the level of technical, infrastructural, and administrative assistance offered by the institution. Additionally, they encounter diverse cognitive obstacles when it comes to utilizing ICT. However, there was no interaction effect between department and age-group on any of the factors. This implies that faculty from management, commerce, and economics, regardless of their age-group, share similar views on the obstacles to the adoption of technology in classroom teaching. Table 129 displays the relevant data.

Partial ETA squared (η^2) is a commonly employed measure of effect size in ANOVA models. It quantifies the proportion of variance associated with each main effect and interaction effect within the model. Generally, effect sizes of 0.01, 0.06, and 0.14 are considered indicative of small, medium, and large magnitudes, respectively, following a commonly used guideline. According to the data presented in Table 129, all of the significant effects had small effect sizes, as per the guidelines established by Cohen (1988).

Table 129. ANOVA Table for the Group Difference on Department by Age-group

Factors	Sum of Squares	df	Mean Squares	F	Sig.	Effect Size η^2 (Partial ETA Squared)
Lack of Institutional Support						
Department	3.187	2	1.594	1.861	.157	.011
Age_Group	10.764	4	2.691	3.143	**.015**	.036
Department x Age_Group	6.769	7	.967	1.129	.344	.023
Error	287.715	336	.856			
Total	308.907	349				

Poor synchronization of ICT with curriculum						
Department	1.687	2	.843	.880	.416	.005
Age_Group	7.321	4	1.830	1.911	.108	.022
Department x Age_Group	9.404	7	1.343	1.403	.203	.028
Error	321.798	336	.958			
Total	339.186	349				
Cognitive Dissonance						
Department	3.352	2	1.676	1.760	.174	.010
Age_Group	9.437	4	2.359	2.477	**.044**	.029
Department x Age_Group	2.632	7	.376	.395	.905	.008
Error	320.021	336	.952			
Total	338.890	349				
Classroom Management Issues						
Department	3.741	2	1.871	2.111	.123	.012
Age_Group	3.734	4	.934	1.053	.380	.012
Department x Age_Group	11.926	7	1.704	1.922	.065	.039
Error	297.792	336	.886			
Total	334.951	349				

7.7 Chapter summary

This study investigated the perceptions of business faculty regarding the barriers to using and integrating ICT in classroom instruction. The findings suggest that while faculty have a reasonable level of technical, infrastructural, training, and administrative support, they lack confidence and face psychological pressure to use technology, which ultimately forces them to use traditional teaching pedagogy. The major barriers to adopting ICT in teaching are cognitive dissonance and classroom management issues. The results also show that faculty from different age-groups have different cognitive issues that restrict their use of ICT. However, female and male faculty, regardless of their age-group, have similar perceptions of poor synchronization of ICT with the curriculum. Educational policymakers and institutions can derive valuable insights from these findings to tackle the identified obstacles and facilitate the successful incorporation of technology into teaching practices.

CHAPTER-8
AI AWARENESS AMONG BUSINESS FACULTIES

Chapter overview

Artificial intelligence is progressively becoming a crucial asset within the realm of education, particularly in the context of business school education. Employing instructional methods based on AI holds the promise of elevating the standard of educational provision, tailoring lessons to suit individual students, and advancing overall student achievements. However, the successful integration of AI in the classroom requires an adequate level of awareness and understanding among faculty. This chapter aims to examine the level of AI-awareness among business faculty in universities in Punjab and their perceptions of the potential benefits of AI in business school. This chapter draws insights from the data that presents the responses of business faculties in universities of Punjab to a set of statements related to their awareness of AI-based instruction and the potential benefits of AI in business school education. The results of this objective will offer valuable insights for educational policymakers and administrators when creating impactful training programs for faculty and improving the calibre of educational delivery within the realm of AI-based instruction.

8.1 Research instrument

The evaluation of AI comprehension in classroom teaching involved the use of ordinal scale statements consisting of five choices (ranging from 1, strongly disagree, to 5, strongly agree) to define AI. Furthermore, the study identified diverse AI tools and technologies, and educators were requested to assess their familiarity with these tools using a standardized scale consisting of five levels of familiarity: ranging from “not at all familiar” to “extremely familiar”.

8.2 Awareness of faculty about AI-based classroom instruction

Table 130 offers an intriguing glimpse into the extent of familiarity with AI among faculty in B-Schools within Punjab's universities. Table 130 displays the proportionate distribution of responses provided by business faculty in relation to a series of statements assessing their knowledge regarding AI-based instruction in the classroom. The responses were evaluated using a 5-point Likert scale, spanning "not at all aware" to "extremely aware." The data presented in the table sheds light on the level of awareness among business faculty in universities in Punjab regarding AI-based instruction.

Table 130 presents the responses of business faculty in Punjab universities regarding their familiarity with statements pertaining to AI-based instruction within the classroom setting. Looking at the responses, it is evident that the faculty are extremely aware of AI-based instruction that is carried out using digital technology (statement 1) and that it is offered through artificially intelligent technologies that can mimic human intelligence (statement 4). Over 50% of the respondents chose the highest level of awareness for these statements. In contrast, the respondents seem to be less aware of the statement that AI-based instruction combines classroom and web-based learning (statement 2), with only around 56% of the respondents choosing the highest level of awareness. Similarly, for the statement that AI-based instruction is delivered remotely through any kind of medium (statement 5), only around 57% of the respondents chose the highest level of awareness. For the statement that “AI-based instruction is a tailored form of instruction delivered through various gadgets” (statement 3), around 61% of the respondents chose the highest level of awareness. Finally, for the statement that AI-based instruction bridges the gap between teaching and learning by increasing efficiency through the automation of numerous processes (statement 6), around 61% of the respondents also chose the highest level of awareness.

The responses from faculty to a set of statements related to AI-based instruction indicate that while there is a high level of awareness among faculty, there are still gaps in their understanding of certain aspects of AI-based instruction. For example, although a significant portion of faculty members demonstrate a high level of awareness regarding the utilization of digital technology in AI-based instruction, there remains some uncertainty regarding their comprehension of how AI-based instruction integrates classroom and web-based learning.

Table 130. AI Awareness of Business Faculty in Classroom Instruction

S. no.	Items	Not At All Aware	Slightly Aware	Somewhat Aware	Moderately Aware	Extremely Aware
1	AI-based instruction is carried out using digital technology.	0.00%	0.00%	0.00%	0.00%	100.00%
2	AI-based instruction combines classroom and web-based learning.	6.57%	7.71%	10.86%	19.14%	55.71%
3	AI-based instruction is a tailored form of instruction delivered through various gadgets.	3.14%	6.86%	12.57%	16.86%	60.57%
4	AI-based education delivery is offered through artificially intelligent technologies that can mimic human intelligence.	7.43%	8.86%	10.86%	18.00%	54.86%
5	AI-based instruction is delivered remotely through any kind of medium.	2.29%	5.14%	8.57%	26.57%	57.43%
6	AI-based instruction bridges the gap between teaching and learning by increasing efficiency through the automation of numerous processes.	7.71%	11.14%	8.86%	11.43%	60.86%

Moreover, there are areas where certain faculty members have incomplete knowledge, such as the personalized nature of AI-based instruction and the implementation of artificially intelligent technologies in delivering education. In general, based on the table, it can be inferred that business faculty in Punjab universities possess a commendable level of understanding regarding AI-based instruction, especially concerning its utilization of digital technology and artificially intelligent technologies. However, there may be some room for improvement in their awareness of other aspects of AI-based instruction, such as its use of web-based learning and remote delivery. These results emphasize the necessity of continuous education and training to ensure that faculty acquire a thorough comprehension of the advantages provided by AI-driven instruction. Educational policymakers and administrators can find value in this data while developing efficient training programs for faculty and enhancing the standard of education provided within the realm of AI-based instruction.

8.3 Familiarity of faculty with AI-based classroom instructional tools

As depicted in table 131, the majority of respondents exhibit a high level of familiarity with AI-based classroom instruction tools such as data analytics software, simulations, voice assistants, language learning applications, digital speech recognition devices, remote proctoring software, automatic test generation and grading systems, and plagiarism detection software. However, respondents display less familiarity with virtual facilitators, intelligent tutoring systems, and adaptive learning software.

Table 131. Degree of familiarity of Business Faculty with AI-based Classroom Instruction Tools

AI-Based Classroom Instruction Tools	**Not At All Familiar**	**Slightly Familiar**	**Somewhat Familiar**	**Moderately Familiar**	**Extremely Familiar**	**Total**
Virtual facilitators and learning environments	108 **(30.86%)**	98 **(28%)**	56 **(16%)**	29 **(8.29%)**	59 **(16.86%)**	350
Intelligent Tutoring Systems (For Analyzing Student Success Metrics)	124 **(35.43%)**	77 **(22%)**	69 **(19.71%)**	39 **(11.14%)**	41 **(11.71%)**	350
Data analytics softwares (Tableau, Microsoft Power BI, Python, etc.)	22 **(6.29%)**	19 **(5.43%)**	9 **(2.57%)**	43 **(12.29%)**	257 **(73.43%)**	350
Simulations (IBM Watson, Learnbiz, Udacity, etc.)	11 **(3.14%)**	27 **(7.71%)**	0 **(0%)**	36 **(10.29%)**	276 **(78.86%)**	350
Voice assistants (Siri, Amazon Alexa, Google Assistant, etc.)	0 **(0%)**	0 **(0%)**	14 **(4%)**	29 **(8.29%)**	307 **(87.71%)**	350
Adaptive learning softwares (Adaptemy, CogBooks, Realizeit, etc.)	217 **(62%)**	44 **(12.57%)**	52 **(14.86%)**	14 **(4%)**	23 **(6.57%)**	350
AI Based Gaming Learning Platforms (EdApp, Kahoot, Gametize, Hoopla, etc.)	33 **(9.43%)**	49 **(14%)**	130 **(37.14%)**	86 **(24.57%)**	52 **(14.86%)**	350

Language learning applications	0 **(0%)**	0 **(0%)**	0 **(0%)**	135 **(38.57%)**	215 **(61.43%)**	350
Plagiarism detection softwares	0 **(0%)**	0 **(0%)**	0 **(0%)**	0 **(0%)**	350 **(100%)**	350
Automatic test generation & grading systems	0 **(0%)**	0 **(0%)**	0 **(0%)**	19 **(5.43%)**	331 **(94.57%)**	350
Remote Proctoring softwares	12 **(3.43%)**	18 **(5.14%)**	7 **(2%)**	15 **(4.29%)**	298 **(85.14%)**	350
Digital speech recognition devices	8 **(2.29%)**	31 **(8.86%)**	66 **(18.86%)**	58 **(16.57%)**	187 **(53.43%)**	350

Therefore, it can be concluded that, overall, the faculty teaching at B-Schools possess a foundational understanding of most AI-based tools, making them well-suited for the adoption of AI. The reason for less familiarity with AI-based tools like virtual facilitators and learning environments, adaptive learning software, AI-based gaming learning platforms, and intelligent tutoring systems can be accounted for by the fact that these tools are still in their initial phase of development and are evolving more in western countries than in India. However, with the changing educational landscape and technological environment, it is expected that these tools can be very prevalent in classrooms in India.

8.4 Potential benefits of AI to educators

Table 132. Potential Benefits of AI in Business School Education as Perceived by Business Faculty

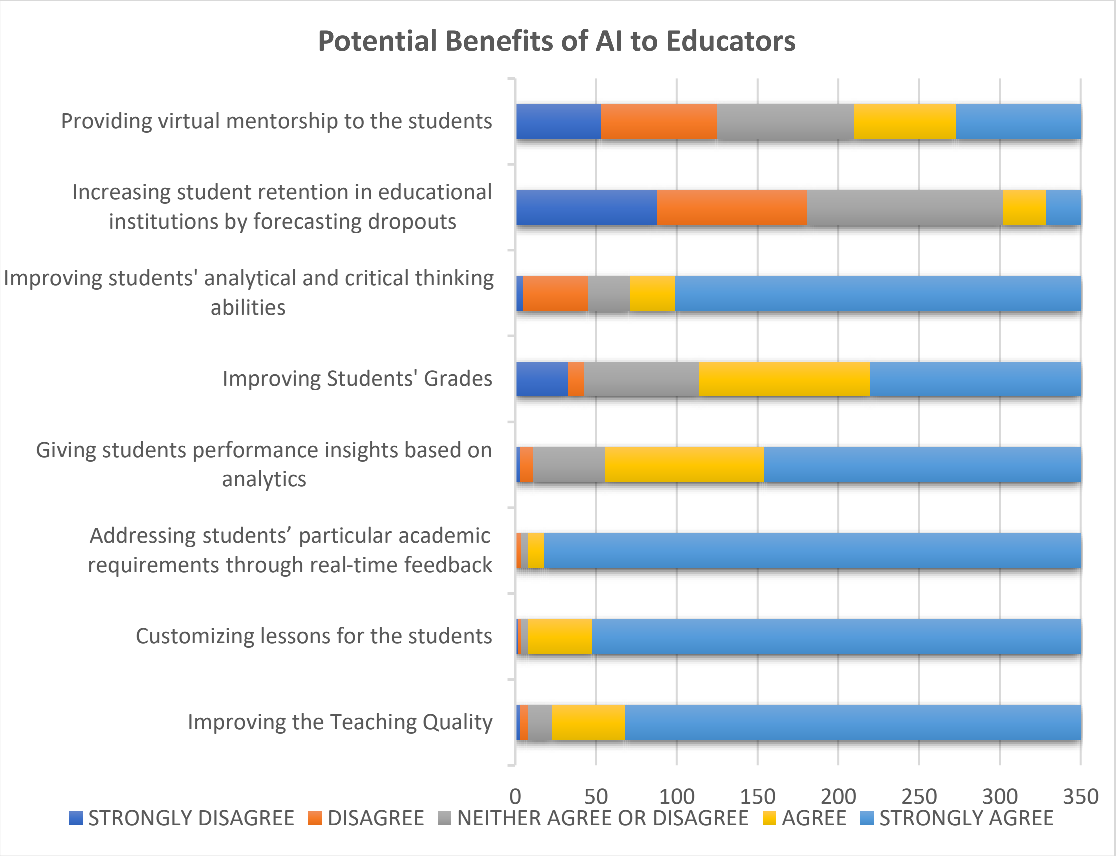
S. no.	Potential benefits of AI	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree	Total
1	Improving the teaching quality	3	5	15	45	282	**350**
2	Customizing lessons for the students	2	2	4	40	302	**350**
3	Addressing students’ particular academic requirements	0	4	4	10	332	**350**

	through real-time feedback						
4	Giving students performance insights based on analytics	3	8	45	98	196	**350**
5	Improving students' grades	33	10	71	106	130	**350**
6	Improving students' analytical and critical thinking abilities	5	40	26	28	251	**350**
7	Increasing student retention in educational institutions by forecasting dropouts	88	93	121	27	21	**350**
8	Providing virtual mentorship to the students	53	72	85	63	77	**350**

The table 132 and figure 21 presents the potential benefits of AI in business school education as perceived by educators. The benefits include improving teaching quality, customizing lessons for students, addressing academic requirements through real-time feedback, providing performance insights according to analytics, improving students' grades, analytical and critical thinking abilities, increasing student retention, and providing virtual mentorship.

The table 132 indicates that educators are generally positive about the potential benefits of AI in the classroom. They strongly agree that AI can improve teaching quality (282 out of 350) and customize lessons for students (302 out of 350). However, they are less certain about the potential for AI to address specific academic requirements through real-time feedback (only 10 out of 350 agree) and improve student grades (only 106 out of 350 agree). Furthermore, the data shows that educators are divided on the potential of AI to increase student retention. While 27 out of 350 educators agree that AI can forecast dropouts and increase student retention, a significant number of educators (88 out of 350) strongly disagree with this notion.

Figure 21. Potential benefits of AI to educators



In general, based on the data presented in table 132 and figure 21, educators demonstrate a measured sense of optimism regarding the potential advantages of AI in business school education. While acknowledging its capacity to enhance teaching quality and offer performance insights, they express uncertainty regarding its influence on student retention and academic achievement. These findings emphasize the necessity for additional research to comprehensively comprehend the benefits and limitations of AI in the context of business school education.

8.5 Chapter summary

The information presented in this chapter sheds light on the level of AI awareness among business faculty in universities of Punjab. The findings indicate that while faculty are generally aware of AI-based instruction, there are still gaps in their understanding of certain aspects of AI, particularly in relation to its use of web-based learning and remote delivery. The data also shows that educators are cautiously optimistic about the potential benefits of AI in business school education, but they are unsure about its impact on student retention and virtual mentorship. The results underscore the importance of continuous education and training to guarantee that faculty possess a comprehensive awareness of benefits associated with instruction utilizing AI. Moreover, the outcomes of this research objective provide valuable insights for decision-makers and administrators in designing effective training programs for faculty members and enhancing the overall standard of education delivery in the realm of AI-based instruction. Overall, the findings of this study contribute to the growing body of research on the utilization of AI in educational environments and offer crucial guidance for future research endeavours in this field.

CHAPTER-9
FINDINGS, CONCLUSION AND RECOMMENDATIONS

Chapter overview

This chapter presents a thorough overview of the research findings derived from the study and emphasizes their contributions to the discourse surrounding behavioral intention research. Theoretical implications of the results are examined, specifically exploring how this research enriches our comprehension of behavioral intention research and the broader research literature concerning the UTAUT model. The implications discussion draws upon the study's findings to underscore their importance for future research endeavours and practical applications. In addition, the limitations of the study are acknowledged, and suggestions are made for ways in which future research can build on this study to further advance our understanding of BIs to use technology. In sum, this chapter offers valuable insights into the research findings and their implications, emphasizing the significance of empirical research in expanding our knowledge of BI and the UTAUT model. It highlights the need for organizations and educational institutions to adapt to new technologies and provides practical suggestions for doing so. Finally, it underscores the importance of continued research in this area and offers suggestions for future directions.

9.1 Findings of the study

9.1.1 Objective 1: To study the socio-economic characteristics of business faculties of universities of Punjab.

This study provides valuable insights into the distribution of respondents across different universities, age-groups, genders, and qualifications in the Punjab region of India. In addition to the key findings mentioned earlier, there are several other insights that can be drawn from the data. Firstly, the data shows that Lovely Professional University has the highest number of female respondents (18) among all participating universities, while GNA University has the least (10). This suggests that Lovely

Professional University is making efforts to attract and retain female faculty, while GNA University may need to do more to promote gender equity and diversity. Secondly, the data reveals that Rayat Bahra University has the highest number of male respondents (15) of any university, while Sri Guru Granth Sahib World University and D.A.V. University tie for the lowest number of male respondents among all universities. This could be due to several factors, such as the academic programs offered by these universities or the geographic location of these institutions. Thirdly, the data shows that most of respondents in the commerce and management departments belong to the age-group of 31–35 years, while most of the faculty in economics departments fall in the elderly age-group of 40–45 years. This suggests that there may be a need for universities to attract younger faculty in economics departments to bring fresh ideas and perspectives to the field. Fourthly, the data indicates that the highest number of respondents from RIMT University and Chitkara University belong to the elderly age-groups of 40–45 years and above 45 years, respectively. This could be due to the fact that these universities have been established for a longer period of time and have a more established faculty base. Lastly, the data reveals that most of respondents have between 1 and 5 years of experience in teaching through ICT, indicating that there may be a need for more training and development opportunities for teachers in this area. This is particularly relevant given the growing importance of online and blended learning models in the wake of the COVID-19 pandemic. In conclusion, the data provides valuable insights into the distribution of respondents across different universities, age-groups, genders, and qualifications in the Punjab region of India. These insights can help universities identify areas for improvement and develop strategies to promote equity, diversity, and inclusion in their academic programs.

9.1.2 Objective 2: To examine the frequency of ICT usage by the business faculties in their classroom instruction.

The present study delves into an exploration of the frequency of ICT usage in classroom instruction among faculty of B-Schools in Punjab. The findings reveal an intriguing disparity according to gender, age-group, and department. This raises concerns about equal opportunities and access to technology in the education sector, indicating the need for targeted strategies and support to enhance classroom instruction through effective digital tools. The study found that the usage of desktop computers in classroom instruction is limited, with female faculty reporting a higher percentage of never utilizing them when compared to their male counterparts. This may be attributed to a lack of familiarity with the technology or a preference for other methods. Conversely, most of the faculty utilize laptops in their classroom instruction, with both female and male faculty reporting high usage rates. However, the usage of tablets lags behind laptops, indicating a need for increased access to and comfort with the technology in the classroom. The employment of projectors in classroom instruction is frequent among all faculty, although usage frequency varies according to age-group and department. This suggests that while the technology is widely available, targeted strategies may be necessary to promote its effective utilization among all faculty. The same trend is observed in the utilization of audio equipment in classroom instruction, which varies by gender, age-group, and department. This highlights a need for equal distribution of usage among faculty to ensure equitable access to resources and technology.

The study also sheds light on the frequency of usage of various digital tools, including data storage and backup platforms, online assessment tools, digital exit tickets, online class calendars, social media, simulation games, and peer assessment tools. The findings indicate varying degrees of adoption among faculty, highlighting the need for targeted strategies to promote their utilization. For example, online assessment tools are widely adopted, but their usage frequency varies according to gender, age, and department. Similarly, digital exit tickets and online class calendars are used less frequently, indicating potential for increased adoption and utilization. The usage of social media in classroom instruction is not widespread, with male faculty using it more frequently than female faculty. This may be attributed to varying levels of comfort and familiarity with the technology or to concerns regarding its appropriateness in the educational context. Simulation games are widely utilized, with differences in usage according to age-group and department. This indicates a potential for increased adoption and utilization through targeted strategies. Peer assessment tools are not widely adopted, indicating a need for more targeted strategies to promote their adoption. Peer assessment is a valuable tool for promoting student engagement and providing feedback, which makes it an important component of effective classroom instruction. Therefore, targeted strategies and support may be necessary to enhance the utilization of peer assessment tools among faculty.

9.1.3 Objective 3: To examine the factors shaping the behavioral intention of business faculties towards the adoption of ICT in classroom instruction.

Technology has rapidly transformed the education landscape, but its adoption by educators remains a challenge. Understanding the factors that influence educators' intention to use technology in classroom teaching is crucial to promoting its uptake. The primary aim of this study was to evaluate the behavioral intentions of faculties towards the use of information and communication technology (ICT) in their classroom instruction within selected universities in Punjab. To achieve this, the study employed the widely recognized theoretical framework of the UTAUT model. The model includes five constructs: PE, EE, SI, ICT SE, and FC, which were all measured to determine their impact on the faculties' behavioral intention to use technology. In addition, the study incorporated the novel predictor variable of OC to explore its influence on the UTAUT constructs. The aim was to determine how a supportive and innovative culture could influence faculties' perceptions of the UTAUT constructs, ultimately leading to a higher intention to use technology. This study aimed to shed light on the impact of OC on educators' intention to use technology, as well as the moderating effects of gender, age, ICT experience, and department on this relationship.

The results of this study revealed that OC has a significant and positive impact on educators' intention to use technology, across all UTAUT constructs. In particular, SI emerged as the strongest predictor, underscoring the importance of peer and organizational support in promoting technology adoption. These findings suggest that cultivating a supportive OC can be a key strategy to promote technology integration in education. OC has been identified as a crucial factor in promoting the adoption of technology in education. Research has shown that an OC that is supportive of technology adoption can enhance educators' intention to use technology in the classroom (e.g., Chen, 2017; Huang, Liaw, & Lai, 2016; Kinnunen & Malmi, 2014). Furthermore, Venkatesh *et al.* (2003) discovered that SI plays a crucial role in predicting technology adoption, highlighting the significance of support from peers and organizations. Moreover, the study identified several moderating effects that can inform targeted interventions to promote technology adoption. Gender was found to moderate the relationship between FC and behavioral intention, suggesting that interventions aimed at improving ICT infrastructure and support should be tailored to the specific needs of female and male educators. Age was found to moderate several relationships, with elderly faculty showing a stronger intention to use technology. However, these relationships are not statistically significant. This underscores the need to provide targeted training and support to educators of different age-groups. Finally, department was found to moderate the relationship between EE and behavioral intention and SI and behavioral intention, suggesting that interventions should be tailored to the specific needs of educators of commerce and management departments. The moderating effects of gender, age, and experience on technology adoption have also been studied extensively in previous studies. For instance, disparity between genders have been found to exist in the perception of technology, with females expressing more negative attitudes towards technology compared to males (e.g., Wang & Newlin, 2002). Moreover, age has been identified as a notable factor in predicting technology adoption, as younger educators tend to exhibit greater willingness to embrace technology compared to their older counterparts (Teo, 2009, for instance). Also, ICT experience has been found to moderate the relationship between various UTAUT constructs and behavioral intention (e.g., Huang *et al.*, 2016), although they are not significant.

In general, this research presents valuable insights into the factors that impact educators' inclination to incorporate technology into classroom teaching. By pinpointing the crucial role of organizational culture and the moderating influences of gender, age, and department, this study offers valuable guidance for the development of targeted interventions aimed at promoting technology adoption and improving educational outcomes. The findings carry significant implications for educational institutions and policymakers, underscoring the importance of cultivating a supportive and innovative culture that encourages technology adoption and utilization among faculty members.

Additionally, the study's utilization of the UTAUT model provides a theoretical framework that can be adapted and applied in other educational settings to assess the factors influencing technology adoption and usage.

9.1.4 Objective 4: To investigate the business faculties' perceptions of barriers to integrate ICT in classroom instruction.

The study also aimed to investigate the business faculties' perceptions of barriers to integrating ICT in classroom instruction. Based on the analysis, it can be inferred that the faculty identified certain obstacles to integrating ICT into the teaching process, although they expressed less agreement with regards to barriers stemming from insufficient ICT infrastructure, technical training, and administrative support. Instead, they tended to agree that the major barriers were "cognitive dissonance," "classroom management issues," and "poor synchronization of ICT with curriculum." One of the main barriers perceived by the faculty was "cognitive dissonance." This indicates that the faculty's potential resistance to change or their existing beliefs and attitudes may not be in line with incorporating ICT into classroom instruction. This discovery emphasizes the significance of addressing these beliefs and attitudes to enhance the chances of effectively integrating ICT in classroom instruction. Another significant barrier perceived by the faculty was "classroom management issues." This indicates that the faculty might have concerns about managing the classroom environment while incorporating ICT into classroom instruction. Hence, it is crucial to offer faculty with training and assistance to proficiently handle the classroom setting while incorporating ICT into classroom instruction.

Additionally, poor synchronization of ICT with the curriculum was also perceived as a significant barrier. This suggests that faculty might have concerns about aligning the use of ICT with the curriculum. Thus, it is crucial to provide faculty with the necessary tools and resources to integrate ICT effectively into the curriculum. On the contrary, the study found that "lack of institutional support" was perceived as the least significant barrier. This indicates that the faculty did not perceive a lack of institution support as a major hindrance to integrating ICT in classroom settings. Nonetheless, it remains crucial to ensure that institutions offer the essential support and resources to facilitate the successful integration of ICT in classroom settings. While the faculty tended to agree that cognitive dissonance and classroom management issues were significant barriers to integrating ICT in teaching, it is important to note that these barriers may be overcome through training and professional development. Therefore, it may be useful for institutions to invest in training programs that address these issues. The findings suggest that poor synchronization of ICT with the curriculum is also a significant barrier. This may indicate a need for curriculum designers to integrate technology more effectively into the curriculum, so that the use of ICT in teaching is aligned with course objectives. The low score for lack of institutional support could be attributed to the fact that the study was conducted at a university that already had a significant level of ICT infrastructure and support. Therefore, it may be useful to conduct further research in institutions with less developed ICT infrastructure and support to explore the extent to which a lack of institutional support is a barrier to integrating ICT in teaching. The reliability coefficients for the survey were generally acceptable, although the reliability coefficient for one factor was somewhat low. This highlights the importance of conducting further research to refine the survey instrument and ensure that it accurately measures the constructs of interest. It is important to note that the findings of this study may not be generalizable to other contexts or disciplines, as the study was conducted at a specific university and focused on business faculties.

Therefore, further research is needed to explore the perceptions of other disciplines and contexts. Overall, the findings of the study suggest that addressing faculty' beliefs and attitudes, providing training and support for effective classroom management, and ensuring the alignment of ICT with the curriculum are essential for successful integration of ICT in classroom instruction. These insights could be valuable for educational institutions that are looking to enhance the integration of ICT in their classroom instruction.

9.1.5 Objective 5: To check the awareness level of business faculties towards the integration of artificial intelligence in classroom instruction.

The findings indicate that there is a high level of awareness among faculty about AI-based instruction, particularly in relation to its use of digital technology and artificially intelligent technologies. However, there are still gaps in their understanding of certain aspects of AI-based instruction, such as its use of web-based learning and remote delivery. The study also highlights that faculty are familiar with most AI-based classroom instruction tools, making them suitable for AI adoption. However, there is less familiarity with AI-based tools like virtual facilitators and learning environments, adaptive learning software, and intelligent tutoring systems. This is likely due to these tools still being in their initial development phase and evolving more in western countries than in India.

The potential benefits of AI in business school education, as perceived by educators, include improving teaching quality, customizing lessons for students, addressing academic requirements through real-time feedback, providing performance insights according to analytics, improving students' grades and analytical and critical thinking abilities, increasing student retention, and providing virtual mentorship. While educators are generally positive about the potential benefits of AI in the classroom, they are less certain about the potential for AI to address specific academic requirements through real-time feedback and improve student grades. Furthermore, they are divided on the potential of AI to increase student retention.

Additional research is required to gain a comprehensive understanding of the possible advantages of AI in business education, specifically regarding its influence on academic performance and student retention. Such insights could prove valuable for educational policymakers and administrators when developing impactful faculty training programs and improving the overall quality of education in the realm of AI-based instruction.

9.2 Conclusion and implications

The study presents a vivid picture of the educational landscape in the Punjab region of India, with each university revealing its unique strengths and weaknesses. Lovely Professional University stands out as a champion of gender equity, attracting a high number of female faculties, while GNA University may need to take proactive measures to encourage diversity among its student body. Most of respondents fall within the age bracket of 31–35 years, indicating that universities are tapping into the talents of young individuals to improve their services. However, there is a need for economics departments to harness the experience of older faculty to drive innovation and creativity in the field. This can help to promote a more well-rounded approach to teaching and research, drawing on the wisdom and expertise of both young and old. The gender-wise analysis of respondents in various departments reveals interesting patterns, with economics, commerce, and management having the highest number of female respondents and the lowest number of male respondents. This underscores the need for universities to cultivate a gender-inclusive environment that promotes equal opportunities and recognizes the value of diverse perspectives in shaping the future of these fields. Finally, the data highlights the importance of providing teachers with training and development opportunities in teaching through ICT. With most of respondents having between 1 and 5 years of experience in this area, there is a need for universities to invest in programs that equip teachers with the knowledge and skills required to leverage technology in the classroom effectively. In conclusion, the data provides a rich source of insights that can help universities improve their services, promote equity and diversity, and cultivate a culture of innovation and collaboration. By leveraging these insights, universities can take proactive steps to address their shortcomings and build on their strengths to deliver a world-class education to their students.

The research conducted on the utilization of technology in classroom instruction among faculty in B-Schools in Punjab offers significant insights into the present status of ICT adoption within the education sector. The findings highlight that while digital technologies have the potential to transform teaching and learning, there is still a disparity in the utilization of these tools according to gender, age-group, and department. This suggests the need for targeted strategies and support to promote equal opportunities and access to technology in the education sector. The study indicates that the utilization of desktop computers in classroom instruction is limited, and there is a preference for laptops. This finding suggests the need for increased access to and comfort with desktop computers in the classroom. The utilization of projectors and audio equipment is frequent, but the usage frequency varies according to age-group and department. This indicates the need for targeted strategies to promote the effective utilization of these tools among all faculty. Additionally, the study emphasizes that the integration of digital resources, such as platforms for data storage and backup, online assessment tools, digital exit tickets, online class calendars, social media, simulation games, and peer assessment tools, differs among faculty. This indicates the need for targeted strategies to promote the adoption of these tools among faculty. The utilization of online assessment tools is widely adopted, but the usage frequency varies according to gender, age, and department. This finding suggests the need for targeted strategies to promote the effective utilization of online assessment tools among all faculty.

The study's findings suggest that by providing effective support, training, and resources to faculty, B-Schools can enhance their classroom instruction through the utilization of digital tools. Consequently, this can foster equitable opportunities for every student and improve their engagement and learning achievements. The study underscores the necessity for specific approaches that encourage the proficient use of digital tools and resources among faculty, guaranteeing fair access and advancing student engagement as well as learning outcomes. In conclusion, the study provides important insights into the utilization of digital technologies in classroom instruction among faculty in B-Schools in Punjab. The findings indicate the need for targeted strategies and support to promote equal opportunities and access to technology in the education sector. By promoting the effective utilization of digital tools and resources, B-Schools can enhance their classroom instruction, ultimately promoting student engagement and learning outcomes.

The findings of the study carry various implications for B-Schools in Punjab and other similar institutions. Firstly, the research underscores the significance of establishing a nurturing and forward-thinking OC that motivates faculty to embrace and employ ICT in classroom instruction. This objective can be accomplished through initiatives like training programs, faculty development workshops, and offering incentives to encourage the adoption and utilization of technology. Secondly, the study recommends that B-Schools should prioritize equipping their faculty with the essential ICT skills and support systems to effectively utilize technology. This can be achieved by providing training and support for faculties to develop their ICT skills and SE. In summary, this study offers valuable perspectives for B-Schools aiming to improve the integration and utilization of ICT in classroom instruction by their faculty members. By comprehending the essential factors that shape faculties' intention to use ICT, B-Schools can devise efficient strategies to promote and facilitate the adoption and usage of ICT. This, in turn, enhances the overall quality of education delivered by these institutions.

The outcomes of this study offer numerous potential advantages for B-Schools in Punjab. Primarily, through gaining an understanding of the pivotal factors that impact faculties' inclination to utilize technology, B-Schools can formulate successful approaches to promote and facilitate the adoption and usage of ICT. This can lead to increased efficiency, productivity, and improved teaching outcomes, ultimately enhancing the quality of education provided by the schools. Second, the study highlights the importance of OC in shaping faculties' perceptions of the UTAUT constructs. By creating a supportive and innovative OC that encourages technology adoption and usage, B-Schools can foster a culture of innovation and continuous improvement that can benefit the entire organization. Furthermore, the research highlights the importance of equipping faculty members with the essential ICT skills and support systems to effectively utilize technology. B-Schools can offer training and assistance to enhance faculties' ICT skills and SE, fostering increased confidence in technology usage and cultivating a more favorable attitude towards adopting technology. Fourth, the study's findings can be used to inform policy decisions and resource allocation for B-Schools in Punjab. By identifying the key factors that influence technology adoption and usage, decision-makers can allocate resources and funding towards initiatives that promote technology adoption and usage, ultimately enhancing the quality of education provided by the schools. In summary, the outcomes of this study carry considerable implications for B-Schools in Punjab. By incorporating the strategies and recommendations presented in the study, these institutions can enhance their teaching outcomes, cultivate a more favorable OC, and foster an environment of innovation and ongoing development.

The study's findings also hold relevance for regulatory bodies such as the education department and the university grants commission, as they seek to comprehend the factors influencing the integration of ICT in classroom instruction. In light of these findings, regulatory bodies can formulate policies aimed at promoting the adoption and utilization of ICT in education. For example, they can design training programs and provide incentives for faculty members to incorporate ICT in their instruction, ultimately enhancing the quality of education and improving the learning journey of students. Moreover, the study can be valuable to the government as it sheds light on the barriers that impede the adoption of ICT in classroom setting. Using these findings, the government can develop policies to address these barriers and ensure the availability of necessary resources for promoting the adoption and utilization of ICT in the classroom. IT companies can also leverage the study's findings to create tailored training programs that target the ICT skill gaps of faculty members. By doing so, IT companies can help universities enhance their ICT capabilities and support the effective use of ICT in classroom instruction. The university administration can benefit from the study's findings by developing a supportive and innovative OC that encourages the adoption and utilization of ICT in classroom instruction. University administration can design programs and initiatives that provide incentives for faculty to adopt and use ICT in classroom instruction, which can lead to a more positive attitude towards the use of technology and enhance the learning experience for students.

Lastly, the study's findings offer valuable insights to university faculty by enhancing their understanding of the crucial factors that influence the integration of ICT in their teaching. Faculty can use this information to develop their ICT skills and SE, which can lead to a more positive attitude towards technology adoption and usage. Additionally, faculty can use the study's findings to engage with university administration and regulatory bodies to advocate for the development of policies and programs that encourage the adoption and utilization of ICT in classroom instruction. In conclusion, the study's findings can have a range of benefits for regulatory bodies like the education department, university grants commission, education minister, IT companies, university administration, and university faculty. Through comprehending the pivotal factors that influence the adoption of ICT in classroom instruction, such stakeholders can formulate policies, programs, and initiatives that foster the adoption and usage of ICT. As a result, the overall quality of education delivered by universities can be significantly improved.

Furthermore, the study offers significant insights into the perspectives and opinions of business faculties regarding the incorporation of ICT in classroom instruction. It indicates that faculties may hold pre-existing beliefs and attitudes that are incongruent with the utilization of ICT in classroom settings, potentially resulting in resistance towards change. This emphasizes the significance of tackling these beliefs and attitudes through training and professional development initiatives. By doing so, faculties can recognize the advantages of employing ICT in classroom instruction, thereby overcoming any resistance to change. Moreover, the study also reveals that faculty may have concerns about managing the classroom environment while incorporating ICT in classroom instruction, which can hinder the successful integration of ICT. This suggests the need for training and support programs that focus on effective classroom management strategies that take into account the use of ICT in teaching. These programs can help faculty effectively manage the classroom environment while incorporating ICT into classroom instruction, which can lead to more engaging and interactive learning experiences for students.

Additionally, the study emphasizes the significance of integrating the use of ICT in accordance with the curriculum. Faculty may have concerns about the relevance of ICT to course objectives, which can lead to poor synchronization of ICT with the curriculum. This highlights the importance of close collaboration between curriculum designers and faculty to enhance the integration of technology within the curriculum. It is crucial to ensure that the utilization of ICT in teaching aligns with course objectives and enhances the overall learning experience for students. Lastly, the study findings indicate that insufficient institutional support may not pose a significant obstacle to the integration of ICT in classroom settings. However, it remains essential for institutions to offer the required support and resources to ensure the successful integration, promoting the sustainability and scalability of ICT integration initiatives. Overall, the insights related to the factors that are enablers and inhibitors of technology adoption can help educational institutions design and implement effective strategies for integrating ICT in classroom instruction, which can lead to more engaging and interactive learning experiences for students. The study also underscores the need for further research to explore the perceptions of other disciplines and contexts, as well as to refine the survey instrument to ensure accurate measurement of the constructs of interest.

The field of education is continually advancing, and the utilization of AI is no different. The intriguing aspect lies in the awareness and perception of AI-based instruction among faculty members within B-Schools of Punjab's universities. The data presented in this study unveils that educators in Punjab's B-Schools possess significant familiarity and proficiency in employing digital technology and AI-driven technologies. However, there is still some ambiguity in their understanding of how AI-based instruction combines classroom and web-based learning. Despite their positivity towards the potential benefits of AI in the classroom, educators are still unsure about its impact on student retention and academic achievement. While educators have a basic idea about most of the AI-based tools, some tools like virtual facilitators and learning environments, adaptive learning software, and intelligent tutoring systems are still unfamiliar to them. The reason for this is that these tools are still in their initial phase of development and are evolving more in western countries than in India. Educational policymakers and administrators should design effective training programs for faculty to enhance the quality of education delivery in the context of AI-based instruction. With the continuous evolution and increasing presence of AI in educational settings, it is of utmost importance for educators to possess a comprehensive comprehension of its potential to improve teaching and course learning outcomes in business education. The study's findings offer valuable perspectives on the awareness and perception of AI-based instruction among faculty in Punjab's universities, playing a significant role in shaping the future of education in India.

9.3 Recommendations

As technology continues to transform the education landscape, B-Schools in Punjab must embrace it to enhance their classroom instruction effectively. However, this adoption can be a daunting task, especially with faculty' varying levels of expertise and attitudes towards technology. Thus, this thesis proposes several recommendations for promoting effective tech. integration, including promoting gender diversity, investing in faculty development, addressing beliefs and attitudes, and fostering an innovation culture. By adopting the following recommendations, B-Schools in Punjab can achieve optimal technology utilization, ensuring the delivery of high-quality education and placements to their students while staying competitive in the global education market.

9.3.1 Specific suggestions

Based on the study's findings, here are several specific recommendations for B-Schools in Punjab's universities:

i) **Promoting gender-balanced recruitment:** According to the results, it has been found that the number of female faculty are more than male faculty in the participating institutions (192 females and 158 males). It is recommended that B-Schools make conscious efforts to achieve gender equilibrium during their recruitment processes. By enacting policies that foster a diverse applicant pool and ensuring equal opportunities for candidates of all genders, they can cultivate a more equitable representation among faculty.

ii) **Provide targeted training and support:** To ensure effective teaching through ICT, it is essential for B-Schools to prioritize targeted training and support for their educators. Since a significant number of survey participants (104 out of 350) have 1 to 5 years of teaching experience using ICT, it becomes imperative to provide them with comprehensive training programs and resources that will help improve their digital teaching skills. These initiatives will help universities foster a culture of continuous improvement and provide the best possible education to their students.

iii) **Focus on developing a positive OC:** Considering the study's findings, which indicate a notable and positive correlation between OC and educators' perceptions of their PE, EE, SE, SI, and FC, it is advisable for B-Schools in Punjab's universities to prioritize the development of a favorable organizational culture that encourages the integration of technology in classroom settings.

iv) **Provide necessary resources and support:** As FC were found to be a significant predictor of educators' behavioral intention to use technology, B-Schools should ensure that necessary resources and support are provided to faculty to effectively integrate technology into their teaching. Although lack of institutional support was perceived as the least significant barrier in the study, it is still important for university administration and policymakers to provide the necessary support and resources for successful integration of ICT in classroom instruction. This can include providing access to ICT infrastructure, technical training, and administrative support. The study emphasizes the necessity for tailored assistance and training to foster the proficient utilization of digital tools and resources by faculty members. B-Schools should provide regular training sessions and resources to enhance faculty' knowledge and skills in using technology in classroom instruction. Regular upskilling and reskilling of business faculty must be a priority to make them ready for the future careers. Intensive hands-on training to teach the AI based courses must be organized for faculty to help retool and reinvent themselves for the digital age. This skill gap can even be filled and facilitated by collaborating with corporations and platform providers like IBM, Google, Microsoft, Coursera, LinkedIn Learning, etc.

v) **Address gender differences:** The study found that the impact of FC on behavioral intention was stronger in males than females. Therefore, B-

Schools should address any disparity between genders that may exist and provide equal support and resources to all faculty.

vi) **Address the needs of older faculty:** The study revealed that older faculty members exhibited a more pronounced influence of EE, SI, and SE on their behavioral intention. Therefore, B-Schools should take into consideration the needs and concerns of older faculty when implementing new technology and provide necessary training and support.

vii) **Foster collaboration between departments:** The study found that departments moderate two relationships in the path model i.e. (EE→BI and SI→BI), it is recommended that B-Schools foster collaboration between departments to ensure the effective utilization of technology in classroom teaching across all departments.

viii) **Provide training and support for effective classroom management:** The study reveals that faculty may have concerns about managing the classroom environment while incorporating ICT in classroom instruction. Therefore, it is crucial for university administration and policymakers to provide training and support programs that focus on effective classroom management strategies that take into account the utilization of ICT in instruction .

ix) **Address faculty' beliefs:** The study suggests that faculty may have pre-existing beliefs and attitudes that are not aligned with the ICT use in classroom instruction. Therefore, it is essential for university administration and policymakers to invest in training and professional development programs that address these beliefs and attitudes, and help faculty see the benefits of using ICT in classroom instruction.

x) **Alignment of curriculum with ICT:** The study underscores the significance of integrating ICT usage with the curriculum to enrich the educational journey of students. Consequently, close collaboration between university administration, policy makers, curriculum designers, and faculty is crucial in effectively integrating technology into the curriculum, guaranteeing that the utilization of ICT in instruction aligns with course objectives. B-Schools must appreciate the change and transform their curriculum after taking thorough feedback from industry experts in the relevant domain. Also, to keep up with the digital economy, AI-related courses such as accounting analytics, financial analytics, supply chain analytics, digital transformation, digital immersion, AI strategy, etc. should be introduced in the curriculum. Also, new concepts can be infused into older disciplines, for example, text mining can be used in an accounting course, and artificial neural networks can be taught in finance, marketing, leadership, emotional intelligence, and operations related courses as a standard best practice.

xi) **Ensure equal access to technology:** The study highlights that there is a disparity in the utilization of digital tools according to gender, age-group, and department. B-Schools should ensure equal access to technology and provide necessary resources to faculty who may not have equal access to it.

xii) **Encourage the adoption of new digital tools:** The study indicates that the adoption of digital tools such as online assessment tools, digital exit tickets, online class calendars, social media, simulation games, and peer assessment tools varies among faculty. B-Schools should encourage the adoption of these tools and provide the necessary resources and support to promote their effective utilization.

B-Schools may establish a dynamic and interesting learning environment that equips students for the needs of the digital era by putting these general recommendations into action. In the long run, improved B-School education is made possible by faculty' successful adoption of technology.

9.3.2 General suggestions

The following are some of the general suggestions for B-Schools in Punjab:

i) **Foster a culture of innovation and experimentation:** B-Schools should foster a culture of innovation and experimentation, encouraging faculty to explore new digital tools and resources in their classroom instruction. Such an approach can result in the emergence of innovative teaching methodologies and strategies that foster heightened student engagement and improved learning outcomes. B-Schools should strive to cultivate a culture that encourages students to evolve from “passive listeners” to “active explorers.” This should also apply to faculty who are expected to be “learning facilitators” rather than “transmitters of knowledge.”

ii) **Conduct regular assessments and evaluations:** B-Schools should conduct regular assessments and evaluations of the utilization of digital tools and resources among faculty. This can provide valuable insights into the usefulness of these tools and help identify areas that require further support and development.

iii) **Industry tie-ups:** The course delivery in B-Schools must include input from industry experts; for example, 50% of the lectures of a particular course can be delivered by an experienced senior executive of a multi-national company. The “ecosystem” approach can be followed, in which a faculty has to bring in experts to co-teach with them, which will shift the faculty’s role from being the expert to being a facilitator. To the students' benefit, they can gain access to the most cutting-edge business applications and intelligence, while the instructors will be spared from the burden of keeping up with every new technology.

iv) **Cross-disciplinary collaborations:** B-Schools must collaborate across disciplines in order to comprehend the multidimensional features of AI and its impact on industry and society. To address the challenge of new students coming from multidisciplinary backgrounds who lack technical acumen, cross-disciplinary teams should be created to encourage them to do higher-order thinking and solve complex business problems outside of the university walls. This works best in the case of sustainability-related projects that require organizational know-how, technical know-how, and an understanding of socio-economic issues.

v) **Cross-border alliances:** B-Schools must form international alliances to exchange their insights and best practices for implementing higher-order knowledge and skills among their students. This can be accomplished through pooling resources, collaborating on new-age industry-driven programs, and sharing expertise while co-developing innovative pedagogies. This will improve pedagogical models and improve the content quality for lecture delivery.

vi) **Experiential learning:** Going beyond classroom learning about why AI is important is the need of the hour. The faculty's efforts must involve hands-on experience in the classrooms. After providing conceptual knowledge about AI and its uses, it is extremely important to focus on experiential learning by having students work with AI systems and also create AI systems wherever applicable, just like creating chatbots. By enhancing the student experience with more individualized learning and social engagement opportunities through AI, faculty can create rich learning experiences for the students through individualized feedback.

vii) **Blended Learning:** Moving away from the traditional brick-and-mortar concept, blending learning should be introduced in course delivery, with the basic content covered through online modules and application-based content delivered through the on-campus presence of students. The utilization of online content delivery enables the tracking of students' learning progress through the utilization of learning analytics, while in-person content delivery on campus amplifies students' ability to engage in unstructured problem-solving and critical thinking approaches.

9.4 Limitations of research

This study has the following weaknesses:

i) **Geographically restricted sample:** The study's primary weakness is that it only includes educators from 14 B-Schools in Punjab. The constraint imposed can restrict the extent to which the study's findings can be applied to different regions or educational institutions with varying characteristics. A more diverse sample that includes educators from other regions could enhance the study's external validity and provide a broader understanding of the topic. Overcoming this limitation and obtaining a more holistic comprehension of the subject can be achieved by incorporating a broader spectrum of participants in future research endeavours.

ii) **Limited comparison:** The study does not take into account the perspectives of faculty from different states in India or between developed and developing nations. Conducting such comparisons could help identify any differences at the regional, national, and international levels in ICT adoption and AI readiness.

iii) **Limited perspective:** The study only focuses on the readiness of educators and does not take into account the views of other stakeholders such as educational institutions, students, parents, and policymakers. To pinpoint and rectify vulnerabilities and obstacles in the AI value chain, future research should strive to encompass a broader array of viewpoints.

iv) **Limited scope:** The study is limited to B-Schools, which may not be representative of other technical disciplines or academic fields. Conducting further research in other academic disciplines may show varied results.

v) **Subscale reliability:** To enhance the study's reliability, more questions could be added to the subscales in future studies. This endeavor can contribute to attaining a more intricate comprehension of the subject matter and effectively tackle any potential concerns regarding the reliability of subscale measurements.

vi) **Social desirability biasness:** One potential limitation of this study is social desirability bias, as the data was obtained from faculty who may have overreported their intention to use ICT in classroom instruction. The presence of this bias should be acknowledged as it may have impacted the outcomes of the study and warrants careful consideration.

vii) **Limited factors in UTAUT**: The current study focused solely on predictors of ICT adoption according to the UTAUT model, including OC, PE, EE, SI, ICT SE, and FC. However, other factors that may impact ICT adoption, such as personal attitudes and beliefs, were not included in the study, which could limit its findings.

viii) **Impact of ICT adoption on quality of teaching:** The study did not explore the effects of ICT adoption on the quality of teaching and learning in B-Schools, despite acknowledging that while the incorporation of ICT in classroom instruction can yield several advantages for students, ineffective utilization may also result in a deterioration of teaching quality.

9.5 Scope of future research

In recent years, the incorporation of ICT in B-School education has become increasingly important. The UTAUT model has become an invaluable instrument for understanding and predicting the factors that influence the adoption of ICT in educational settings. Despite significant progress in this domain, further research is necessary to explore the applicability of the UTAUT model specifically in the realm of B-School education. Furthermore, as AI-based technologies continue to advance, it is essential to explore how these tools can be efficiently integrated into B-School education. The following aspects outline the areas that warrant further investigation in future research:

i) Exploring factors that influence sustained use of technology:

- Investigating the long-term adoption and use of ICTs in B-School education
- Determining the factors that contribute to the continued utilization of ICT in classroom
- Evaluating the user characteristics, such as SE and motivation, and their role in sustained technology use

ii) Examining the influence of ICT adoption on student engagement and learning outcomes:

- Assessing the efficacy of various forms of ICTs in augmenting educational outcomes and student involvement
- Exploring the effects of ICT adoption on student motivation, contentment, and retention
- Investigating the function of ICTs in fostering active learning and collaborative problem-solving within B-School education

iii) Examining the role of context in shaping ICT adoption in B-School education:

- Investigating the impact of institutional policies and practices on ICT adoption in B-School education
- Investigating the impact of cultural values and societal norms on the acceptance and utilization of technology in B-School education
- Examining the effects of external elements, such as technological advancements, on the adoption of ICT in B-School education

- Exploring the interplay between cultural factors and the adoption of ICT in B-School education. This research can aid in identifying the determinants of ICT adoption in diverse regions and devising strategies to encourage its utilization

iv) Developing strategies for promoting ICT adoption in B-School education:

- Evaluating the effectiveness of different strategies, such as training programs or incentives, in promoting ICT adoption in B-School education
- Developing customized approaches for different student populations, such as undergraduate vs. graduate students or business vs. non-business majors
- Examining the impact of different ICT implementation models, such as one-to-one device programs or blended learning environments, on ICT adoption in B-School education

v) Understanding individual differences in ICT adoption:

- Exploring the influence of age, gender, previous experience, and other personal attributes on the acceptance and utilization of ICT in B-School education
- Examining the impact of diverse learning styles and preferences on the adoption of technology
- Developing personalized approaches to ICT adoption according to individual differences

vi) Investigating the potential of emerging technologies in B-School education:

- Investigating the incorporation and usage of emerging technologies, such as blockchain, artificial intelligence, or machine learning, in B-School education
- Identifying the factors which facilitate the effective integration of emerging technologies in B-School education
- Evaluating the impact of emerging technologies on learning outcomes and student engagement in B-School education

vii) Developing customized AI-based educational tools and platforms:

- Developing personalized approaches to AI-based education according to individual differences in learning styles, preferences, and abilities
- Developing AI-based tools and platforms that can adapt to changing student needs and preferences over time
- Evaluating the effectiveness of different AI-based educational tools and platforms in enhancing learning outcomes and student engagement

viii) Creating personalized learning experiences and assessing student learning outcomes:

- Developing AI-based approaches to personalized learning, such as adaptive learning algorithms and intelligent tutoring systems
- Examining the effectiveness of AI-based approaches to personalized learning in enhancing student learning outcomes
- Developing AI-based approaches to assessment that can provide real-time feedback on student performance and inform instructional design

ix) Examining the potential of AI in promoting collaboration, creativity, and innovation in B-School education:

- Developing AI-based strategies to promote problem-solving and collaborative learning in B-School education.
- Examining the emerging role of AI in fostering creativity and innovation in B-School education.
- Evaluating the impact of AI on the generation of the skills required in the modern day business world

x) Exploring the ethical and societal ramifications of AI in B-School education:

- Examining the ethical implications of AI-based decision-making systems in B-School education
- Evaluating the impact of AI on employment and the changing business scenario

To summarize, forthcoming research in B-School education regarding ICT adoption can concentrate on cross-cultural comparisons, the incorporation of emerging technologies, and longitudinal investigations. Regarding AI in B-School education, future research can focus on AI-based personalized learning, AI-based assessment, and AI-based curriculum design.

CHAPTER-10
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LIST OF PUBLICATIONS

S.No	Type of Paper	Name of the Journal	Journal indexing	Title of the Paper	Published Date	Volume & Issue Number	ISSN/ISBN Number	Type of paper
1	Journal Paper	International Journal of Virtual and Personal Learning Environments	Scopus	Tech Transition: An Exploratory Study on Educators' AI Awareness	26th January 2022	Volume 12, Issue 1	1947-8518	Research Paper

LIST OF CONFERENCES ATTENDED

Sr. No.	Conference Name	Organizer	Date of conference	Title of paper presented
1	Rethinking Business Designing Strategies in the Age of Disruptions	Mittal School of Business, LPU	December 19th, 2020	Tech Transition: Are Educators Aware of Artificial Intelligence?
2	Business in Turbulent World: Keeping Connection Alive	Mittal School of Business, LPU	21st Nov 2022	The Organization Culture That Helps (or Hinders) Digital Transformation in Business Schools

LIST OF WORKSHOPS ATTENDED

Sr. No.	Name of the Workshop	Organizer	Date of the workshop
1	Research Methodology in Management	NIT Andhra Pradesh	19th to 24th October, 2020
2	Research Tools and Techniques	NIT Puducherry	23rd to 27th November, 2020