

**WORKFORCE ANALYTICS: PANACEA TO
ENHANCE ORGANIZATIONAL PERFORMANCE
THROUGH HR PRACTICES OF K12 SCHOOLS IN
PUNJAB**

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Management

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DECLARATION

I declare that the thesis entitled “**Workforce Analytics: Panacea to Enhance Organizational Performance Through HR Practices of K12 Schools in Punjab**” has been prepared by me under the guidance of Dr. Mridula Mishra, Professor and Head, Mittal School of Business, Lovely Faculty of Business & Arts, Lovely Professional University. No part of this thesis has formed the basis for the award of any degree or fellowship previously.



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CERTIFICATE

I certify that Mr. Neeraj Mohan Puri has prepared his thesis entitled “**Analytics: Panacea to Enhance Organizational Performance Through HR Practices of K12 Schools in Punjab**” for the award of Ph.D. degree of the Lovely Professional University, under my guidance. He has carried out the work at the Lovely Faculty of Business & Arts, Lovely Professional University, Phagwara. The work reported, embodies the original work of the candidate and has not been submitted to any other university or institution for the award of any degree or diploma, according to the best of my knowledge.



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Date: May 25th, 2024

DEDICATION

I dedicate this thesis to all my near and dears who blessed me and reposed faith in my competency. Especially, to my wife and angel daughters who have to sacrifice the maximum due to my non availability and paucity of time I could spare for them while I was on this voyage. My mother is the backbone in pursuing my doctorate degree. My father, who constantly reminds and enquires about my progress to earn doctorate degree.

Finally, I am Doctorate.

ABSTRACT

This empirical study explores the paradigm shift in HR department's approach of decision making from conventional to analytics based to optimise K12 schools' performance. Our New education Policy 2020 empowers the principals not only to be an instructional leader but to stretch their roles as change leaders by extending their area of operation. Cuming, (1980), Aina, (1982), Bratton and Gold, (1999) advocates that human resource management involves recruitment, selection, guidance, development, promotion, and monitoring of people at workplace. (Omebe, 2014) Human Resource Management involves gamut of activities like attracting, recruiting, training, developing, appraisal and motivation. In order to achieve educational goal, it is of paramount importance that appropriate academic staff is appointed, timely trained, adequately rewarded and carefully retained.

Presently, the way K12 schools make decisions is purely based on intuition or gut-feeling. Ideally, the impact of the principal's gut-based decision making on the organization's performance is not measured. In contrary to it, world is switching to data driven decision making using analytics. Analytics is commonly applied by finance, marketing & customer relationship department are reaping the harvest of applying analytics, then why should workforce (HR) department be an exception. In prevailing era of Big Data and Analytics Evidence-Based Management (EBM) is on rise. Researchers like Pfeffer and Sutton (2006) and Briner, Denyer and Rousseau (2009) had established the impact of EBM on HR practices, and consequently on the organization's performance. Some schools have experienced tremendous results after applying Workforce Analytics (WA). Most of these institutions are in western countries like the US or outside of Sweden.

Rationale of the Study:

Education industry is the backbone of any economy as the competent skilled students produced by this sector will become future workforce. Education sector of India is expected to touch US \$ 225 billion by the end of year 2025. Government has proposed to establish approximately 15000 schools, close to 100 Sainik schools and at least 750 residential Eklaya schools in tribal regions in consonance with National Education Policy 2021. Education is an emerging strategic sector hence Government of India has permitted 100% Foreign Direct Investment (FDI) in this industry through automatic route since 2002. In last two decades from April 2000 to September 2020, we have received US\$ 3,849.20 million via FDI.

If education is a weapon to change the world, then schools are the place where education is imparted. Teachers are prominent source of knowledge transmission. In any type of organisation human resource are most difficult to manage. Under prevailing circumstances where the demand of competent faculty is more than its supply every educational institution needs to manage its workforce efficiently. Prominent functions of HR like recruitment and selection, training and development, performance appraisal and retention play vital role to enhance performance of the school. Ever since ages K12 schools never realised the significance of the HR functions. The manpower related decisions were also being taken by the principal and the management on the basis of their gut feelings and ideas. As the time rolled on education sector became highly competitive with soaring talent war and further schools' performance got directly proportional to the performance of the human force. School administration sits on huge data which remains untapped. Taking lessons from the success stories of the industry, off late it was realised by the school management that they need to create HR department and also need to harness the power of analytics to take evidence-based data driven decisions which may enhance school's performance.

Human resource Analytics is a latest buzzword, thankfully analytics is gaining popularity like other functions of management may it be Sales, marketing, finance where application of analytics has proved to be bane. K12 schools have intense competition when it comes to attract the competent faculty then next big challenge is to retain the experts. Most of the schools still follow the conventional approach of recruitment and selection process. They spend huge amount on recruitment and selection process. Hardly have they tried to harness the data and take insights from it. In the age of big data, still school administration follows the rule of thumb and base their decisions on their prejudice, whims and experiences. More or less training and development of employees is also a grey area for the educational institutions. Either teachers are not getting any training at all or if they are getting then, it is not need based. Selection of teachers for training is again a neglected area. Most of the times teachers are randomly picked for the training. Performance appraisal in schools is either done uniformly same for all or as per the discretion of the Management without any rational logic. One of the serious challenges K12 schools face is high attrition of teachers. Usually, competent teachers become opportunistic after certain point of time. Organisations find it tough to retain their high performing educators. They keep switching jobs for the sake of better paycheque. All the above discussed issues adversely affect the performance of the institution. The one stop solution for all these HR challenges is workforce Analytics. Therefore, this study combines all the major HR Practices followed by K12 schools that impacts the performance of school and analytics can be used as a tool to strengthen the decision making.

Significance of the study

Every organisation may it be formed for profit making or not for profit, wants to maximise its surplus and enhance its performance. Educational institutions cannot be isolated. With the passage of time education sector has grown phenomenally as the demand of K12 schools is soaring continuously. Consequently, K12 schools are facing razor edge competition. With the advent of New Education Policy teaching will be a

specialised task. NEP lays emphasis on the training and recruitment of qualified and competent teachers. Henceforth, talent attraction, talent development and talent retention is going to be a cumbersome task for the school administration. Though there exist lot of literature on academia, HR functions and analytics but there is little research done on application of Analytics for HR functions undertaken by K12 schools.

Analytics is an emerging branch which uses statistical tools to derive meaningful insights from the available data. There is no denying the fact that all the decisions based on the data are rational and scientific. Descriptive and inferential statistics is used while doing analysis. Analytics has three categories descriptive, predictive and prescriptive. Descriptive analytics is a basic stage where the existing data is gathered on the basis of past events for example to measure turnover rates (Kumar, 2016) or cost of new hire. When analysis include what if conditions then firm shifts from descriptive to predictive analysis. Predictive analysis assesses the past trends. Basis these trends it recommends various best options or alternatives available to the management. For an instance best fit, time to hire the candidate enhances the probability of selecting the right candidate. Predictive HR analytics allows decision makers to peep into future consequently minimising the risk and maximising the return on investments. Handa and Garima (2014), has rightly observed that analytics is a boon for the managers to make guided decisions regarding availability of resources, talent and how to maximise them to generate high yield. This research study will be very beneficial for the school authorities and help them improve their performance through evidence-based decisions.

Gaps in existing literature

Researchers across the globe have done an extensive study about Human Resource Development and practices. Various scholars have studied about organisational performance. There is no dearth of studies on the relationship or impact of HR practices on the organisational performance. But most of the studies are based on one or two HR

Practices. There is lot of literature available on Analytics too. Perhaps, there is huge gap of literature about HR Practices and organisational performance with context to K12 schools. Furthermore, application of analytical tools in education is relatively new area of practice and research. Education sector is booming and there will be enormous requirement of competent workforce in this sector which need to be effectively managed. To bridge the gap of existing literature the present study will be beneficial. This is a comprehensive study of its own kind which takes into consideration four major HR practices and addresses the challenges faced by Edu leaders of K12 schools while managing their workforce to enhance their organisation's performance by applying analytical tools.

Objectives of the research work

In the light of literature review and gaps observed, need was felt to conduct comprehensive research with following objectives:

1. To study the existing HR Practices and identify the Challenges of K-12 Schools in Punjab.
2. To measure the impact of Workforce Analytics to enhance Organizational Performance through HR practices of K-12 Schools.
3. To assess the relationship of Workforce Analytics in HR Practices of K-12 Schools in Punjab.
4. To develop a model applying Workforce Analytics for HR challenges in K-12 Schools of Punjab to enhance organizational performance.

Variables

This study comprises of three types of variables. Dependent variable- Organisational Performance, `Independent variables (four)-Recruitment and selection, Training and Development, Performance Appraisal and Retention, Moderator—Workforce Analytics.

Basic Conceptual Model

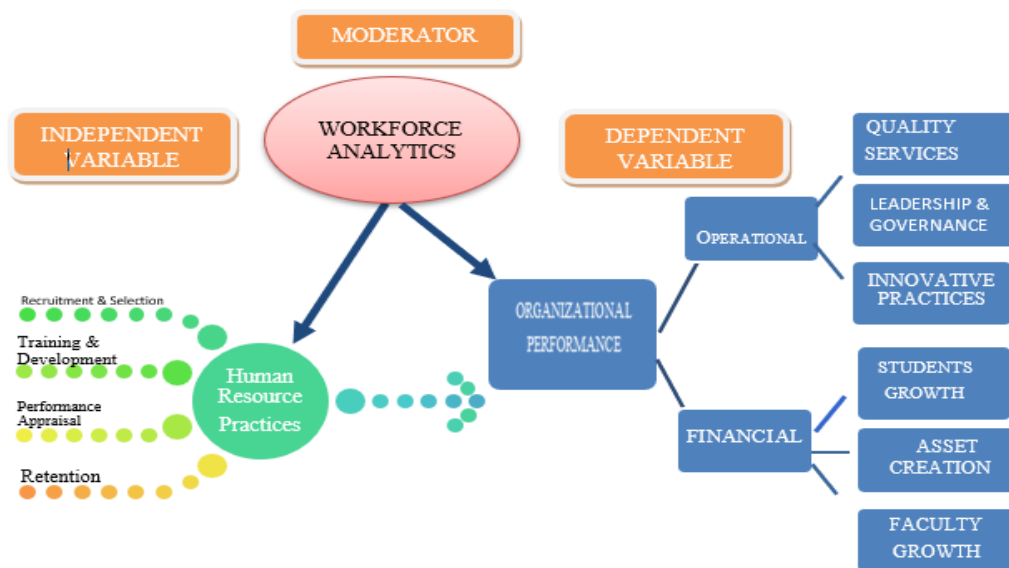


Figure 1: Conceptual framework

Source: Self designed

Methods: Sampling, Sample size and Data Collection

This is a quantitative research based on exploratory method. Stratified sampling technique is adopted to collect samples. Punjab is divided into 3 regions which are treated as strata's Majha, Malwa and Doaba. Population of 1020 CBSE affiliated K12 schools is divided in these strata. Further there are 22 districts in Punjab and from each district 3 schools on the basis of year of establishment is selected and finally on random sampling basis 4 teachers and 1 principal from each school was part of the sample.

Sample size of 330 is determined using Taro Yamane. Self-structured questionnaire was administered online to collect the data. 340 responses were received out of which 330 correct responses were selected and remaining 10 incomplete responses were rejected. To ensure the validity of the questionnaire it passed through 3 phases of screening and validation by experts. Reliability of the construct is determined through Cronbach alpha independently for all the variables which qualifies thumb rule. Descriptive and inferential statistical tools are applied to achieve the said objectives. Coefficient of correlation and structural equation model is used.

Results and Discussions

In order to identify the existing practices and challenges of HR functions in K12 schools' descriptive statistics and Thematic Analysis is done. Outcome of the results show that in Punjab still Management is largely dependent on traditional methods of recruitment like advertisement and references whereas modern methods like consultancy and social media is picking up the momentum but not extremely popular. As far as selection of faculty is concerned school administration prefers interview followed by demo. Psychometric test for the selection of teachers is not much popular. Every institute is particular about training their educators to keep them abreast with the latest trends. Most of the educational institutes prefer off the job training so that they get experts to teach the students. In case of performance appraisal in K12 schools Management, Principal are mostly involved but now some schools have started implementing 360-degree feedback system. In order to assess the relationship between WFA and HR Practices of K12 School, correlation analysis is applied. Results show recruitment and selection has low positive correlation with workforce analytics but the relationship is significant ($r=0.473^{**}$, $p<.01$), training and development has weak positive correlation ($r=0.456^{**}$, $p<.01$) with workforce analytics, whereas performance appraisal is moderate and positively associated with workforce analytics ($r=0.507^{**}$, $p<.01$) and retention of competent and elite teachers and principal is moderately associated with workforce analytics ($r=0.529^{**}$, $p<.01$).

HR Metrics model “STAR” (Selection Training Appraisal Retention) is developed which defines several key metrics. Structural Equation Model is applied to establish the association and relationship between observed and latent variables having moderating effect. Path models of all variables satisfy the Goodness-of-fit test which is an indication that SEM model is best fit and the data structure fits well. Results show that training positively influences analytics, since the p value is less than 0.05 ($t=2.600$, $p=0.009$). Output shown in the above indicates that retention positively influence analytics as p value is less than 0.05 ($t= 4.164$, $p<0.001$) quite significant relationship is established. Results displayed in the table highlights positive association between performance appraisal and analytics with p value less than 0.05 ($t= 3.870$, $p<0.001$), this is very significant. Recruitment is positively associated with analytics as results are significant. Values indicated in the above table supports the analysis as p value is less than 0.05 ($t= 3.090$, $p=0.002$).

It is quite evident from the results shown in table that training do influence the performance as the values are significant having p value less than 0.05 ($t= 5.296$, $p<0.001$), relationship is significant. This study shows that retention does not influence performance as output is insignificant ($t=0.253$, $p=0.800$). The relationship between performance appraisal and organisational performance is found to be positive ($t=5.228$, $p<0.001$). Results show there is insignificant relationship between recruitment and performance ($t= 0.511$, $p= 0.610$). Finally, it is proven that analytics definitely influences performance and is positively associated ($t= 2.511$, $p= 0.012$). R square measures the proportion of variation explained by SEM. As per Cohen (1992) results that fall between .30-.50 medium to large. Results shown in the above table highlight that this model is fit. The R square value between the variables like recruitment, training, appraisal & retention with analytics is determined as 0.404 whereas R square value of Recruitment, training, appraisal and retention with regard to performance is 0.570. Results by and large establishes positive relationship between all the independent variables of HR practices with Workforce Analytics.

Conclusion and Implications

This thesis brings out positive impact of applying workforce analytics to the HR practices of the K12 schools to enhance the performance of school. All the metrics developed and recommended under the STAR Model will be great support for the school management to take informed and evidence-based decisions to hire the right fit at right time through right source, train appropriate candidates at reasonable cost for adequate need-based training, best performance appraisal techniques ensuring equity and justice and finally retention of high calibre employees through adequate monetary and non-monetary rewards. With the use of metrics scientific decisions will be taken by applying analytics which will consequently improve the performance of the school. This study will give direction to the management to manage and operate K12 schools in more efficient manner.

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LIST OF ABBREVIATIONS

K12	Kindergarten to Grade 12 th Schools
CBSE	Central Board of Secondary Education
HR	Human Resources
HRD	Human Resource Development
HRM	Human Resource Management
WFA	Workforce Analytics

CHAPTER 1

INTRODUCTION

1.1 Background of Study

“Policies of the future government is synched with the practices of present classrooms.”

Education plays linchpin role in socioeconomic development of the Nation. Education industry is the backbone of any economy as the competent skilled students produced by this sector will become future workforce. Education sector of India is expected to touch US \$ 225 billion by the end of year 2025. Government has proposed to establish approximately 15000 schools, close to 100 Sainik schools and at least 750 residential Eklaya schools in tribal regions in consonance with National Education Policy 2021.

Education is an emerging strategic sector hence Government of India has permitted 100% Foreign Direct Investment (FDI) in this industry through automatic route since 2002. In last two decades from April 2000 to September 2020, we have received US\$ 3,849.20 million via FDI. The Cabinet under the chairmanship of Prime Minister, Sh. Narendra Modi approved the National Education Policy 2020, paving way for massive transformational reforms at school and higher education sector. As per the statistics funds to the tune of Rs. 54,873.66 crore (US\$ 7.53 billion) has been allotted for Department of School Education and Literacy by the government in Union Budget of 2021-22. As per the report published by EY-FICCI 2014, India’s K12 education system is largest in the world with 253 million students, enrolled in 1.4 million schools.

In the light of above facts, education sector is going to be the feeder for stimulating growth of other industries. Higher education will become source to supply competent and skilled manpower to the industries and K 12 schools will be the engine as they lay the foundation of human resource. Consequently, HR functions like recruitment and selection, training and development, performance appraisal and retention of competent teachers at school level need to be reimaged. Further, school administrators and principals need to harness the benefits of workforce analytics to enhance the performance of their educational institution. Analytics at school level is at its infancy. The school administration sits on huge data which could be used as a strength.

Competition in education industry is sky rocketing at meteors pace; hence it is imperative to manage HR Practices immaculately so as to enhance Organisational Performance. Inevitably, meticulously planned and effective management of human resource i.e educators at the school level is vital for the success of schools (Blanford, 2009). For attainment of School's vision and mission it is imperative that school leaders follow best HR practices. In addition to this, many researchers are of opinion that Principal is solely responsible for developing competent teachers who impart quality education which has strong correlation with learners' success (Rusmini, 2004; Tim, Mike, Paul and Anne, 2009). In School Community Headmaster is a competent authority to monitor and regulate the whole gamut of workforce related functions of recruitment, training, development, appraisal and retention, rather than confining his role as a supervisor, mentor and assessor. Our New education Policy 2020 empowers the principals not only to be an instructional leader but to stretch their roles as change leaders by extending their area of operation. Cuming, (1980), Aina, (1982), Bratton and Gold, (1999) advocates that human resource management involves recruitment, selection, guidance, development, promotion, and monitoring of people at workplace.

As a HR Management tool, Analytics can contribute immensely to improvise the standard of academics and operations in education sector (Jindal & Dutta, 2015). Application of Analytical tools in education is relatively new area of practice and research. As the civilisations develop there is always transition from conventional practices to automation (Barneveld, Arnold & Campbell, 2012). In 21st Century where we are enveloped with BIG DATA no organisation, may it be an industry or education, can isolate themselves from Analytics for long. Purpose for adopting analytics is more or less the same for business houses or educational institutions, to enhance the efficiency, better outcomes and sound decision making (Luan, 2004). For operational and academic excellence higher educational institutes & K-12 schools need predictive analytics to gauge their enrolments, recruitments, retentions, revenues, expenditures. To accomplish organisational pursuits every entity needs to manage its Human Resources effectively and efficiently.

(Omebe, 2014) Human Resource Management involves gamut of activities like attracting, recruiting, training, developing, appraisal and motivation. In order to achieve educational goal, it is of paramount importance that appropriate academic staff is appointed, timely trained, adequately rewarded and carefully retained. In simple words it can be said that success of educational institutions largely depends upon the academic performance of the pupils for which HR activities in schools have to be coordinated to get maximum output from the employees. All educational institutions have to depend on their teachers for implementation of its programmes. Nwaka and Ofojebe (2010) is of opinion that faculty is the critical resource for realization of the educational policies and objectives.

Around the globe Human resource issues are looked upon as a pivot to every initiative in educational policies. No denying the fact that in education world generally focus is on pupils' performance, funnelling funds, and of course quality in education, but since last few years the factors which concern the most are appointments, selection, appraisal and competency building of the human resource. With HR issues escalating in education system of late it is being realised that HR challenges have to be tackled in totality. Recently, researchers are discussing about professional upgradation. Actually, in 1990s researchers started focussing on 'human resource strategy' for the teaching profession (Fullan & Mascal, 2000).

In this razor-edged competition, there is no gain saying that every school want to earn National & International acclaim. This can be achieved when human resources are utilised efficiently and effectively. It is of paramount importance that right person is rightly placed at right time, they are developed timely, adequately compensated and every effort is made to retain the talent. HR Department contains infinite pool of untapped information about the human resources, which if harnessed adequately and supported by data-led insight can revolutionize business decisions, subsequently affecting the business greatly.

In prevailing era most of the organisations are switching over to Big Data and Evidence-Based Analytical decision making. Researchers like Pfeffer and Sutton (2006) and Briner, Denyer and Rousseau (2009) has identified the benefits of analytic based

decision on Human Resource practices, and consequently on the organization's performance. As per the study, in contemporary world, decision making would only be effective if it is data driven. Future business decisions would not only demand authentic information and meaningful insights above all the information should be analytically evidenced. Workforce Analytics is a tool that empowers management to take strategic decisions. (Pfeffer & Sutton, 2006, p. 1). In the light of above views, presently, Human Resource (HR) departments are not doing great job to manage their workforce. HR department is hardly applying any analytics to manage the functions of hiring, development, appraisal and retention to influence firm's performance. Despite, proven results of Analytics in other functions of management like Finance, Marketing, R&D (Paauwe, 2009) and popularity of HR Analytics (Boudreau & Ramstad, 2006), only limited enterprises are able to determine the actual value addition workforce make to the business. Mayo stated that: Majority of the organizations fail to measure the contribution of their intangible assets fairly by applying analytical tools (Fink, 2010). Exactly, prime function of HR is to take strategic decisions to utilise manpower for company's growth but HR is busy assembling and presenting information instead of analysing the data to make future strategy. It is obvious that organizations need Workforce Analytics.

“Workforce Analytics is a journey.....not a destination.”

1.2 Rationale of Study

Institutions collect innumerable data related to clients, enrolments, revenues, recruitments and so on. All the top order executives have to leverage workforce analytics to thrive. To survive in this razor edge competitive scenario, organisations must develop their workforce to work in most effective way. Workforce Analytics is a branch of study which applies analytics to the data in such a way to take wise decisions and frame best manpower strategies. However, obtaining employees related information is a big challenge as this data is scattered. Normally it is spread across HRMS, payroll system, compensation system, talent management, spread sheets etc. Building competent human resource capital through workforce planning is indispensable. Human resource management has been a matter of concern for all the organization ever since ages.

Tectonic changes in technology, shrinking of the world due to globalisation and workforce diversity is compelling organisations to modify their business strategies. We are living in the age of big data. Information technology combined with statistical tools can serve as a boon for the workforce planning. Every organisation aims to manage its workforce in a way to maximise the output by minimising the cost. This is possible through effective planning, utilisation of resources optimally and through correct decisions. For this every concern big or small will have to resort to Workforce Analytics. This is a recent buzz nowadays. HR Analytics assist in managing the manpower through superior and well calculated decision making.

Harvey (2012) is of view that economic meltdown has generated interest of big firms in the area of Workforce analytics. Initially this concept and its application were not clear to many departments. Workforce Analytics is a new corporate instrument. Many firms have no idea of the needs of their present and future workforce. People are potent resource of any enterprise. In one of the Global meetings held recently, Global Chief HR Officer for Ernst & Young stated: “Holding onto key talent is like trying to keep frogs in a wheelbarrow”. Consultants at Deloitte consider Workforce analytics as latest innovation. **Ringo (2012)** propounded that organizations which have resorted to workforce analytics have competitive edge over the others and can thrive in adverse conditions. All the vital recruitment decisions, identification of the future requirement, analysing and predicting present and future technological needs and improving appraisal methods is possible with workforce analytics. Workforce analytics is not about squeezing the employees rather to raise an army of more empowered, efficient and productive workforce who add value to the organisation.

Top companies across the world are witnessing the diversity and demographic changes in the workforce. **Henson (2002)** classified employees into various levels on the basis of their age like entrants 20-30 years, forerunners 30-40 years and 40-50 years seniors. It is seen that youngsters of 20-30 years are tech savvy more flexible, whereas those in 3-40 years are very diligent as they believe hard work will bring them prosperity lastly over 40, they are dedicated and loyal. Hence organisation has to draft their HR policies considering these factors. An environment has to be created that people love to be associated with the firm. In common parlance human resource means the manpower.

Michael J. Jucius has defined human resources as “a whole consisting of inter-related, inter-dependent and interacting physiological, psychological, sociological and ethical components”.

Addressing workforce issues through analytics add value to the organisation and ensure effectiveness in decision. From compensation and rewards, to training and recruitment or resource to geographical allocation, workforce analytics provide Chief HR officers all the essential tools required to improve HR strategies.

Business analytics optimises the facts and figures to take decisions and frame strategies taking the aid of quantitative data and numerical values to design line of action. HR analytics should be part of Management course curriculum to develop the skills among practitioners. In a 2001 research report, META Group (now Gartner) coined three Vs: volume (amount of data), velocity (speed of data in and out), and variety (range of data types and sources). If put simply it means, there is tsunami of data, its volume may increase or decrease any time, it can come of huge variety and can be received from several places. In 2012, Gartner updated its definition as follows: ‘Big data is high volume, high velocity, varied information that needs modern tools to process which will facilitate improved decision making, insight discovery and process optimization.’ Consequently, firms need new tools and technology as its size is huge, it is changing rampantly and mostly unstructured.

Although workforce analytics has made its way quite for some time, yet its growth trajectory is slow. In late 2015, a global survey of human resource professionals was conducted by Mercer in partnership with Human Capital Media and they discovered that aspirations from analytics are high but very few serious attempts have been made to actually achieve them. As many as (77%) respondents said they wish to enhance their workforce analytics capabilities within upcoming two years but the same percentage also shared that their organization had spent hardly \$100,000 per annum on workforce analytics. On the other hand, 31% of respondents believe that they have efficient or even moderately equipped manpower to apply analytics, and only 9% agreed that they apply predictive analytics.

You take it or not but big data is need of an hour. Its role in HR management cannot be undermined. Typically, firm have to undergo several phases to develop the analytic capability of their employees. First stage is of standard reporting, eg staff turnover, how much staff is required, how many candidates do we employ, when and which department etc. At second place introspection-to analyse in which department turnover is high? This is determined by simple query and tabulation tools. In third phase management need to investigate the reason of exit, whether this is on account of nature of job or there is mismanagement. This demands application of advanced statistical tool such as regression analysis. From here we move to fourth stage that is predictive analytics where a model is built depicting which people in the organisation are at risk of changing the job. Then eventually final stage arrives which is considered as prescriptive analytics. At this stage taking insights from predictive analytics decision making and action plan begins. Its scope is vast as Business Analytics software has registered a growth rate of 6.4% in 2014. Workforce analytics has always been considered as a cost center than profit center as compared to finance and marketing departments because it lacks the right metrics and analytical models.

With the boom in demand of faculty in schools' country wide, acquisition of talent, training, appraisal and retention of teachers is a nationwide challenge for private schools. This issue becomes graver with respect to small cities. After considering all the above facts and the gaps in previous research studies, we got the purpose of study to undergo comprehensive research with all the vital HR functions discussed above with special reference to workforce analytics as mediating variable to enhance schools' performance.

1.3 Significance of the study

Every organisation may it be formed for profit making or not for profit, wants to maximise its surplus and enhance its performance. Educational institutions cannot be isolated. With the passage of time education sector has grown phenomenally as the demand of K12 schools is soaring continuously. Consequently, K12 schools are facing razor edge competition. With the advent of New Education Policy teaching will be a specialised task. NEP lays emphasis on the training and recruitment of qualified and competent teachers. Henceforth, talent attraction, talent development and talent

retention are going to be a cumbersome task for the school administration. Though there exist lot of literature on academia, HR functions and analytics but there is little research done on application of Analytics for HR functions undertaken by K12 schools.

Analytics is an emerging branch which uses statistical tools to derive meaningful insights from the available data. There is no denying the fact that all the decisions based on the data are rational and scientific. Descriptive and inferential statistics is used while doing analysis. Broadly, there are three categories of analytics descriptive, predictive and prescriptive. Descriptive analytics is a basic stage where the existing data is gathered on the basis of past events for example to measure rate of turnover (Kumar, 2016) or hiring cost of new employees. In the case of what if conditions, analysis shift from descriptive to predictive analysis. Predictive analysis measures the trends followed in the past. Basis these trends it recommends various best options or alternatives available to the management. For an instance best fit, time to hire the candidate enhances the possibility that perfect candidate is selected. Predictive analytics allows decision makers to peep into future consequently minimising the risk and maximising the return on investments. Handa and Garima (2014), has rightly observed that analytics is a boon for the managers to make guided decisions regarding availability of resources, talent and how to maximise them to generate high yield. This research study will be very beneficial for the school authorities and help them improve their performance through evidence-based decisions.

1.4 Conceptual Framework

We propose a conceptual framework comprising of the following metrics to be studied

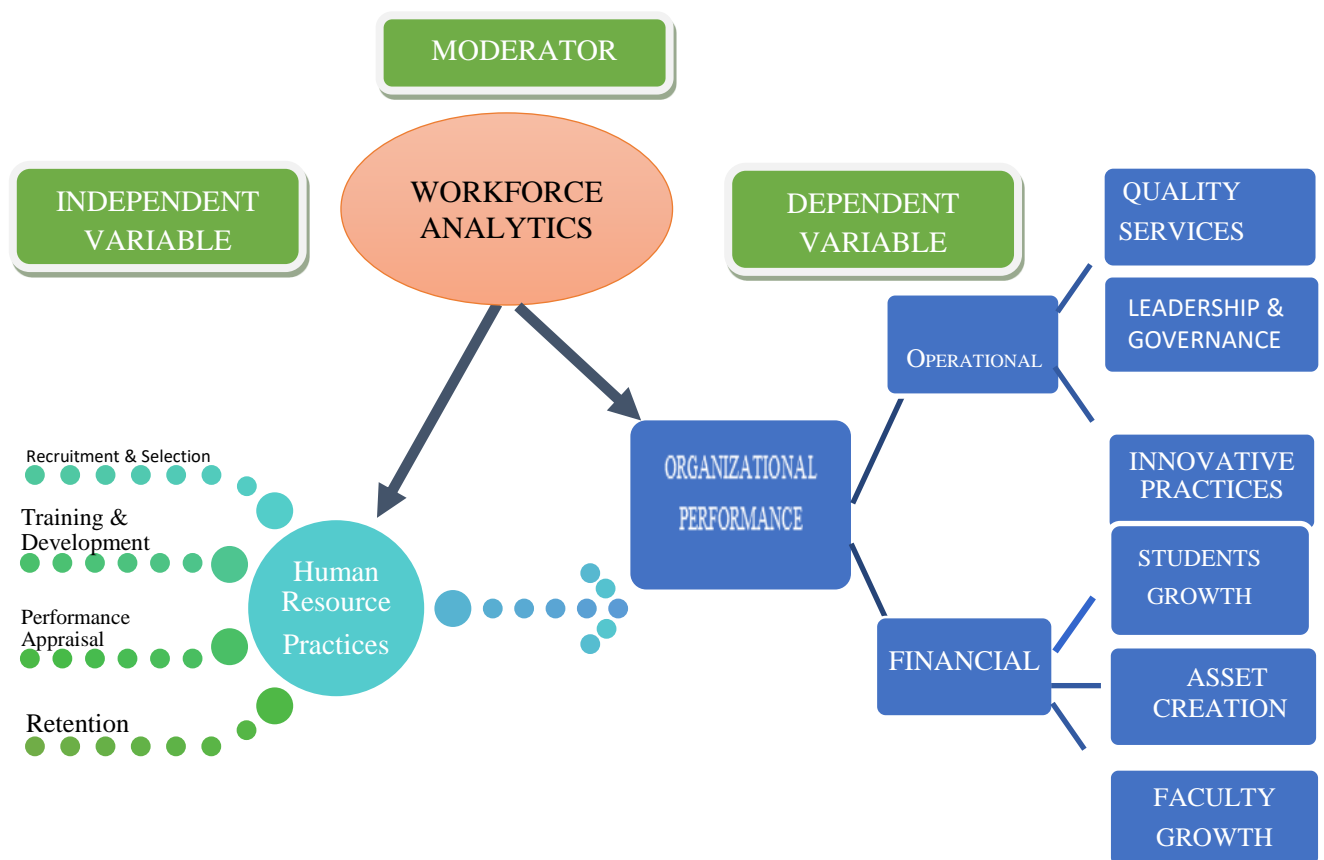


Figure 1: Conceptual framework

Source: *Self designed*

In this study there are 4 Independent Variable, 1 Dependent Variable and a Mediator. Independent Variables are Recruitment & Selection (Talent Acquisition), Training & Development, Performance Appraisal & Retention. Dependent Variable is Organizational Performance. Mediator is Workforce Analytics.

1.4.1 Workforce Analytics

Education is the only instrument of change. Teachers are the potent tools who can transform the education. Workforce in K-12 schools signifies the faculty. With education industry booming up, the traditional tools to measure and manage the HR challenges and issues have become obsolete. Hence, the need for Analytics in K-12 schools is seemingly being felt. Administrators and educators can gain competitive edge & actionable insight by applying analytics to decision making process. Whereas traditional techniques were on gut feelings and often backward-facing but analytics provide futuristic outlook of an organisation, supported by prescribed suggestions to facilitate decision making. At this juncture K-12 educational leaders and educators have realized that now it is high time implement analytics. After extensive review various gaps were observed chiefly that very less work has been done w.r.t application of workforce analytics to HR issues of school. No author has studied all the HR practices like Recruitment & selection, Training, Performance Appraisal & Retention altogether. **Huselid (2018)**, defines workforce analytics as a system to understand, quantify, manage and improve the role of human capital to execute the strategies to accelerate growth of the firm.

Definition of Workforce analytics

Gartner (2012) explained workforce analytics as a technique to analyse data by developing certain metrics to measure and boost the performance of an organisation. It measures all the HR functions like recruiting, training and developing, appraisal and compensation. In this process few metrics are designed like time to fill, cost per hire, accession rate, time to start, add rate, replacement rate, retention rate and offer acceptance rate.

As per Gustafsson (2012), turn down the pages of history HR analytics has been given various names from Talent Intelligence, Talent Analytics (Davenport, Harris and Shapiro, 2010), HR Analytics (Mondore, Douthitt and Carson, 2011) or Workforce Analytics (Hoffman, Lesser, and Ringo, 2012b). Rouse (2012) stated that workforce

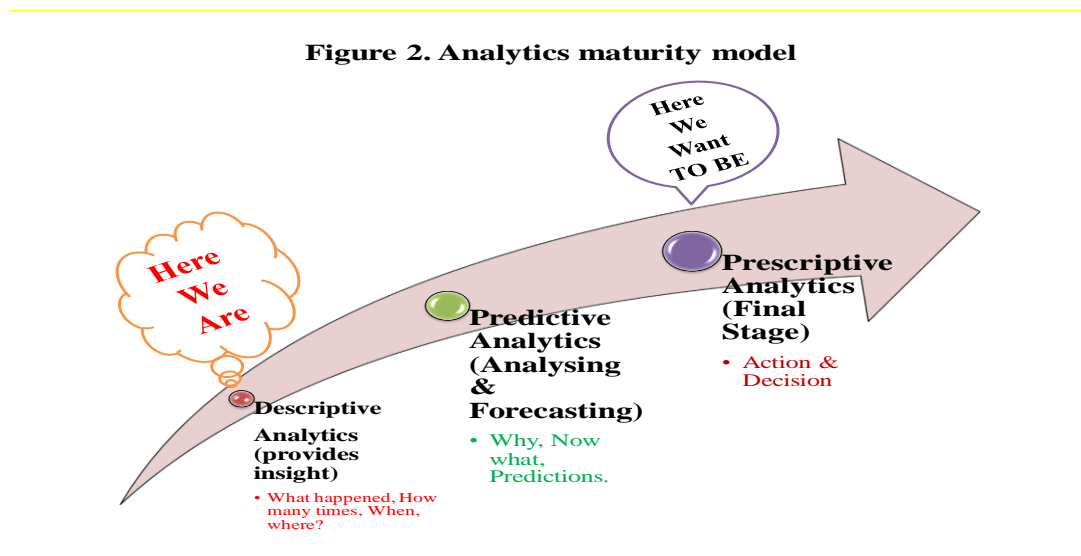
analytics comprises of application of statistical tools on HR related data using software, technology and methodology to take informed decisions. It helps HR managers to take better business and people decisions. Workforce Analytics empower them to improve recruitment methods and retain performers. Workforce analytics enable managers to pool the prominent information relating to employee's talent, skill sets etc and then design the strategy to accelerate the performance.

Robinson (2012) cited that workforce Analytics is synthesis of statistical tools and software on Human Resource data to optimize workers related decisions by applying mathematical models. Lesser and Hoffman (2012) explored those analytics is all about taking measured decisions related to human resource by extracting maximum information. In addition, it gives an opportunity to leaders to build a more engaged, effective, and empowered workforce to add value to an organization. Bassi (2011), is of opinion that Workforce Analytics has a wide array of spectrum from basic HR reporting to predictive HR. It involves people related decisions to improve the quality of their performance. Harris, Craig and Light (2010), extracted that HR department is now looking beyond routine historical data and routine reporting. Questions which really matter are-- whether our recruitment process is capable enough to select the second line of leaders? Does our organisation have skilled people for our goal accomplishment? Is our team future ready? Which people are creating value for the organisation? Concept of "Talentship" has been coined by Boudreau and Ramstad (2007), that it is a science which guides and refines the decision making related to human capital. Davenport & Harris (2007), explained analytics as a decision-making process with the use of statistical values and numerical analysis and predictive models.

According to **Levenson, Boudreau and Lawler (2005)**, Human Resource analytics transform worker related data and enables management to form relevant insights. It comprises of statistical tools, mathematical models and research design, but at the same time it goes beyond all this. Collecting appropriate data related to human resources inside and outside the firm, articulating meaningful questions, fixing appropriate standards to enhance analytical competencies of HR throughout the firm.

Kinds Of Workforce Analytics

Descriptive workforce analytics provides an insight about past whatever has happened like what, where, when, how. It interprets historical trend, contrary to it predictive workforce analytics determines the events which are likely to unfold in future and the trend which may happen in upcoming period. Last and final stage of analytics is Prescriptive Workforce Analytics which suggests the best possible solution out of the various alternatives available under prevailing situation. In case of descriptive analytics dashboards and key performance indicators are used whereas predictive analytics is used to analyze large amount of data to prepare actionable insight so that smart decisions can be taken. Data mining, statistics, machine learning and artificial intelligence are the tools which are applied under predictive analytics to analyze available data to make future predictions. In order to generate recommendations statistical modeling is used in case of predictive workforce analytics whereas simulation and optimization techniques are used in prescriptive analytics. Workforce Analytics is also known as HR Analytics, Human Capital Analytics and Workforce Intelligence. The evolution of Workforce Analytics is explained in figure 1.4.1



1.4.2 Organizational Performance: For the purpose of this study **Organizational Performance** means increase in enrolment, increase in strength of faculty and development of infrastructure. This is indispensable variable as growth & progress of any institution is determined only by performance.

1.4.3 Recruitment and Selection: Recruitment is a prime function of HRM. It is the initial step of filling the vacant position. As per this study, recruitment is a comprehensive process of inviting applicants, selecting appropriate candidate and appointing suitable teachers as per the needs of the institution. It is process in which at the first stage school has to identify the need of faculty department wise, then they advertise it, later on they shortlist the applications received followed by calling the candidates for next phase known as selection. Even process of selection varies from institution to institution. Recruitment is a like a heart of human resource management. Appointment process begins from here. Recruitment with context to this study means the entire process of approaching the candidates, shortlisting the right fit, selecting the best and appointing right teacher at right place. Recruitment strategy is effective if it resolves five main issues: “Who should be appointed?”, “From where to be appointed?”, “What should be the recruitment channel?” “Where to be appointed?” and “When to be recruited?” (Box & Purcell, 2008). During recruitment process every employer has sole objective to accumulate reservoir of probable candidates who could be reached out immediately as and when the vacancy arises. (Beardwell and Claydon, 2004; Rogelberg, 2006). Selection is a process of finalizing the apt candidate possessing the skill sets and qualifications required to close the position is known as selection. Selection criteria is a characteristic which a candidate must possess to successfully perform his work. Effective recruitment and selection procedure is a key to ensure that efficient workforce is becoming part of the team. (Naveen & Raju, 2014).

1.4.4 Training and Development: Training and Development is means to refine present or future performance of a teacher by enhancing their skills and knowledge. It is an ongoing process. With adequate training faculty feels confident, stay motivated, updated with the recent trends and their competency enhances. Resulting, educators teach students without hit and trail leading to improvement in the grades and performance of the students.

In the words of Merrow (1999), the water tank will keep losing water because no one is bothered about the leakage. Management keeps misdiagnosing the issue that it is due to poor recruitment process whereas it is actually a problem related to retention. We do not treat teachers properly, they are generally underpaid, trained poorly so they leave in

droves. Retention is an HR function to ensure that high performing employees continue the organisation as long as possible. It should be the priority of firm to hold back its best workforce thereby, containing recruitment, training cost and loss of trained talented staff to our rivals. Retention of the competent workforce is profusely dependent on HR policies and practices. Karim, Choudhury & Latif (2019) in their study emphasized training and development of employees should be a regular feature considering the changing market dynamics, competition and interest of the stakeholders. Further, employees are aware about training, they get motivated with the training as it makes their performance better.

1.4.5 Performance Appraisal: Performance appraisal is a systematic process to periodically assess the performance of an individual faculty and evaluate productivity as per certain pre-established Institutional objectives and criteria. Performance appraisal leads to promotions, demotions, transfer, retrenchment, increment of faculty.

1.4.6 Retention: This is a challenging area. Retention is an ability of an institution to hold back its high performing team members. The success of school and the performance of students by and large depends upon the competent and experienced staff, hence it is paramount to understand the significance of retaining the high end faculty.

CHAPTER 2

REVIEW OF LITERATURE

2.1 Introduction

Human resource is most potent and active resource. Of all the resources available this is the only resource which appreciates with the passage of time. There is hardly any sector which can operate without human resource. There is no dearth of research studies about the functions of human resource. Analytics is an emerging branch which combines data and statistical tools to take informed and rational strategic decisions. Industry in advanced economies have reaped the benefits of workforce analytics in various domains of HR like finance, sales, marketing but in HR functions still it is at its infancy. Researchers across the globe have done extensive study on HR analytics. There are various theories on the evolution of HR Analytics its progression. Organisational performance is an age-old concept. Ever since centuries authors have researched lot about the relationship and impact on organisational performance of various other factors. Though many academicians have researched a lot on school education, schools' performance and other areas related to academics. In this chapter gaps in existing literature, theme-based literature review and objectives of the study.

2.2 Literature Review

For any research to be effective and to achieve its objectives it is paramount to study what research has already been done in the specific area. Hence, it is vital prerequisite to study the existing literature for actual planning and implementation of research projects. It is only after extensive study of existing literature researcher identifies the gap, formulate hypothesis, sets his objective and prepares his framework.

2.2.1 Recruitment and Selection

It is pertinent to note that faculty is a backbone of the school. For the success of any educational institution competent teachers are of paramount importance. Hence, recruitment and selection of experienced and qualified teachers is vital function of HR department. Study conducted by Arora and Pratibha (2021) on IT sector concluded that in order to enhance organizations performance effective HRM practices needs to be

implemented hence, institute should trace, allure and prepare human capital that can provide cutting niche to the organizations in this competitive scenario.

In a study conducted by Dharshini & Seleena (2020) on the recruitment and selection of workforce for non-banking financial companies they emphasised on discovering new methods of talent acquisition and evaluation in coming times as it has an impact on the job satisfaction. In present study we have shortlisted HR practice such as recruitment and selection which were used in the Fombrun, Tichy, and Devana Model of HRM. This model states that above mentioned HR variables have direct effect on organization's performance.

Hardini, Setyarini & Harto (2019) stated that recruitment process has many stages with a specific purpose, similarly during selection process, candidate's skills and competencies must be checked. They recommended to innovate the recruitment and selection process. The study of Venkatakrisnan & Perumal (2017) concludes that, this is an evidence-based approach to make better people side decisions. It is focused on acquiring best talent by assessing future manpower needs by stimulating morale and satisfaction of employee. HR Analytics guide the organisation to find intersection between more viable and more empowered management with efficient employees. Analytics help in skill and job matching, forecast workforce requirements, discover the variables that lead to enhanced productivity and satisfaction of employee. The study of Zaraket & Halawi (2017) on Lebanese banks has discovered direct positive relationship between mediating variables and HRM practices that influence organizational performance.

(Hofemann et al., 2012) was of opinion that recruitment is an act to be able to place right person possessing right set of skills at right time to right work. Employees are dynamic and complex rather than being a simple static asset. This is the only resource which appreciates over time as they acquire new knowledge, their efficiency and competencies will grow. Dim, & Akpunonu (2017) in their study recommended that Hospital management should be "responsible for recruiting competent and skilled medical experts. Hence this charge should be handed over to professionally experienced health personnel.

Researchers in their studies have observed that there exists relationship between recruitment-selection and organizational performance (Croucher, 2008).

In his study *The Importance of Talent and Intellectual capital*, ROSIN (2015) stated that recruitment has been a fundamental function of HR, ever since dawn of ages. As per this article attracting right talent is no way less than attaining share in a competitive market. *Ofobruku, Anike(2019)* in their study of hospitality business concluded that recruitment definitely have significant impact on the performance of hotels, therefore, sound recruitment practices yields superior performance in this industry, it is proven fact that efficient recruitment practice are positively correlated with the performance of hospitality business. Recruitment and selection are prominent functions of HRMPs. Strong relationship is recorded among recruitment, selection procedures applied for selection which has significant impact on the organisations profit (Hausdorf and Duncan, 2004). Moreover, it is the mean to explore the sources of finding the potential candidates to fill the vacancies. (Jain, 2015).

(Michaels et al., 2001) states Globalisation has created a talent war all over the world, therefore, to gain competitive edge over the competitors recruiting quality employees using selective hiring decision is imperative. HR professionals have to make rigorous efforts to search competent candidates who can contribute to organization's growth; however, they need to formulate new and efficient recruiting and selection strategies that serve to be key differentiator in organisations success. (Ryan and Tippins, 2004).

2.2.2 Training and Development

School is considered as one of the specialized service sectors. Educational institutions operate under intense competitive conditions where apart from the world class infrastructure the efficiency and effectiveness of the competent teachers matter the most. In order to have competitive edge in the education sector it is vital that faculty is trained continuously to upgrade their skills, Due to globalization our areas of operation is becoming large. Timperley, Wilson, Barrar, and Fung (2008), defined the term “teacher training” as a process, procedure and policy designed to prepare existing or prospective teachers, to enhance their capacity to perform their task effectively within classroom for preparing the future leaders.

For the success of any organization, it is paramount that its workforce is trained from time to time. The change is happening at lightning speed; therefore, it is imperative that our manpower is adequately developed to take on the future needs. Therefore, training is indispensable and undoubtedly it makes the employees effective which eventually enhances the performance of organisation. Training is not only a cost centre but it also helps to improve returns on investment (Richard Chang Associates, INC.) There are numerous factors like job satisfaction, knowledge and management on which employee performance depends in addition to training and development (Chris Misano, 2010). Training provides a fillip to the employees and stimulates their performance which subsequently benefits both the workforce and the organization too. Harris and Sass (2011) have determined positive and strong correlation between teacher training and student achievement. Undoubtedly, training enhances the job satisfaction of the employees thereby improving their performance. Training is an ongoing process to enable the human resources to upskill, upscale and upgrade themselves. It helps in enhancing the knowledge, abilities, skills and competency of the manpower. Ewuim and Ubochi (2007), have similar opinion.

In a study on banks, it is discovered that training is a problem-solving tool. Training should empower the employees to fight against the challenges. Authors Iftikhar and Sirajud (2009), established a fact that no organisation can achieve its mission and goal if training and development is not regularly imparted to employees. In the words of Saleem *et al.* (2011) training is a systematic process to increase the technical know-how skills of the staff which motivates them to contribute in firms' welfare. Singh and Mohanty, 2012 are also of the opinion that training modifies the efficiency of the workers thereby leading to enhanced organizational performance. In terms of to Nunvi (2006), training not only helps the manpower discharge their current duties efficiently but at the same time help workers acquire the skills required in future. Moreover, Cambell (1971) is of the view that training aims at short term improvement in the skills whereas development has a long-term impact by upgrading the employees for the future requirements. Some researchers have proved that due to modernisation, knowledge explosion, development of internet and globalization it is indispensable to invest in training and development of human resource to survive and thrive in future Khan *et al.*

(2011). Further, Mehrdad *et al.* (2009) has classified training in 2 categories chiefly On-the-job (orientation, apprenticeship, job training, internship and assistantship, job rotation and coaching) and cognitive or off-the-job (Lectures, computer-based training, games and simulations etc), James *et al.* (2014) has observed that training modifies the attitude of workers changes their behaviour to quickly adapt new technology, eventually, absenteeism and attrition rate reduces, thereby reducing wastage of time, money and resources consequently organizational performance enhances Samupwa (2008), in his research work analysed that regular educators training modifies their behaviour and improves performance of teachers positively. On the other hand, Schunk, Meece, and Pintrich (2002) declares that in-service teachers training program helps to improve the education system immensely. According to the suggestion of Zimmerman, Boekarts, Pintrich, and Zeidner (2000), a right training empowers teacher to plan make effective strategies to empower students. It is proven that in-service training plans enhances vision, make teachers more competent to disseminate knowledge to the pupils. Kazmi, Pervez, and Mumtaz (2011) recommends in-service training, as it equips teacher with the latest trends and make their classroom approach more rational and systematic.

2.2.3 Performance Appraisal

Performance appraisal is a vehicle to assess employees' performance and to implement strategic initiatives for the betterment of employees (Lawler and McDermott, 2003). Regular and unbiased performance appraisal is an important requirement of employees (Thurston, 2001), and majorly, performance appraisal system is required for developmental and administrative purposes. 360⁰ feedback and management participation in the process of performance appraisal ensures authenticity (Kinicki *et al.*, 2004). Authors believe that genuine performance appraisal stimulates the satisfaction and accelerates motivation among employees (Wood and Marshall, 2008; and Selvarajan and Cloninger, 2009). Some researchers have identified that if employees are convinced with the accuracy of appraisal, they feel more committed towards their duties and organisation (Roberson and Stewart, 2006). Some authors proved that perception about authentic appraisal, management's involvement, whole years performance and

position in the organisation build confidence among employees over the appraisal system (Selvarajan and Cloninger, 2009).

2.2.4 Retention

Run down the annals of history, first ever evidences of teacher retention were found in 1840 in Belgium. In terms of (Silbert, 2005) monetary measures with hike in salary was only means to retain competent workforce. With rise in rate of school going children the demand for the schools has quadrupled but there is paucity of experienced teachers. This gulf has widened a lot. Various researches conducted on, why people do not want to choose this as a career option highlight the facts that inadequate salary, meagre scope of promotion, almost negligible perks, uncertain tenure, no retirement benefits and numerous restrictions. Ingersoll (2001) expressed that retention is a bigger challenge than recruitment. (Berry, Noblit, & Hare, 1985; Ingersoll, 2001; Odell & Ferraro, 1992) found that schools which provide ample administrative support to teachers, schools where disciplinary issues are comparatively less and higher engagement of educators in process of decision making are able to retain the high performing employees. Darling-Hammond's point is relevant here. "Great instructional leaders set up a progressive environment where they produce line of new leaders than followers." (2003, p. 13).

Arora and Pratibha (2021) in their study on IT sector identified that retaining high performing employees have become imperative for organizations. Skilled workforce is always an asset for the firm and they will contribute in enhancing the performance of the firm. (American Teacher, 2005), has very beautifully compared the problem of retention with a leaky bucket. If the bucket is having holes, it is not wise to pour more water rather to fix the holes. Similarly, school management need to find out why good teachers quit their jobs rather than investing their time and money in appointing new staff. There is multitude of research available on teacher retention and schools' performance, but there is limited research on the impact of retention of high calibre teachers on schools' performance. (Moir, 2003) has deduced that teacher turnover, may it be voluntary or transfer, is expensive and has adverse effect on the school's performance. Gamut of activities like advertising for vacancy, shortlisting applications,

conducting interview & verifying criminal background checks, then orientation of new staff members are some expenses which institution bears when a teacher leaves his job. For example, in Texas, the turnover rate was 15.5% p.a, whooping 40% teachers' turnover rate in initial three years, puts additional burden of \$329 million annually on the state for fresh recruitment, selection and training. This turns out to be \$8,000 per candidate who discontinue in the beginning few years of teaching (Texas Centre for Education Research, 2002). Kelly (2004) observed that non conducive working conditions—with special regard to, the behavioural climate of the schools—enhances attrition. Similarly, Stockard and Lehman (2004) identified that fresh appointments in schools did not stick to their job at one workstation due to excessive behavioural issues, lesser autonomy to perform duty, minimum support, and ineffective administration.

Most of the traditional research literature emphasized on monetary factors like remuneration and perks as a source of retention. But over the period of time, modern studies have added new dimensions workplace wellness and work-life balance that influences employee decision to continue or to leave (Griffeth & Hom, 1995). HRD manager makes earnest efforts to ensure that their talented staff continue their services in the entity till eternity (Griffeth & Hom 1995). With avalanche of new organisations mushrooming up competent persons have no dearth of opportunities; hence Organizations confront the challenge to retain employees. Any person who is not satisfied with his current occupation, he may switch over to other best substitute. In prevailing scenario employee retention is major function of HRM (Fombrun & Shanley, 1990).

Best companies attain zenith because value their high performing employees and they provide them comforts keep them gelled with the organization. (Muchinsky, 1977) argues that workers continue and leave organizations for many reasons. Free flow of communication, freedom to work, fair appraisals are factors which an HR manager has to ensure for retention. (Dalton, & Todor,1979) states that firms which are inflexible having authoritative organizational culture generally have dissatisfied employees with high turnover despite good incentives to stay.

2.2.5 Workforce Analytics

F.W.TYLOR was the pioneer to introduce the scientific principles of management in 1911. Ever since then, century has passed in exploring new and more sophisticated methods of workforce management. Mamaghani (2006) discovered that IT innovations have impacted the workforce over past decades. He also noticed transition in workforce trends due to Globalization, development of IT and Outsourcing. Extensive literature review has been done ranging from 2001 till 2017. HR department has transformed the way it was managed during Taylor’s era, presently business is data-driven, due to rampant growth of technology and analytic tools (Penpokai et. al. ,2023)

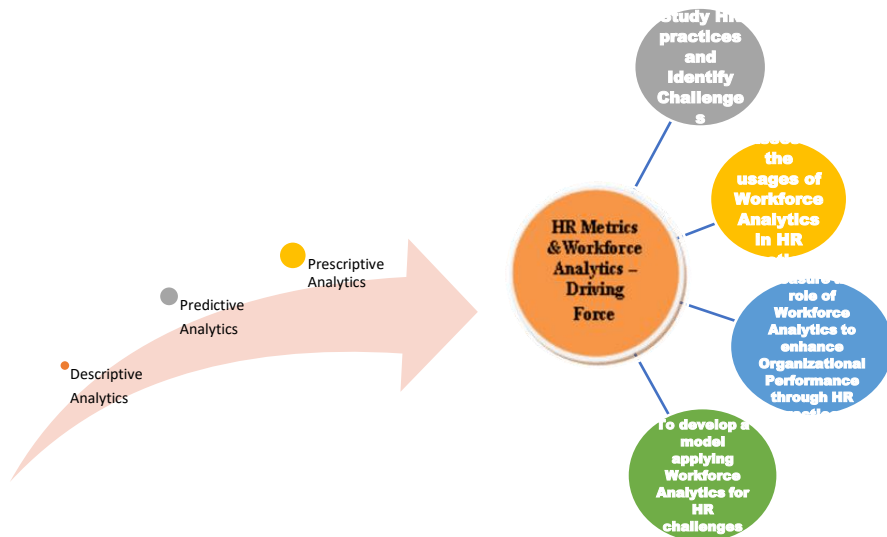


Figure:2.1 Types of Analytics and HR Metrics

Workforce analytics is our moderating variable for the purpose of this study. Laney (2001), This study states that in prevailing scenario, turbulent business situations have pushed forth the traditional practices giving way to modernised and sophisticated techniques like workforce analytics to handle challenges. Extending data management options enable to formulate strategies to yield better returns. Levenson (2005) HR Managers are looking ahead of the descriptive analytics to modern tools of analytics like predictive and prescriptive for taking crucial decisions to recruit, select, upgrade, appraisal and retention. In order to find solution to: Is our recruitment processes creating

adequate leaders? Do organizations have the right skill sets to achieve targets? What type of talent is required in the future? Which teachers are bringing value to school? If schools are serious to maximize the return on investments, then workforce Analytics is the only one-stop solution (Schuler et al., 2011; Scullion et al., 2010). In this paper "Harnessing the power of HR analytics" states that HR Analytics is relatively a new concept which includes statistics and research designs. It consists of behavioural modelling, predictive modelling, impact analysis, cost-benefit analysis and ROI. This theory suggests moving beyond scorecards and dashboards to bring remarkable change in decision-making. Two action steps were identified in this study-build workforce analytics as a centre of expertise and creation of analytical skills across all the departments of the organisation (Martin 2011).

To implement WA successfully, it is vital to establish a connection between HR practices and employees. Workforce Analytics helps to predict, plan and project the requirement of manpower with specific skills, for certain locations of the organization in advance efficiently. Analytics enables to measure performance of the human capital against organizational performance, thereby facilitating the HR Department to find answers to important questions like: is there any need for fresh recruitments, whether an investment in employee training is required, types of incentives for appraisal and retention, becomes easier (Homann et al., 2012). With the power of metrics and analytics it is now possible for HR leaders to address challenges of workforce. Through the analytic tools the human capital decisions can be optimised. HR analytics will help in evidence-based decision-making and feel gut-free. As per the paper of Hota & Ghosh (2013). This paper confirmed that HR Analytics is the modern way to combine metrics with human capital to generate best results. This tool shortens the hiring cycle, improves retention, better training, labour cost reduction and increased consumer satisfaction.

Harvard Business School (2013), this study deduced that even the best of the organizations lag to understand the HR analytics. This is for sure that those who are leveraging the workforce are three times better than their competitors to satisfy their clients. This area needs attention and commitment of management towards implementation, clear understanding of skills, integrating data, linking manpower efforts with their performance. This study conducted the survey which highlights that to develop high

potential employees 66% respondents agreed that they use advanced analytics. Kelly & Hirsch (2013) this paper recommends using metric and analytical tools. Authors advocates building up HR analytical capability and leveraging the data using dashboard. This study stressed on building a team which is equipped how to use analytics. Besides, this study also suggested that not everything should be analysed. Organisation should set their priorities like cost factor, turnover, global workforce etc. Fairhurst (2014) as per this study Sales, Marketing and Risk professionals are now optimising the tools of artificial intelligence and using big data in more sophisticated way. HR can have an advantage to learn from other functional departments how to utilise data driven approach to take decision and add value to the business. Kinange & Fred (2015) this study reveals that, HR field today demands radical shift from analogue to digital. The hard truth is that most of the organisations are not able to reap the benefits of Analytics due to lack of clarity. If implemented in its true sense it can enhance the credibility of HR department. He has presented 5 major steps of Analytical model these are track, analyse, model, decide and act. A study by Momin & Mishra (2015) recommends that HR issues like recruitment, appraisal, retention, forecasting turnover can be easily addressed through HR analytics. HR analytics has helped in transforming HRD, thereby accelerating the performance of employees through increased revenues, decrease attrition rate and mitigate risk. Further this paper suggests that in this intense competitive scenario and robust technology workforce analytics is vital. Every organisation must set up HR Analytics for reaping accurate results and to have advantage over the competitors. George & Kamalanabhan (2016) in their qualitative study in which researchers conducted interviews of HR professionals with an objective to discover the key factors that can influence the acceptance of analytics in HR. Transcripts were analyzed and split into three categories: individual, organizational and technological. Researchers observed that analytics enables an organization to know the importance of HR practices on their performance and value addition. Researchers advocated that Analytics in HR is a way ahead and can be boon for the HR department to forecast human planning. Research paper of Vihari & Rao provides an insight that how HR modern business houses can take the advantage of Analytics to become business partners. They have designed two theoretical frameworks viz Mapping HR-Analytics-Strategy" and the second to measure the Return on Investment of HR Analytics. This study vehemently comments about the

sustainability of HR Analytics in coming times. Continuous changes in demographics, evolution and diversity in human resources have made HR analytics very lucrative.

Human resource management (HRM) is a branch of Management which takes care of human capital of the firm. All the policies and practices required to manage the men including human resource appraisal, retention, training, selection and compensation form integral part of HRM (Dessler, 2008, p. 4). HRM is sum total of activities that impacts workers habits, performance and behaviour (Noe, Hollenbeck, Gerhart, & Wright, 2007, p. 5). Top 4 models of HRM are Fombrun, Tichy, and Devana Model of HRM, the Harvard Model of HRM, the Guest Model of HRM, and the Warwick Model of HRM (Bratton & Gold, 1999, pp. 17-24). Present study takes into consideration The Fombrun, Tichy, and Devana Model of HRM. This model recommends HR practices such as recruitment and selection, training and development, performance appraisal and compensation.

Fink (2010) explored more and noticed through his survey that there are numerous areas where research and analytics can influence an organisation to great extent. Author found that analytics is chiefly being applied to resolve issues related to recruitment and selection, turnover & retention and performance management. Managing men is gargantuan task. Primarily, to appoint perfect people with the perfect skills to the exact work at appropriate time is known as recruitment. Of all the resources, human resource are most potent, active and versatile assets. In a study held on The Importance of Talent and Intellectual capital, it is stated that recruitment has been a fundamental function of HR, ever since dawn of ages. As per this article attracting right talent is no way less than attaining share in a competitive market. It is vital to understand that due to technological and economic advancement, globalization and internationalization of market the tools and techniques of acquiring talent has to be based on workforce analytics. Fred & Kinange (2015) In their study on “AN OVERVIEW OF HR ANALYTICS TO MAXIMIZE HUMAN CAPITAL INVESTMENT” pointed out that organizations at their inception stage are more of like a start-up. Hence, they rely more on managerial instincts and judgements avoiding data driven information which is very dangerous. The results could be disastrous, making poor hire decisions. In order to take well informed

and scientific decisions on the employee's side, workforce analytics is an appropriate approach, which will eventually improve performance of an individual and organization.

Even the research paper of Isson & Harriott (2016) People analytics is a modern age approach to convert big data for building useful insights: the way you attract, hire, train and retain talent, highlights the significance of talent acquisition analytics to determine how many candidates to be interviewed from a pool of applicants, to determine best technique of interview and how many rounds of interview to be conducted. Predictive Analytics is a way ahead to identify the potential talent, recruit best candidate and minimize the cost of wrong hire. In this study it was observed that traditional recruitment approach is no longer valid in this globally competitive talent market which is propelled by big data. Hence to innovate, succeed and lead organizations need to use advanced analytical tools to hire right talent at right time. Volini, Dussert, Bennett, Cowley, Clayton & Thomas (2016) Team of Deloitte and Oracle explained that HR is long behind the curve it is still catching up. Traditional HR solutions will not be sufficed to cope up with sky-rocketing competition and modern challenges. In the absence of workforce analytics decision making would be left at chance like trying in dark. Workforce analytics provide an array of solutions to the chief financial officers (CFOs) like data management and reporting to more sophisticated applications such as predictive modelling, data mining, and optimization. This paper reported that workforce Analytics can assist chief HR officers (CHROs) to decide about compensation and rewards, recruiting and staffing. Workforce analytics gives the CHRO the tools required to improve all aspects of their HR strategy.

The research paper by Jain (2015) on Analytics for optimizing HR investment strategy, identifies that HRD needs to look beyond 'one size fits all' kind of an outlook. Every employee has different set of skills, make different contribution so he need different type of training. Like, training requirements for R&D team will not be same for that of the Production team. This paper recommends descriptive and predictive analytics to identify the need of training and decision should be data driven not on the basis of gut feeling. Frantsev (2015) in his study explores and identifies the benefits which a firm can gain by applying predictive analytics to HR area. Descriptive analytics focus on generating past summaries and reports, predictive analytics targets to interpret the past by

establishing the correlation among the key activities like entire employee lifecycle; training impact, hiring success, workers management risks and manpower retention. This help HR professionals to make better decisions related to HR activities, by eliminating the error. The survey conducted by this study highlights that all the stakeholders have very highly rated predictions on employee recruitment, training and attrition are essential. Also predicting employee engagement, affecting to a longer employment relationship between the employee and the company, was given due weightage by all the respondents. The salient advantages of predictive analytics listed by the participants were cost cutting in recruitment cost, lower employee turnover will help to save cost ensuring healthier and longer employment relationships. In addition to this, predictive analytics will allow firms to optimize operations and to target training budgets more effectively, employees' wellbeing and human resource planning were seen as the vital benefits. Companies mostly prefer investing in those analytics areas which are strategically significant and add value to their core business. The prominent benefit noted by all the interviewees of predictive analytics was cost saving in employee recruitment with reduced employee turnover and longer employment relations.

Momin & Mishra (2015) this study lay emphasis that every organisation should align HR analytics with overall business goals. Workforce analytics helps to identify right person for training & development. Appropriate training motivates the employee which in turn enhance the profitability of the concern. Training and development are another vital function of HRM. In order to enhance the productivity of the employees, from time-to-time HR management has to identify training needs of their employees. Through predictive analysis, quantitative modelling, performance reviews succession plans can be designed. The research study of Lakshmi and Pratap (2016) states that, HR needs to look ahead of mere reporting to predictive analysis. By using advanced predictive analysis strategic organisational goals can be attained. Workforce Analytic tools can enhance business performance through improved employee engagement and commitment. Workforce decision can be better made using employee data. It primarily focusses on assessing future manpower needs by enhancing employee satisfaction and morale. They have recommended few steps for HR department to yield better results like such as employee sentiment analysis, hiring and future capacity planning & attrition risk management. Anticipating human resource need and to decide how to best fill open

positions. It also facilitates to identify the underlying reasons for workers attrition and discover how many high-performing employees are at risk of leaving. Analytics helps to establish adequate training and career development initiatives. Abdullah & Othman (2019), are of opinion that training provided to workers help to establish link between the needs and skills of the marketplace and boost the confidence of employees to perform their job in a better manner. Collins & McNulty, (2020), claimed that on-the-job training doesn't enhance the performance whereas off-the-the-job training improves efficiency. Further, regular training helps to upgrade the skills and knowledge of staff there by increasing workers satisfaction, which is vital to attain firms' goal (Guest 2020).

IBM (2009), In present complex economic conditions, workforce analytics can contribute immensely to address human capital issues. The survey conducted for this study reveals that those organisations who apply workforce analytics are able to evaluate workforce performance by 11% more, retention decision 11% higher and develop training strategies 18% better than those who do not use analytics. This study also reveals that workforce analytics can play linchpin role in resolving many issues confronted by the firms today relating to human capital, and thereby enabling HR Management to play bigger role by taking effective corporate decisions, formulating adequate strategies and steering it in right direction. Primary barriers in implementation of workforce analytics as identified in this study are consistency, integration, accessibility and lack of analytic capability. Visierinc. and Fisher (2013), recommend that organization should pay attention towards three fundamental HR issues-attrition, recruitment and employee performance before moving on to advanced workforce analytics.

As per this paper of Jain (2015) on Analytics for optimizing HR investment strategy, the incentive structure should vary from department to department for example Sales team will not have same appraisal as for the Finance Team. Not only this, segmentation can be in terms of managerial and clerical levels, new comers and old hires and so many other ways. This decision should be based on adequate data mining using analytics. Even usage of regression and discriminant analysis is recommended. Even the study of Mitarai (2015) on Bridging the HR Analytics Gap, suggests that the role of workforce analytics to measure employee performance within team is paramount, and critically, discuss what

data points are possible to measure performance of employees, talent teams want to improve retention as seniors will start retiring. Recruitment teams wish to improvise hiring decisions, assuming that a poor-decisions can cost heavy as much as 5 times the annual package of an employee or may be more. Training teams on the other hand are interested to evaluate not just attendance and marks of their programs, but correlate concerned data with performance of employees to check the actual impact of those programs. Despite the fact, HR heads are beating their head with big data like what to manage and measure, identifying from where to get the data and then how to implement. Study recommended that pick up small projects, let them show results then work with leaders how to implement analytics. Momin & Mishra (2015), this study emphasise that analytics enable HR manager to track the performance of employees and spot star performer from overall workforce. Workforce Analytics makes it convenient for the HR department to transform the first-hand unprocessed data into meaningful and quantifiable results. Workforce analytics comprises of business intelligence, methods and techniques ranging from simple reporting of HR metrics to next level of predictive model. This will enable managers to take better decisions about people side of the firm. It has also been observed that the performance of the companies who provide medical security, incentives, rewards to their workforce perform better than others (Xiao et al. 2020).

In a survey conducted by Goldberg & Proctor (2000) in USA preeminent educators expressed that respect at workplace, competitive salary, mentoring and other financial incentives are the preconditions to address the issues of recruitment and retention. Mount, Harter, Witt and Barrick (2004) suggested celebrating festivals and staff birthdays together, incentivizing the performers, meetings with the staff acts as a motivator and reduces attrition. In exploratory quantitative research conducted in South Africa by Molefe & Hofmeyr (2013) states that understanding & implementation workforce analytics is at its infancy. In the survey and interviews conducted from 15 respondents, most of them remarked that key metrics for workforce analytics are recruitment to identify the skills, organisational training & development needs, staff retention, cost benefit analysis and finally restructuring and forecasting future trends. Fred & Kinange (2015). In their study on “AN OVERVIEW OF HR ANALYTICS TO MAXIMIZE HUMAN CAPITAL INVESTMENT” emphasized that human capital

analytics help to identify-who all among the high performers of the firm are doubtful to leave and what efforts must be done to make them to stay? HR leaders often have a big challenge: to predict and fulfil major business requirements, to manage diversity issues and how to minimize recruitment and retention cost. HR Analytics process is very easy and almost every organization can implement it to have gain competitive edge, probably this may enable us to realize the dream to transform the country's workforce.

Exploration research done by Vargas (2015) provides an insight because HR professionals are not using workforce analytics to gain competitive advantage. HR professionals very well understand that for prosperity of company, hiring and retaining the right person is imperative. This study emphasised on individual level adoption. Significant factors which impact HR analytics are social influence, effort expectancy, quantitative self-efficacy and performance expectancy. This study recommends HR-3 model of Internal Labor Market (ILM), which includes minimizing the attrition of valuable employees who possess special knowledge, it will also bring down cost for training and recruitment. To implement HRA properly management has to provide required tools, support, resources and data. During their study Volini, Dussert, Bennett, Cowley, Clayton & Thomas (2016) suggests that organizations that use workforce predictive indicators of talent retention are competent enough to combat the challenges of regrettable attrition through increased investments in training, engagement events, or employee benefits. Analytics help to understanding why skilled people quit, what helps in retaining and how to motivate top performers. Through appropriate use of workforce analytics an organization will be in better position to invest its time and resources. Wirges et al. (2023) in this age of analytics, ML, AI and algorithm human resource department have shifted their reliance on workforce analytics. Recently, Google's HR data analytics team has designed a technique to improve company's recruiting and selection process. This method involves what are the chances that candidate will be right fit for the position he\she is hired. Wirges & Never (2023), in their study recommended razor-edge HR technology to harness workforce data and then evaluate it.

2.2.6 Organizational Performance

Performance measurement is not a new concept. It is increasingly viewed as vital for the managers of not-for-profit organizations (Schuster, 1997; Berman & West, 1998). The concept of organizational performance is under continuous evolution. During '50s, fulfilment of social objectives was considered as organizational performance (Georgopoulos & Tannenbaum, 1957: p. 535). During this span, performance evaluation was dependent on people, work and organization's structure. Later in the 60s and 70s, optimum utilisation of limited resources by exploiting the environment became the indicator of performance evaluation (Yuchtman & Seashore, 1967: p. 379). The new approach of effectiveness (goal accomplishment) and efficiency (minimum use of resources) gained popularity in 80s and 90s (Lusthaus & Adrien, 1998 after Campbell, 1970). Gradually, profitability and ROI became the prominent indicators of performance. Consequently, the focus of OP kept on changing from financial indicators; to non-financial indicators and finally sustainable development. Firm's performance is commonly measured in terms of effectiveness (how an organization can achieve its goals timely), efficiency (how much optimally resources are used by firm), customers satisfaction, innovation, products or services quality and capability to retain unique human pool (Guest, 2001).

Barnard (1938) viewed timely accomplishment of organizational purposes as organization's effectiveness, at the same time he considered efficiency as the degree to which individual motives are satisfied. Barnard is of opinion that organisations effectiveness and efficiency is also primarily dependent on its survival. Venkatraman & Ramanujam (1986) proposed that there are three dimensions of organizational effectiveness: (1) financial performance, (2) operational performance, and (3) the influence of stakeholders. Venkatraman and Ramanujam's financial domain deals with the overall financial performance of the company, and this domain generally covers strategy and entrepreneurship research. It may be further narrowed down into sub-dimensions such as growth, profitability, efficiency, survival, financial structure, cash flow, and resource accumulation. Organization's performance on non-financial issues falls under the ambit of operational dimension. It may be decomposed into sub

dimensions, such as network, market size, organization infrastructure, product quality, process innovation, satisfaction of employees and customer.

In common parlance, organizational performance can be understood in this form that to start any business entity various productive assets, including men, physical, and capital resources are committed and to ensure its sustainability and future growth organisations performance need to be evaluated (Barney, 2001). Haque (2021) in his study conducted on 200 employees in Bangladesh has examined HRM practices and organizational performance are strongly correlated. In a study conducted on the 424 employees of Mineral and Refinery complex in Odisha by (Pattnaik and Sahoo, 2020) relationship between HR practices and organizational performance was identified. Waheed et al. (2019) in their study on IT sector 632 employees explored that adoption of innovative HRM practices improves the organizational performance.

Profitability, efficiency and turnover are key indicators of organizational success proven by (Mousa & Othman, 2020) to measure financial performance. Singh et al (2020), has discovered that in this intense competition customer satisfaction is an emerging indicator of organizational performance. Owners who invest in the assets will park funds till the time they are getting handsome returns, in comparison to its alternative use. Consequently, value creation is determining factor of performance. Till the time investment is yielding returns equal to or more than the expectations, organisation will continue to exist else it will exist. Therefore, value creation and survival are indicators of performance.

In order to measure school's performance, following variables were selected from the Carton Organisational Performance. Employee growth is used as a measure of organisational performance. It refers to addition made to the number of persons hired by any entity within two time periods. This metric is very often applied while making summary of empirical articles. After sales increase, employee growth is popular indicator of performance in service industry. The employees' growth, is an indicator of numerous performances. For an instance, at first place, companies appoint employees in anticipation of sales growth. Secondly, rise in size of manpower in a firm is an indication that organization is adding necessary resources for growth. (Baum, Calabrese, &

Silverman, 2000) were of opinion that growth in research and development employment, acts as a measure of performance.

According to Hosmer (2001), to attain competitive advantage and for enhancing organizational performance, human resources act as a biggest deterrent, because it is characterized by numerous restraint, attracting, training and retaining employees are critical issues. Author Reichheld (1993) has also emphasised on this indicator of organisational performance. As per their theory small reduction in employee turnover rate may lead to 50% rise in profitability. Drucker (1954) considers if a firm can attract additional capital, it is a measure of organisational performance. He states that even growth in total assets of the firm is also an indicator of organizational effectiveness.

Innovation and development: There are infinite studies which lay their emphasis on the impact of the innovative capacity on performance of a firm. The innovative capacity of an organization accelerates its viability. Deshpande et al. (1997) conducted a study which highlighted the significance of this variable and its impact on organisational performance. This study included several companies from five countries: Japan, United States, France, Germany and England. As per this study, performance of the firms differs on the basis of the innovative practices followed by them. Also, Kotler (2003) based his study on the case study of SONY and established the relationship between innovation and performance. He noticed SONY has significantly increased its market share and became global leader due to innovation in its range of products. Quality of the product and services is a key aspect enhance the brand value of the firm, thereby meeting the expectations of the stakeholder, (Saner & Eijkman, 2005). HR managers should focus on the quality aspect to achieve operational performance which will subsequently lead to financial performance of the firm. Authors have often studied the relationship between Leadership-Governance and organizational performance. Most popularly cited study belongs to Gompers, Ishi & Metrick (2003). In 90's authors have taken a sample of 1500 US firms to frame an index for measuring corporate governance. This study has established positive relationship between organization performance and corporate governance. In their study Brown & Caylor (2009) have derived similar results. In their research on German firms, authors have discovered positive impact and strong association between corporate governance and performance. Bauer et al. (2008), in

Japan, identified that performance of firms having superior governance is 15% more than companies with poor governance. Leadership variable is generally traced in organizational diagnostic models (Weisbord, 1976; Waterman et al., 1980). Profitability and share price of the organisation is substantially impacted by leadership.

In their study DE & Dey Authors have identified key challenges faced by the HR are Talent acquisition and resource management, workforce administration and performance & learning. They advocated that use of predictive analytics can add value in workers profiling & segmentation, minimises attrition & enhances loyalty, appropriate recruitment, employee sentiment analysis and employee fraud risk management. In a paper of explorative in nature which examined that supply side of HR Analytics is dominant as compare to demand side. Consulting, technology firms and social media played a vital role in diffusion of technology. They have also noticed that the attitude of the management needs to be futuristic with regard to Workforce Analytics. Authors are of the opinion that currently performance enhancing concepts of HRA are very high. Fred, M.O (2017) HR Managers are looking ahead of the descriptive analytics to modern tools of analytics like predictive and prescriptive for taking crucial decisions of recruitment & selection, training & development, performance appraisal and retention. In order to find solution to: Is our recruitment processes creating adequate leaders? Do organization have the right skill sets to achieve targets? What type of talent is required in future? Which teachers are bringing value to school? If schools are serious to maximize the return on investments, then workforce Analytics is the only one stop solution (Schuler et al., 2011; Scullion et al., 2010). Huselid (2018), stated that workforce analytics chiefly targets to identify, predict and manage behavior, efficiency and effectiveness of manpower. Daash (2020) has examined the role of Analytics in post pandemic period is going to increase manifold. Due to adverse effect of CORONA industrial growth is slow down, resulting in talent war, retention hence organizations will rely on Workforce analytics to take decisions to manage their ROI.

2.3 Identified Gap

Researchers across the globe have done an extensive study about Human Resource Development and practices. Various scholars have studied about organisational performance. There is no dearth of studies on the relationship or impact of HR practices on the organisational performance. But most of the studies are based on one or two HR Practices. The prevalent studies fail to cover existing practices and challenges faced by educational institutes with respect to recruitment, selection, training, development, performance appraisal and retention. Most of the studies either discuss about challenges or practices that do not cover all the variables under discussion in this research.

There is a lot of literature available on HR or workforce Analytics. After exploring existing literature intensively, a need is felt for a study to establish a relationship between HR functions of K12 schools and Analytics. Perhaps, there is a huge gap of literature about HR Practices and organisational performance with context to K12 schools. Furthermore, application of analytical tools in education is a relatively new area of practice and research. The education sector is booming and there will be an enormous requirement of a competent workforce in this sector which needs to be effectively managed. To bridge the gap of available literature, this research is beneficial. There is a dearth of studies that determine the impact of analytics on all the major HR practices of K12 schools to boost their performance. This is a comprehensive study of its own kind which takes into consideration four major HR practices and addresses the challenges faced by education leaders of K12 schools while managing their workforce to enhance their organisation's performance by applying analytical tools. There is a paucity of literature which provides metrics for HR practices carried on in K12 schools.

This study brings a one-stop solution to existing challenges faced by school administration, providing them a tool to take informed decisions in a rational and scientific manner.

2.4 Objectives

The core purpose of workforce analytics is to direct the business house how to use its human capital efficiently to stimulate high performance. In the light of above literature review and gaps observed, need was felt to conduct comprehensive research with following objectives:

- 1. To study the existing HR Practices and identify the Challenges of K-12 Schools in Punjab.**
- 2. To measure the impact of Workforce Analytics to enhance Organizational Performance through HR practices of K-12 Schools.**
- 3. To assess the relationship of Workforce Analytics with HR Practices of K-12 Schools in Punjab.**
- 4. To develop a model applying Workforce Analytics for HR challenges in K-12 Schools of Punjab to enhance organizational performance.**

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

Creswell and Creswell (2017), has proposed various research designs like quantitative, qualitative and mixed. Research design is also categorised as survey, exploratory, descriptive, review, correlational etc. This research work, is quantitative and exploratory. To achieve the set objectives of this study self-structured questionnaire is designed used and primary data collection from Principal and Educators of K12 Schools in Punjab.

In this chapter we have discussed about research design, population, sample size, sampling technique, questionnaire design, data collection, research instrument, experts vetting, pilot study, reliability and validity and statistical tools.

3.2 Research design:

In this study, in order to investigate probable solution to the research questions set in the questionnaire an effective research design is implemented. Since, the objective of the research is to create new insight so in this quantitative study descriptive cum exploratory research method is used. After going through various theories and literature review, finally quantitative research is the only best fit for this research study.

Myers (2009) defined that if the purpose is to develop new insight of the concept, then exploratory method is the best technique of research. Moreover, this is the most apt scheme when in-depth study is to be carried out for the topic for which less research has been conducted. Saunders and Lewis (2012) are of opinion that in order to have new insight on the issue only exploratory technique is best fit.

3.3 Population and Sample Size:

There are total 1020 K12 Schools CBSE affiliated in Punjab.

<http://www.icbse.com/schools/state/punjab>

Punjab is divided into 3 region that is strata Doaba, Majha & Malwa having 22 districts

in totality. (<http://www.punjabdata.com/Majha-Malwa-Doaba.aspx>). Our study contains 330 samples. 3 schools from each district are selected on basis of year of affiliation, 5 respondents from each school are part of survey this includes 4 teachers and 1 principal.

<https://targetstudy.com/school/.html>.

For this study Taro Yamane (1967) method was used to calculate the sample size.

$$\frac{N}{1 + N(e)^2}$$

Where N is population and e = 0.05

Table 3.1: Frequency table of respondents

	Frequency	Percent	Cumulative Percent
Valid			
Principal	66	20.0	20.0
Teacher	264	80.0	100.0
Total	330	100.0	

Table 3.1, shows the Frequency, Percent and Cumulative Percent values of 330 respondents who part of the sample. Results show that out of 330 participants 66 (22 districts X 3 schools in each district having 1 principal) were principals and remaining 264 were teachers. Hence, 20% of the sample were principals of the K12 schools and 80% constitutes the teachers.

3.4 Sampling technique:

Stratified Sampling technique is adopted to collect samples from population. Schools are selected on the basis of affiliation. In each K12 school there are 4 wings KG, Primary, Middle and Secondary. Oldest teacher from each wing is part of the sample.

Zikmund (2003) advocates this sampling technique when data to be collected by the researcher is purely as per his discretion. Stratified sampling is adequate to collect data under quantitative research as subject knows who they are and what they know (Siegle, D. 2002).

3.5 Data collection instrument and Questionnaire Design

Data is collected through self-structured questionnaire. Questionnaire of this study uses 5 point likert scale- Strongly disagree (Score 1), disagree, Neutral, Agree & Strongly agree (Score 5). Our questionnaire comprises of two sections: first section seeks information about the respondent's Personal background and the second section contains 57 statements. Through intensive Literature Review 6 variables were finalised. Basis these variables several statements were framed. After due deliberation with the experts and taking into consideration their opinions finally 58 statements were selected. Questionnaire is further split in six sections each section represents different variable namely recruitment & selection, training & development, performance appraisal & retention, organisational performance and workforce analytics. There are 13 statements for recruitment and selection, 8 statements to measure training and development, 7 statements for performance appraisal, 8 statements about retention, 10 statements measure the school performance and 11 statements for workforce analytics. The HRM Inventory used for this study is taken from Verburg (1998) which tests an array of HRM practices in domains such as recruitment and selection, performance appraisal and rewards and training and development.

3.6 Experts Vetting

To determine the efficacy of the questionnaire it was sent to the 20 industry and academia experts who specialise in HR. These are the experts in the field of human resource in corporate and academia. The first draft of questionnaire was shared with these selected experts carrying the option of Retain, Modify and Delete. Their recommendations were later on incorporated to prepare second draft and which was finally approved by them. After making necessary amendments later on third draft of

questionnaire was developed which was vetted by 19 Teachers and Principals PAN India of K12 schools who are not part of the sample.

3.7 Pilot Study

For any research to be authentic, instrument's reliability is vital in ascertaining the level of stability and internal consistency on an instrument. In order to ensure reliability of the instrument, face validity and pilot study were conducted. Once the instrument is ready feedback from industry experts is taken to ensure face validity of the instrument, then pilot test is conducted to determine the reliability of the instrument. Pilot test was conducted with 151 respondents with the same profile as desired in the survey and they were included in the sample

3.8 Reliability and Validity of Instrument

3.8.1 Reliability Instrument

In order to ensure the reliability of the self-constructed questionnaire reliability analysis is performed. Cronbach's Alpha is applied to check the reliability and validity of the statements.

Table 3.2: Case Processing Summary

		N	%
Cases	Valid	330	100.0
	Excluded ^a	0	.0
	Total	330	100.0

Listwise deletion based on all variables in the procedure.

Above table shows shows the information about number of respondents who participated in this study (N) 330 respondents have responded to all the 58 statements of the questionnaire, no one is excluded. Four different human resource practices chiefly recruitment and selection, training and development, performance appraisal and

retention are part of the study, organisational performance is considered as a dependent variable and finally workforce analytics is used as a moderating variable.

Table 3.3: Cronbach Alpha for Scale Recruitment and Selection

Cronbach's Alpha	N of Items
.649	13

As per the results of table 3.3, all the 13 statements for the Recruitment and Selection are included. The obtained Cronbach's Alpha value is 0.649. Pallant (2001) states Alpha Cronbach's value **above 0.6 is considered high reliability and acceptable index**

Table 3.4: Cronbach Alpha for Scale Training and Development

Cronbach's Alpha	N of Items
.784	8

Output of table 3.4 with regards to employee training and development shows Cronbach's alpha for 8 items = .784 which is greater than 0.6 hence all items are reliable. Cronbach Alpha value more than 0.60 have a good internal stability and consistency (Cresswell 2005, 2010; Pallant 2001; Sekaran 1992).

Table 3.5: Cronbach Alpha for Scale Performance Appraisal

Cronbach's Alpha	N of Items
.681	7

From table 3.5 it was observed that Cronbach's alpha for 7 items is 0.681 which is marginally greater than 0.6 this justify that all the statements pertaining to performance appraisal variable are reliable.

Nunnally and Bernstein (1994) Alpha Cronbach values in the range of 0.60 - 0.80 are considered moderate, but acceptable.

Table 3.6: Cronbach Alpha for Scale Retention

Cronbach's Alpha	N of Items
.760	8

The outcome of Cronbach's alpha for retention variable, for 8 items is =0.760 hence, this variable is highly reliable for this study.

Table 3.7: Cronbach Alpha for Scale Organisational Performance

Cronbach's Alpha	N of Items
.854	10

As per the table 3.7, 10 statements of dependent variable organizational performance also fulfil the norm as Cronbach's alpha with 0.854 which is > 0.8 , (Nunnally and Bernstein, 1994) it is excellent and highly reliable.

Table 3.8: Cronbach Alpha for Scale Workforce Analytics

Cronbach's Alpha	N of Items
.848	11

Finally, the moderating variable workforce analytics having 11 items also meet the idle ratio of Cronbach's alpha as the results show 0.848 it is > 0.6 on the table. Hence, all the eleven variables in the study are proved to be highly reliable (Cresswell 2005, 2010; Pallant 2001; Sekaran 1992).

3.8.2 Validity Instrument

There are chiefly three types of validity namely construct validity, content validity/face validity and criterion Validity.

- **Construct validity**

Construct validity helps to determine whether the measurement tool is actually measuring what we are interested to measure. For an instance questionnaire is a tool to collect the data.

- **Content/Face validity**

Face validity is also known as content validity. The face validity or content validity was conducted to seek expert's advice to ensure that every aspect of the research is covered. This is also known as validation or vetting of questionnaire by the academia or industry experts. Content validity is the degree to which a test measures all of the factors related to a construct. Its validity is measured by subject experts. To determine the construct validity questionnaire was vetted by 20 academia experts of HR. Their recommendations were incorporated. Later on, again the questionnaire was validated by 19 Teachers and Principals who are not part of the sample.

- **Criterion validity**

Evaluates how accurately a test measures the outcome it was designed to measure. It is an index of how well a test correlates with an established standard of comparison.

3.9 Statistical tools

Taking into consideration objectives of study and insights built over the exploratory research of literature the data has been analysed using several statistical tools like Thematic Analysis, descriptive tools, coefficient of correlation, Structural Equation Method.

To study the existing practices and challenges of HR functions Thematic Analysis is performed. In order to assess the relationship of workforce analytics and Human Resource practices of K12 schools in Punjab coefficient of correlation is used. In the

process to study impact of workforce analytics on organisational performance Structural Equation Model is applied. There are several studies which had applied same techniques of correlation and Structural Equation model to examine impact and relationship between organizational performance and HR practices (Arora and Pratibha, 2021).

3.10 Conclusion

Research methodology is a soul of the research process. This chapter uncovers validity, reliability, scope and rationale of study, data collection, sampling technique, statistical tools. Next chapter focuses on results and data analysis.

CHAPTER 4

RESULT AND DATA ANALYSIS

4.1 Introduction

Results and data analysis forms an integral part of any research work. In previous chapter research methodology was discussed. In this section relevant statistical tools are used to achieve the objectives of the study.

4.2 Statistical Tools

Research study is considered authentic when its results are derived by applying appropriate statistical tools. Results of research study are considered as generic. There are several statistical tools to yield the results. Its application varies as per the requirement of the research objectives and nature of data. In this study following statistical tools are used to derive results.

- Descriptive statistics was used to find out the mean and Standard. Deviation (SD) value for all the variables under consideration.
- Thematic Analysis is done to identify the existing HR Practices and challenges faced by K12 schools of Punjab.
- Pearson correlation is used to find relationship between workforce Analytics and HR Functions of K12 schools.
- Structural Equation Model is used to study the impact of HR functions through WFA on the organizational performance.
- Finally, Metrics for HR functions were developed to provide solution for the challenges faced by school administration.
- STAR Model is also developed highlighting all the HR Metrics.

4.3 DESCRIPTIVE STATISTICS:

Descriptive statistics is most popular and ancient tool used by researchers to define, show, and review the major features of a dataset used for a given study. Data is presented and summarized in the form tables, graphs and basic statistical techniques like central tendencies, dispersion and frequency distribution this helps to measure and understand data in a better way to derive conclusion.

Table 4.1 Demographic profile of Respondents

Characteristics	Category	Frequency	Percentage
Gender	Female	252	76.4
	Male	78	23.6
	Total	330	100
Profile	Principal	66	20
	Teacher	264	80
	Total	330	100
Experience	0-5	48	14.5
	5-10	54	16.4
	10-15	70	21.2
	Above 15	158	47.9
	Total	330	100
Location	Rural	68	20.6
	Urban	201	60.9
	Semi Urban	61	18.5
	Total	330	100

Results revealed by table 4.1 state that this study comprises of total 330 respondents. Female 252 participants (76.4%) dominate in education sector at school level, whereas males 78 participants (23.4%). Nation-wide in K12 schools' female staff is preferred due to affectionate and caring nature, they can better nurture the tiny toys, toddlers and adolescents. Of all the participants 66 were Principals (22%) and remaining 264 were teachers (80%). In this study total 66 schools are included. There is only single position of a principal in each school, hence rest of the participants are educators teaching at different levels of the school. As far as experience is concerned majority of the participants are senior teachers with an experience above 15 years (158, 47.9%), followed by between the range of 10-15 years of experience (70, 21.2%), those who were between 5-10 years were (54, 16.4%) and finally (48, 14.5%) were with the experience of 0-5 years. In this study senior most, teachers were given priority over the one with less experience as it is criterion for selecting the respondent. They being long

associated with an institution know the processes and policies better than new recruits. 201 respondents are from urban area (60.9 %), 68 participants are from rural area (20.6%) and only 61 are residents of semi urban area (18.5%). Mutiso and Kilika (2017), has applied descriptive statistics in their study on Public Schools in Kenya.

Table 4.2: Descriptive Results

Variable	Mean	Std. Deviation	No. of items	N
Recruitment & Selection	3.69	0.42	13	330
Training & Development	4.34	0.41	8	330
Performance Appraisal	3.96	0.46	7	330
Retention	3.78	0.52	8	330
Organisational Performance	4.17	0.48	10	330
Workforce Analytics	3.89	0.42	11	330

The 5-point likert scale is used for questionnaire to collect the data. Recruitment and selection is the first variable. Over all mean of all the statements of recruitment and selection shows (*Mean: 3.69, Std. Deviation: 0.42*) Descriptive analysis shows that External source of recruitment is preferred by the K12 school management (*Mean: 3.40, Std. Deviation: 0.895*); out of various channels of recruitment advertisement is most reliable with (*Mean: 4.04, Std. Deviation: 0.965*), this is followed by walk in direct entry (*Mean: 3.41, Std. Deviation: 1.174*). As far as modern modes of recruitment are concerned schools of Punjab are less dependent on them. Consultancy (*Mean: 2.81, Std. Deviation: 1.166*) and social media (*Mean: 2.80, Std. Deviation: 1.105*) are comparatively less used by the K12 schools, perhaps workforce is less active on these medias. As far as dependence over internal sources of recruitment is concerned school administration heavily rely on that too (*Mean: 3.52, Std. Deviation: .851*). Recruitment of teachers through the references of existing employees is very popular (*Mean: 3.15, Std. Deviation: 1.099*). This study shows that K12 schools of Punjab strongly agree that in their schools they have clear recruitment policy (*Mean: 4.43, Std. Deviation: 0.742*) and they immediately do the recruitment rather than delaying else it leads to an academic

loss of pupil (*Mean: 4.13, Std. Deviation: 0.793*). School authorities also shared that as far as selection is concerned most of the schools strongly agree with the similar process. Interview is preliminary stage where screening happens (*Mean: 4.52, Std. Deviation: 0.600*); later some schools conduct written test from the teachers (*Mean: 4.11, Std. Deviation: 0.924*), then demo is conducted to check several skills of the educator (*Mean: 4.37, Std. Deviation: 0.699*), at final stage some of the educational institutes recommend psychometric tests of candidates (*Mean: 3.23, Std. Deviation: 0.979*).

Teachers' training and development is second variable. The mean value of this variable is (*Mean: 4.34, Std. Deviation: 0.41*). The mean score about the existing HR practice of training and development of faculty shows (*Mean: 4.04, Std. Deviation: 0.965*) that training is a regular feature of the schools. Respondents agreed that in their school every teacher receives training (*Mean: 4.44, Std. Deviation: 0.683*), they also strongly agree that training program enhances the performance of the faculty (*Mean: 4.62, Std. Deviation: 0.588*); participants also agreed that the development programs keep them updated with latest trends in education domain (*Mean:4.66, Std. Deviation: 0.524*); educators strongly feel that training assist them in doing their job better (*Mean:4.61, Std. Deviation: 0.558*); respondents were of the view that on the job training is more suitable (*Mean:4.27, Std. Deviation: 0.621*), while teachers and authorities also recommend off the job training also (*Mean:3.13, Std. Deviation: 0.864*). Training is therefore an ongoing process which is indispensable.

Performance appraisal is third variable. The overall Mean and SD of this variable is (*Mean:3.96, Std. Deviation: 0.46*). Descriptive values of the existing practices of various schools of Punjab are as follow: Participants agreed that their institution has adequate performance policy at place (*Mean:4.12, Std. Deviation: 0.698*); they strongly agreed that their school has fair appraisal policy and no discrimination is done (*Mean:4.27, Std. Deviation: 0.728*); Appraisal is done on the basis of seniority (*Mean:2.96, Std. Deviation: 1.028*); educators agreed that management and principal jointly decide about the appraisal (*Mean:4.22, Std. Deviation: 0.670*); as per the existing practices appraisal is done on the basis of overall performance of the teacher (*Mean:4.27, Std. Deviation: 0.681*) and our management also takes into consideration the feedback from other stake holders too while deciding appraisal (*Mean:4.01, Std. Deviation: 0.832*).

Retention is fourth variable. The overall mean and standard deviation of this variable is (*Mean: 3.78, Std. Deviation: 0.052*), retention of competent faculty is important function of management (*Mean: 4.00, Std. Deviation: 0.725*); teachers agree that monetary rewards are provided by our institute (*Mean: 3.45, Std. Deviation: 1.010*); Nonmonetary rewards are also popular in schools of Punjab (*Mean: 3.19, Std. Deviation: 0.864*); in order to retain competent teachers work life balance is to be maintained (*Mean:3.99, Std. Deviation: 0.764*); teachers agree that conducive work environment is necessary for retention (*Mean: 4.10, Std. Deviation: 0.722*); retention reduces training cost (*Mean:3.69, Std. Deviation: 0.943*); school authorities also agree that reduction in attrition leads to reduction in recruitment cost (*Mean:3.73, Std. Deviation 0.873*); retention of competent teacher helps in attracting more admissions (*Mean:4.12, Std. Deviation: 0.794*).

Organisatioal performance is another variable in the study with mean and *Std. Deviation* values (*Mean: 4.17, Std. Deviation: 0.48*); Quality service to the parents and teachers enhances school's performance (*Mean: 4.55, Std. Deviation: 0.539*); management is able to satisfy every stakeholder then institute's performance improves (*Mean: 4.22, Std. Deviation: 0.664*); management must evolve and adapt quickly to enhance performance (*Mean: 4.26, Std. Deviation: 0.661*); innovating new process leads to organizational performance (*Mean: 4.38, Std. Deviation: 0.607*); innovative practices to enhance students satisfaction (*Mean:4.41, Std. Deviation: 0.562*); assets of the school has increased over the years (*Mean:4.13, Std. Deviation: 0.759*); continuous rise in the number of teachers (*Mean:3.74, Std. Deviation: 0.892*); strength of students is continuously rising (*Mean:3.80, Std. Deviation: 0.895*).

Last and final variable of the study is workforce analytics. Its descriptive results of mean and *Std. Deviation* are ; (*Mean:3.89, Std. Deviation: 0.42*); respondents agree that Analytics is a new and emerging field for them (*Mean:3.42, Std. Deviation: 0.900*); participants agreed that analytics is applied to HR functions in their school (*Mean:3.57, Std. Deviation: 0.691*); respondents agreed analytics improves recruitment process (*Mean:3.87, Std. Deviation: 0.561*); analytics helps in identifying recruitment source (*Mean:3.88, Std. Deviation: 0.598*); using analytics best candidate can be selected

(Mean:3.98, Std. Deviation: 0.619); analytics helps in retention of skilled teachers (Mean:3.93, Std. Deviation 0.639); usage of analytics minimizes the chances of biasness in appraisal (Mean:3.85, Std. Deviation: 0.686); analytics provides an insight which candidate to be retained (Mean: 4.02, Std. Deviation: 0.633); analytics helps to determine improvement in the performance after training programs (Mean: 4.05, Std. Deviation: 0.612); Decisions based on the analytics helps in improvement of school performance (Mean:4.18, Std. Deviation: 0.598).

4.4 THEMATIC ANALYSIS

In order to achieve first objective Thematic Analysis is performed.

4.4.1 Interview Process

Participants' interview took place telephonically due to pandemic situation on pre agreed day. Interviews were semi-structured. The objective of the interview was to identify the existing HR Practices and challenges faced by the K12 schools. During the interaction, the interviewer prompted respondents' certain relevant themes.

4.4.2 Participants

In qualitative research, purposive sampling is a popularly used technique. In order to effectively use scarce resources, information rich cases are selected (Patton, 2002). To this end, only Academia and industry experts in HR were involved at first level to understand their opinion. In second phase working Principals and teachers of K12 schools PAN India were selected to know more about the practices and challenges faced by them. Finally, 330 respondents of Punjab's K12 CBSE affiliated schools were approached through a questionnaire to get the insight about the same.

4.4.3 Data Analysis

First objective is achieved using thematic analysis (Braun and Clarke, 2006). The process of thematic analysis involves recording the transcription of interview and preparing codes. Initially, the scholar needs to go through the transcripts to discover potential themes. Then follows second level where researcher reviews the codes. In this

process diversity of initial codes was maintained. The research objective was discussed with participants who shared their insights. Moving on to the third stage, researcher shortlisted the quotes that were integrated with themes. In next phase, author reviewed themes before naming and explaining them. In the final phase, after the themes were finalized, by the researcher report writing began.

4.4.4 Themes

The analysis produced four themes namely Recruitment and Selection; Training and Development; Performance Appraisal and Retention.

Recruitment and Selection: Key Component

Every respondent was of the opinion that recruitment and selection is the prominent function of HR in schools. As qualified and experienced teachers almost all the participants stated that right person at right place on right time is essential for the success of any school. Precise opinion of interviewee for the question what are the existing HR practices and challenges you face with regard to Recruitment and Selection. To this question participants gave following replies:

R 01: *Respondent said, their institute “has adequate recruitment and selection policy at place. Further, selection of teacher is done as soon as the position arises through demo. As per him quality of hire is serious challenge their institution faces.”*

R 02: *Participant strongly agreed that, “out of various internal and external sources of recruitment, their school rely more on external sources. Out of various channels of recruitment they are more dependent on advertisement. As this helps them to build a data bank for future use too. Demo and written test are used for selection. With regard to challenges, he expressed his concern regarding cost per hire, which they cannot determine or track properly.”*

R 03: *“As per this respondent consultancy and social media as a channel of recruitment is yet to gain popularity in K12 schools of Punjab. They barely use it in their school for*

recruitment purpose as school is remotely located. The pain area is it is difficult to determine source per hire.”

R 04: *“Participant agreed that internal recruitment is most popular method of recruiting teachers in Punjab. Institutes depend more upon conventional methods of recruitment as compare to modern methods like linked in, consultancy etc. These are less popular in this part of the country. When asked about Analytics, she said this is new field for them, they are not much aware about its application. She further said, we find it difficult to measure acceptance ratio and best source of selection.”*

R 05: *“Participant expressed his concern about the metrics to determine time of recruitment, cost per hire, best source of recruitment. He said, our school is dependent on internal source like references or internal promotions.”*

R 23: *“Participant strongly agreed that most of the good teachers are recruited through advertisement. Selection is done through written test. Challenge they face is the time taken to close the position and no analytics to find out the cost per hire. If there is delay in recruitment of teachers then it leads to an academic loss and hence impacts organizational performance.”*

R 24: *“Participant agreed that in their school direct walk in by candidate and reference from existing employees are popular means of recruitment. He strongly agreed that demo is always taken after interview to finalize the candidate. During this process they find it difficult to determine the time to fill.”*

R 25: *“Respondent informed that in their school they are open for internal and external both the sources as per the need. He strongly agreed that presently, they conduct interview, followed by demo but they don’t conduct any psychometric test for the appointment of educators. According to him the problem area is to assess the time taken to close the position and to find out the yield rate.”*

R 26: *“Participant said in my school recruitment is done immediately the position is created, they prefer walk in and even agreed to depend upon advertisement at times. He*

also added that they are not averse to use modern recruitment tools like linked in, Facebook. Psychometric test and interview of candidate is done for selection purpose. As per this respondent cost per hire and quality of hiring is at chance so they see this as a challenge.

R 27: “Interviewee replied that in my school we have clear policy on recruitment, he agreed that internal source is reliable and also strongly agreed that we get good results from advertisement of positions vacant. Interview and demo are held for selection. At the same time, they also expressed that the challenge is to apply analytics for decision making as most of the decisions are not based on data. Even their school find it difficult to measure quality and time per hire.”

R 28: “Interviewee stated that they have outsourced the recruitment process as it saves time. They rely on consultants for hiring of new or additional teachers. Selection process is done by the principal and management through interview and written test. They see acceptance ratio and time to fill as a challenge.

R 59: “Respondent said that our policy on recruitment is clear as soon as the vacancy arises, we advertise or invite direct walk in for interview. In extreme situation we also involve consultancy, but not very often. After interview is done, we conduct written test. He disagreed that they conduct psychometric test for selection of teachers. In this whole process cost to fill or time to fill is seen as a pain area for them.

R 60: “Participant strongly agreed that recruitment and selection process is at place in his school, they don't delay the appointment process of the teacher as it hampers the smooth learning process. They prefer internal promotions for the prominent position and fill vacancies for the lower position with the reference of existing teachers, in certain cases they also go for social media appointments. In order to select a candidate, they are in favor of psychometric tests and also demonstration by the candidate. Analytics is new field for them and area of concern other than quality and time to fill determination.”

Table: 4.3 Existing Practices and Challenges of Recruitment and Selection

S.No.	Key words from existing practices	Challenges
R01	Policy is framed, immediate recruitment is done. Demo for selection.	Quality of hire
R02	Dependence on External source of recruitment-Advertisement. Demo and written test for selection.	Cost of hiring
R03	Preferred traditional methods-, least priority to consultancy and social media.	Best source for hiring
R04	Analytic is new field, internal source more dependence, traditional recruitment source is popular, less preference to linked in, consultancy etc.	Acceptance rate and best source of recruitment
R05	Internal promotions, internal recruitment is preferred. Interview and demo for selection	Metrics time per hire, cost per hire and best source.
R23	Advertisement is the preferred. Written test for selection	Delay in hiring, cost per hire
R24	Direct walk in, reference from existing employee are used for recruitment, Interview is held for selection.	Time to fill
R25	Internal and external both sources for recruitment are used, demo and interview for selection.	Yield rate and time to close the position.
R26	Recruitment immediate, walk in and advertisement more dependence, open for modern recruitment channels too, psychometric test and interview for selection.	Cost per hire and quality of hire

R27	Clear policy on recruitment, internal source, advertisement channel, interview and demo for selection.	Application of Analytics, quality and time per hire.
R28	Recruitment process outsourced to consultancy, interview and written test for selection, Management and Principal take care of this function.	Acceptance ratio, time to fill
R59	Clear policy, immediate recruitment, advertisement and walk in source, interview and written test for selection.	Cost to fill, time to fill
R60	Recruitment and selection process at place, immediate fill, internal promotion, reference, social media for recruitment; psychometric test and demo for selection.	Analytics new area, time to fill and quality of hire.

Training and Development: Skilling and Useful

In this pretext, all the participants shared their perspective over the benefits that accrue to the educators due to constant training and development program. Author seeks opinion of interviewees about existing HR practices and challenges they come across while planning training and development program for their faculty. To this question participants gave following replies:

R 06: *“I am pretty convinced that training should be regularly provided to the staff members as it enhances their efficiency and keep them updated. I find it difficult to determine the training cost per employee, respondent remarked.”*

R 07: *“To me need based faculty development program keep teachers updated with latest educational trends and boost their confidence which will ultimately improve the results thereby increasing schools’ performance. As per participant, how to measure internal training hour is painful”*

R 08: *“According to me regular training keep faculty abreast with latest knowhow this minimizes the chances of errors and enhance their productivity. Enhanced competency improves the results. For my school, calculation of external training hours is a big challenge, we even find it difficult to assess the effects of training on teachers.”*

R 09: *“As per this respondent on the job training is better than off the job training, as faculty gets real time inputs and it boosts the confidence. For our school management, formal development expenditure is tedious task to calculate.”*

R 10: *“One of the major challenges which as a principal we find is how to measure the impact of training? What is the cost of training? Training is a regular feature, all the teachers are covered in rotation, on the job is preferred by us.”*

R 29: *“Respondent replied that training and development is a regular feature. We try to fulfil the training norms of CBSE. But it is difficult to decide who exactly needs training?”*

R 30: *“Participant said that I strongly agree with the statement that every teacher should be imparted training as this boost the confidence of the teacher. Resulting in improvement in the result of students. He considered determination of total training expenditure per employee is difficult task.”*

R 31: *“I firmly believe that regular on the job training for teachers keep them updated with new trends and enable them to perform their task in more efficient manner. She agreed that they are not able to use analytics in efficient manner and find it difficult to determine the percentage of training eligible employees trained.”*

R 32: *“On the job training is necessary, replied participant. Teachers get to know how to handle then class. Only challenge is to decide the percentage of training time via classroom, i.e how much training is needed physically.”*

R 33: *“Respondent was of the view that off the job training is more suitable as teachers teaching time is not affected. Moreover, off the job training saves productive school*

hours. I see training hours via technology as a challenge. Further, how far training has improved the performance of teachers is also an area of concern.”

R 34: “Participant strongly agreed that every teacher of school should receive timely trainings and these should be held after different intervals. As per the participant measuring training cost is a hurdle.”

R 35: “Respondent replied teacher training is essential and indispensable as world is changing at very fast pace so educators need to keep the pace. Only then they can impart the best education to their students. Development program will enhance their knowledge and students will get benefitted. It is really difficult to decide the internal and external training hours and cost.”

R 36: “Participant agreed that for the better performance of students, teachers should regularly upgrade themselves. Off the job training is recommended. After training teachers will be equipped to manage the classrooms in a better way. It is difficult to strike balance between physical training vs online training.”

R 37: “Off the job Training help institution to achieve its objectives as teachers perform their task in a better way, thereby making students feel satisfied, said participant. According to him, it is difficult to decide how much total budget is to be allocated for annual training and what should be the proportion of internal training vs external training. How to apply analytics?”

R 61: “Training is ongoing process, in today’s world information is changing at meteors pace. Hence it is vital that teachers are regularly trained to keep them abreast with the latest knowledge, replied interviewee. He stated that on the job training is preferred in their institution as per the needs of the employees. They see challenge in determining the cost of training and the metric for internal and external training hours.”

R 62: “Respondent stated that training enhances the performance of the employees, we prefer off the job training as this saves the training cost, and chances of error are minimized. Also, we ensure that once the teacher is recruited then every faculty member

receives necessary training as per the requirements of CBSE. I find a challenge to assess the training needs per employee, training via classroom or via technology.”

Table 4.4: Existing Practices and Challenges of Training and Development

S.No.	Existing Practices	Challenges
R06	Training should be regular, enhances performance and upgrades the faculty	Cost of training
R07	Continuous, improves performance, enhances knowledge, boost confidence.	To measure internal training hours
R08	Regular, faculty updated, better efficiency, good results, less errors, in house training programs.	External training hours, determine the impact of training.
R09	On the job is better than off the job.	Development expenditure of faculty
R10	Training is regular, on the job is preferred. All the teachers are covered.	Cost and impact of after training.
R29	Training is an ongoing, held after regular interval	Who is to be trained
R30	Regular to all the employees, special trainings boost confidence, better output.	Total training expenditure per employee
R31	On the job training, it enhances the performance of educators.	Percentage of training eligible employees.
R32	Regular, on the job is preferred, educators perform better.	Cost of training and how many trainings are needed physically
R33	Off the job training is suitable.	How many teaching hours are needed,

		bifurcation of online and physical trainings.
R34	Every teacher is provided training. Improved confidence.	Cost, after training impact.
R35	Training is essential, improves learning.	Internal and external training cost
R36	Off the job training for all the employees.	Physical and online trainings
R37	Off the job training, students' performance improves.	Application of analytics, Total budget of training.
R61	Ongoing process, on the job is recommended, better knowledge, more command.	Internal and external training hours, cost of training
R62	Off the job training, increases performance, saves training cost, every teacher is given training, reduces risk	Training needs per employee, training via classroom or on campus.

Performance Appraisal: Deeper understanding of people

Under this theme, participants were asked to share their experts' advice and experience about existing performance appraisal practices and issues they face while implementing it in their school. They revealed:

R11: *“Participant strongly agreed that normally schools have their own appraisal policy. Mostly appraisal at school level is done by the management and principal without any biasness. At times it becomes difficult to assess how much compensation is best for whom”*

R12: *“Respondent was of the view that in their school while doing appraisals seniority is kept in mind. Since they are not applying analytics hence it is difficult to determine the absenteeism rate.”*

R13: *“Participant stated that while doing appraisal whole year’s performance is taken into consideration. According to him, determination of Human Resource ROI is not an easy task.”*

R14: *“Participant was of the opinion that nowadays in their school 360⁰ performance appraisal is done. The challenge faced by them is how to determine the efficiency of teachers.”*

R15: *“Respondent states that position of a teacher is taken into consideration while appraisal is done. She said in their school it is a practice that teachers’ appraisal is done as per their seniority and profile they hold. The challenge identified is to determine effectiveness of teaching staff.”*

R16: *“According to me major challenge, I felt is how to measure the performance of the teachers. It is difficult to determine who is contributing how much, replied one of the respondents. Appraisal is free from prejudice but on basis of whole year performance.”*

R 38: *“Performance of teachers throughout the year is taken into consideration while doing appraisal of teachers, replied the participant. He further added that in schools’ efficiency and effectiveness is difficult to measure.”*

R 39: *“Performance appraisal in our school is done by the management and principal, I strongly agree with this. Respondent also agreed that in schools teachers stop contributing if their appraisal is not at par with their colleagues, this is a serious challenge we often face.”*

R 40: *“Participant quoted that in our school no biasness is done with the teachers while planning their appraisal. At the same time in education sector, it is complex task to measure the efficiency of teachers.”*

R 41: *“In our school peer, students and parents view is also taken into consideration while doing appraisal, said participant. He also shared that how much compensation is to be given to whom is a critical factor, hence human capital ROI is difficult to measure.”*

R 42: *“We have appropriate appraisal policy at place in our school, timely appraisal is given to ensure that the educators stay motivated, replied participant. She said, one of the major problems with the teaching staff is the habit of reporting late, hence there is dire need to have a metric to measure this issue.”*

R 43: *“In my school our management, gets fully involved in appraisal process, informed participant. The problem faced by us is that it is difficult to measure absenteeism rate.”*

R 44: *“Participant agreed that in our school appraisal is done on the basis of whole years performance of the faculty. Only challenge felt is that they have no system at place to determine ROI of human capital.”*

R 45: *“In my school, performance appraisal is done on the basis of seniority and no discrimination is done with any employee, informed respondent. He also admitted that measuring efficiency and effectiveness is hurdle for them.”*

R 46: *“We consider the role and position of teacher whether they are PRT, TGT or PGT while deciding their appraisal, said interviewee. With regard to the challenges faced by them he said, some teachers get demotivated and their performance plunge when their colleagues get better compensation than them, hence it is difficult to measure efficiency and effectiveness at school level.”*

R 63: *“I strongly agree that our management is fully involved in the appraisal process which takes into consideration every aspect like seniority, role of a teacher and overall performance, replied interviewee. As far as challenge is concerned, we are not able to assess the absenteeism rate, frequency of leaves availed and frequency of reporting late.”*

R 64: “Performance appraisal is done by management, principal and even very recently we have started involving parents and students also, replied respondent. In my school appraisal policy is very transparent free from bias. The problem faced by us is that absenteeism rate, frequency of leaves and reporting late is difficult to determine.”

Table 4.5: Existing Practices and Challenges of Performance Appraisal

S.No.	Existing Practices	Challenges
R11.	Management and Principal involved in appraisal, proper policy at place, no biasness.	How much compensation for whom
R12.	No biasness, as per seniority	Absenteeism rate
R13.	Whole year performance is taken	Determination of ROI
R14.	360-degree performance appraisal	How to determine efficiency
R15	Appraisal as per seniority, profile, roles.	How to determine effectiveness.
R16	Based on whole year performance, no prejudice	Who has contributed how much
R38	Performance throughout the year	Efficiency and effectiveness.
R39	Appraisal done by management and principal on basis of performance.	Determine effectiveness and efficiency

R40	Unbiased appraisal, authorities decide themselves	Measuring Efficiency
R41	Peer, parents and students view is taken into account.	How much increment and to whom, ROI determination.
R42	Policy at place, Appraisal for all timely	Absenteeism rate, Metrics for late reporting.
R43	Management is fully involved in the appraisal process	Absenteeism rate.
R44	Whole year performance is taken into consideration.	ROI
R45	Appraisal done on the basis of seniority, no discrimination	Effectiveness and efficiency.
R46	Appraisal on the basis of roles and responsibility, position.	Effectiveness and efficiency.
R63	Seniority, role, position of the faculty	Absenteeism rate, reporting late, frequency of leaves.
R64	Appraisal is done in a free and unbiased manner, 360-degree appraisal involving all the stakeholders.	Absenteeism rate, reporting late, frequency of leaves.

Retention: Holding back the Elite

In any educational institution teacher are most critical and precious resources. They cannot be replaced with any type of technology. Students' performance to great extent depends upon the quality of teachers. Hence, it is vital to minimize attrition and enhance retention. Interviewee were asked to share their point of view about the existing practices

and challenges of retaining high performing employees. To this question participants gave following replies:

R17: *“As per the participant retention of experienced teacher is an important function of school administration. Monetary rewards are offered to retain teachers by giving salary hike or incentive. The challenge faced by us is to contain the attrition rate.”*

R18: *“Respondent shared that to retain teachers most of the schools offer monetary and non-monetary rewards. Voluntary turnover rate is a threat posed to our school.”*

R19: *“One of the participants was of the opinion that work life balance and conducive environment helps in retention. As per him the voluntary attrition is a big issue.”*

R20: *“Another respondent was of the view that if experienced teachers are retained then the cost of training and recruitment can be saved which enhances organizations performance. She also expressed her concern with regard to how much remuneration should be given to new entrant against the resource which is leaving.”*

R21: *“Respondent strongly agreed, monetary benefits are lucrative option to retain a competent teacher. Due to nail biting competition and increase in the number of CBSE schools it is becoming difficult to retain talented teachers, said the respondent.”*

R22: *“Participant agreed that nonmonetary benefits are also attractive option to retain the senior teachers. One of the participants shared that finding what helps in retaining the teacher and who is to be retained is tedious task.”*

R 47: *“When asked about work life balance to attract and retain the efficient employees, Interviewee strongly agreed. He also added to it that teachers’ efficiency enhances when they are able to strike balance between work and life. He said that despite this teacher’s attrition is increasing due to demand and supply, hence it is a challenge now a days.”*

R 48: *“Respondent vehemently agreed that conducive work environment helps to retain the competent faculty. She replied that in our school we have very congenial and happy work culture. She added, we are at embryonic stage of analytics application.”*

R 49: *“Interviewee, was asked to share about the retention and training cost. She informed that we have experienced in our school, if we are able to retain our experienced teachers then we can always cut down our training cost. The challenge we face at present is how to integrate workforce analytics with HR functions.”*

R 50: *“I my school I have witnessed that with low attrition we have save massive recruitment cost, this improves schools’ performance, relied one of the principals. I am finding it difficult to determine metrics of retaining the employees.”*

R 51: *“My experience with my school is that if the experienced and efficient teachers are retained, definitely the student’s strength can be increased. As satisfied students will produce good results which will indirectly help to attract new admissions. At the same time, it is difficult to retain the experienced teachers as they become over opportunistic, this is a threat posed to us.”*

R 52: *“In our school we prefer monetary benefits like better package or enhanced perks to retain eminent teachers and it works, replied respondent. Yes, I agree that I am aware about analytics to help in strategic decision making but, we have still not implemented it.”*

R 53: *“As far as my experience is concerned, in my school we tried to retain the teachers with a blend of monetary and nonmonetary rewards, depending upon case to case. Trust me it helps, says one of the respondents. Though, we are yet struggling with to determine the metrics of attrition rate and turnover index.”*

R 54: *“Retention in our school has helped us cut down lot of training cost, says one of the interviewees. We are still struggling to measure the attrition rate and competency opportunity metric.”*

R 55: *“In last few years, my school is able to reduce the recruitment cost due to our effective retention policy. We provide conducive environment to our staff this helps to reduce attrition, said respondent. We are facing problem to identify how to integrate analytics with our HR functions.”*

R 56: *“Respondent agreed to the statement that with adequate work life balance, conducive work culture and nonmonetary benefits their school is able to retain many experienced teachers. Despite that voluntary turnover rate is difficult to determine.”*

R 57: *“One of the principals, when interviewed commented monetary benefits are preferred by the teachers over nonmonetary benefits like appreciation, more leaves etc to continue the job at same place. For us, it is difficult to anticipate who is planning to leave and when, further what will be the best means to retain him/her.”*

R 58: *“As per my experience I have found that if school is able to retain its senior and capable teachers then lot of saving can be done on account of recruitment cost which otherwise has to be spent in addition to loss of time and academic hours, said interviewee. In my school, we are facing problem of voluntary leaving and attrition rate determination due to new schools opening up and teachers have variety of options.”*

R 65: *“Respondents stated that retention of elite teachers is important function of the management. In our school we ensure that competent faculty are identified and retained, for this we ensure to build good work culture and work life balance. The primary challenge faced is, despite this voluntary attrition is not contained.”*

R 66: *“Interviewee said that retention is one of the major functions of HR, if competent teachers are retained then cost of recruitment and cost of training can be saved. This will indirectly improve the performance of the school. At the same time, they see a challenge that application of analytics is complicated task though it is gaining popularity.”*

Table 4.6: Existing Practices and Challenges of Retention

S.No	Existing Practices	Challenges
R17	Retention is very important function	Contain attrition rate
R18	Monetary and nonmonetary rewards both	Voluntary attrition
R19	Proper work life balance is maintained	Attrition is high
R20	Retention helps to save recruitment cost, nonmonetary benefits are offered.	Challenge is how much is to be paid to the new employees to replace the old employee.
R21	We prefer monetary benefits as for teachers nothing is more lucrative than this.	Retention of experienced teachers is a challenge.
R22	On regular basis nonmonetary benefits are offered to the team.	Deciding who is to be retained and what benefits to be passed to retain.
R47	Work life balance, regular appreciation for good work.	Voluntary attrition is a concern
R48	Work culture, happy and conducive work environment.	Minimize attrition and application of analytics to retention.
R49	Retention through both intrinsic and extrinsic rewards, retention leads to saving in the cost of training.	Integration of analytics to take informed decisions related to retention.
R50	Effective Retention policy leads to cut in recruitment cost, saves money for the school.	Metrics of retaining employees

R51	Experienced and trained staff is retained, students' performance improve, this increase enrolment in the school.	Retention strategies, application of analytics.
R52	Recommend monetary benefits like enhanced package, better perks	Application of analytics to take strategic decisions.
R53	Blend of monetary and nonmonetary benefits on case-to-case basis.	Metrics of attrition and turnover rate.
R54	Proper retention strategy has helped cut down the cost of recruitment.	Competency opportunity and attrition metrics
R55	Conducive work culture, appropriate retention policy helps minimize recruitment cost and enhances schools' financial performance.	Application of analytics
R56	Conducive work environment, nonmonetary benefits, work life balance helps in retention and reduces cost of appointment and selection.	Determination of voluntary attrition rate
R57	Adequate retention scheme, Nonmonetary benefits like appreciation, more leaves, club membership etc	Problem in assessing who, when, why is leaving and how to retain.
R58	With appropriate retention policy, experienced faculty can be retained and cost of recruitment is saved, knowledge loss and academic loss can be prevented.	Voluntary leaving and attrition rate.
R65	Retention scheme where competent resources are identified, nurtured and retained though monetary rewards, good work culture.	Voluntary attrition rate
R66	Sound retention policy helps to cut down recruitment and training cost.	Application of analytics to this function

4.4.3 Data Treatment and Discussion

Mutiso and Kilika (2017), in their study justified the fact that HRM includes gamut of duties and task that are needed to coordinate human resource functions to support operational activities. This includes procurement of manpower, human resource development, compensation management. The procurement aspect involves hiring the suitable candidate as per the requirement of school. This activity starts with identification of number of teachers required, followed by recruitment and selection process. Another HR function followed in schools is training and development of teachers. This helps to enhance the capabilities of employees and upgrading their skills. Then comes another function of performance appraisal of staff which is motivational factor to enhance their performance. This works as a double-edged sword, to encourage the educators and also to retain them.

The crux of the study is that for recruitment there should be strong policy, out of various sources available school need to identify which source works best for them. Further, while selecting teachers K12 schools follow various processes to ensure that right fit is placed for right position. Similar results are obtained by Ogbu, Ojo, and Remilekun (2017), in their study. They have proved that recruitment and selection plays linchpin role in the success of company and to gain competitive edge globally. They recommended that references of existing employees and external source for recruitment but on the basis of their performance and competency. Boxall, Purcell and Wright (2009), mentioned four challenges a management faces while planning recruitment and selection who to recruit, when to recruit, what source, where to place?

The major challenge faced by school administration while doing recruitment and selection is to find the best source, determine the cost of recruitment, time to fill, quality of hire and acceptance ratio. Bhatia (2014), in her study has expressed that attracting the right talent in this 21st century due to increasing workforce diversity is becoming a threat.

Needless to mention that training and development is an ongoing process. This study has also proved the fact that training improves the efficiency of the teachers keep them upgraded with latest trends in education resulting help them perform better, this save

wastage of time and resources, consequently schools performance will accelerate. Something similar to this is proved by DeNisis and Griffin, (2005) in their study about human resource management. They find that training and development is empowering and planned preparation of employees for the skills required to complete the job, this training can happen on the job or before taking up a job, but it should be continuous. Authors also pointed out that there is catch that who to be trained, for what to be trained and when to be trained. This study has found challenges in close proximity to the above study like identified in training and development are to determine training cost per candidate, who to be trained, formal development expenditure, total training expenditure annually.

Performance appraisal is a key function of HR. In K12 schools most of the times appraisal is done by the management in consultation with the principal. In some schools 360-degree feedback is taken for appraisal of faculty. Largely, appraisal is done fairly on the basis of performance and the type of work assigned to the teachers. Sahoo & Mishra, (2012) highlighted the fact in their study that PA should be done 360 degrees involving all the stakeholders in an unbiased manner and taking into consideration the roles performed by each employee. Key problems noticed by the educational leaders are to find absenteeism rate, human capital ROI, efficiency, effectiveness, frequency of reporting late and frequency of leaves.

In nutshell, this study highlights the fact that in this razor edge competitive scenario, educators have become opportunistic. They switch over their jobs for better perks, package, work culture, growth. Hence, to retain the competent staff members schools have to design effective retention strategy with the blend of monetary and nonmonetary rewards as per the need of the candidate. Almost same results were obtained by the **Goldberg & Proctor (2000)** of USA in one of the surveys about retention observed that respect at workplace, competitive salary, respectful environment and other financial incentives helps in retention. Cerasoli et al., (2014) states that extrinsic and intrinsic rewards help in motivating the teachers. Many a times educators like nonmonetary bonuses also. The grey areas noticed by the K12 school management with regards to

retention is to determine attrition rate, voluntary turnover rate, which teacher to be retained, what are the best means of recruitment.

4.5 STRUCTURAL EQUATION MODEL

4.5.1 Introduction

Structural equation model (SEM) consists of set of certain statistical tools that are used to measure and analyse the relationships of latent and observed. In this method other than endogenous and exogenous variables, mediating variables can also be introduced and studied. SEM is a comprehensive approach, its toolkit includes exploratory factor analysis, Confirmatory factor analysis, Path model & analysis and model fit. It is generally used when researcher wants to study relationship between independent variable, dependent variable and mediating factor. This test is a powerful tool to check the correlation and relationship among several factors. It examines linear causal relationships among variables, taking into consideration measurement errors too.

4.5.2 Exploratory Factor Analysis

Exploratory factor analysis (EFA) is a multivariate statistical technique. EFA is one of the methods of factor analysis which is used to identify the factors that truly represent the variables under study. This technique helps to identify few common factors and related manifest variables. EFA ensures that measured variables are associated with any factor.

Table 4.7: Exploratory Factor Analysis and Reliability

Items	Factors						Cronbach's Alpha
	RECR	TRAIN	APPR	RETEN	PERF	ANA	
RECR_2	0.741						0.542
RECR_4	0.761						
RECR_5	0.601						
TRAIN_4		0.860					0.847
TRAIN_5		0.865					
TRAIN_6		0.779					
APPR_4			0.783				0.687
APPR_5			0.821				
APPR_6			0.644				
RETEN_6				0.843			0.712
RETEN_7				0.838			
RETEN_8				0.660			
PERF_3					0.759		0.863
PERF_4					0.815		
PERF_5					0.771		
PERF_6					0.741		
PERF_7					0.745		
ANA_3						0.782	0.882
ANA_4						0.795	
ANA_5						0.784	
ANA_6						0.711	
ANA_7						0.777	
ANA_8						0.689	
ANA_9						0.629	
ANA_11						0.675	

Note. ANAL= Analytics, PERF= Organisational performance, RECR=Recruitment and Selection, TRAIN= Training and Development, APPR=Performance Appraisal, RETEN=Retention. Table 4.7, shows the results of exploratory factor analysis. After running the analysis Hair et al. (2013): *Multivariate Data Analysis*, 7th Edition

Table 4.8: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.883
Bartlett's Test of Sphericity	Approx. Chi-Square	3444.661
	Df	300
	Sig.	<0.001

Table 4.8 measures KMO sampling adequacy, which is an indicator that sample are adequate or not. Kaiser (1974) recommends that value above 0.5 is barely accepted, 0.7-0.8 is acceptable and 0.9 above is wonderful. Therefore, the data has good sampling adequacy.

KMO value of the above table is 0.883 which is acceptable. Fiedel (2005) says that sample size of 300 or above is remarkable, in this study the sample size is 330 which is superb. Bartlett's Test of Sphericity is used to determine the strength of relationship among variables. The significance value shown in the table is .001 which is far less than .05. Hence results are highly significant.

Total Variance Explained by all the factors were 62.6%, which is greater than 50%.

Table 4.9: Factor Correlation Matrix

Factors	ANA	PERF	TRAIN	RETEN	APPR	RECR
ANA	1.000					
PERF	0.444	1.000				
TRAIN	0.363	0.446	1.000			
RETEN	0.362	0.210	0.132	1.000		
APPR	0.390	0.480	0.386	0.196	1.000	
RECR	0.187	0.060	0.015	0.106	0.031	1.000

Output shown by table 4.9 highlights the analysis of correlation coefficient. Correlation matrix is depicted in a rectangular array. It shows correlation coefficients between a one variable with rest of the variables in study. In correlation coefficient it is necessary that value of 1 is always observed between a variable and itself, hence the principal diagonal of the correlation matrix contains 1s.

CFA Model

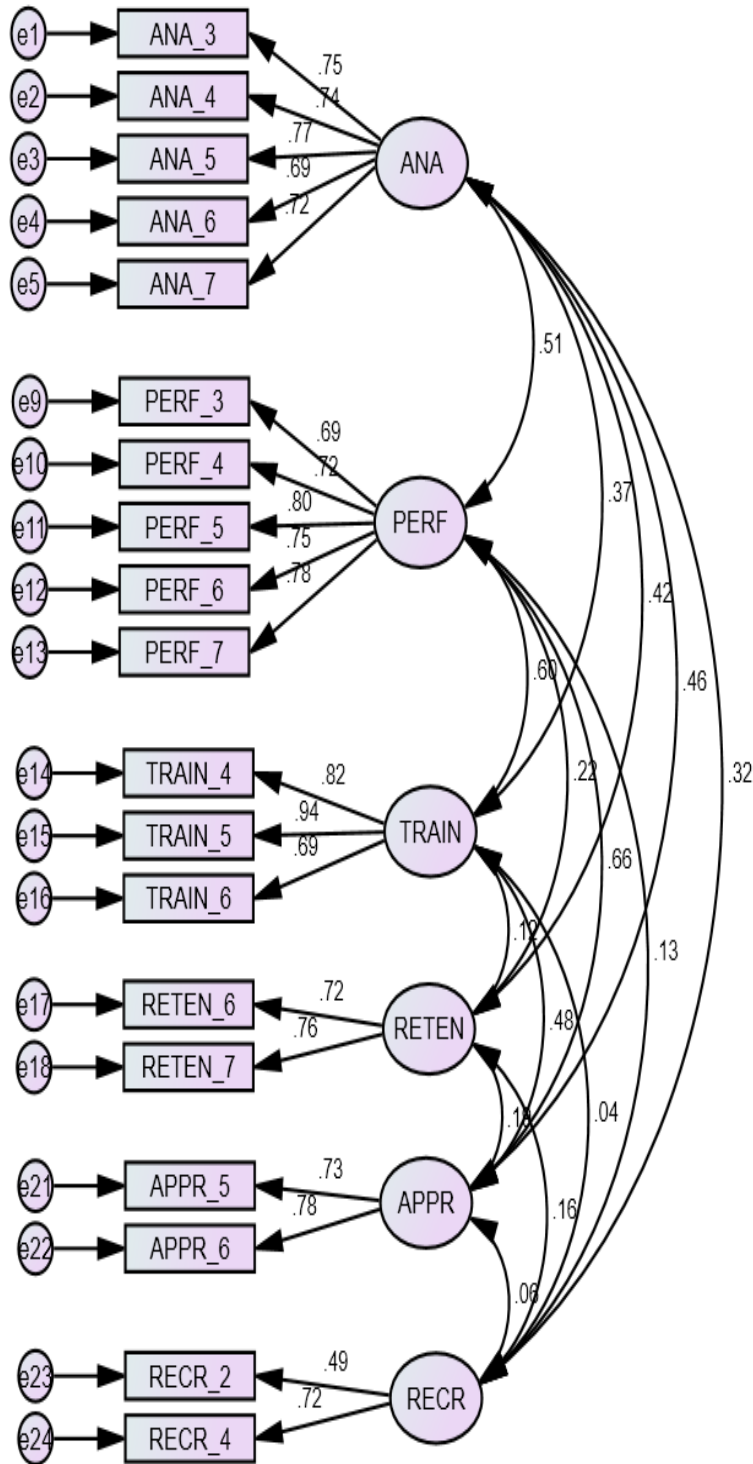


Figure 4.1: CFA Model

CFA allows the researcher to study that a relationship between the observed variables and their underlying latent factor(s)/construct(s) exists. In confirmatory model all the latent variables are treated as exogenous variables. Therefore, it establishes relationship between all these variables.

Table 4.10: CFA Model Fit Values

Model Fit Indices	Model Fit Values	Recommended Threshold
CMIN/DF	2.038	<5
SRMR	0.042	<0.08
GFI	0.918	>0.90
TLI	0.931	>0.90
CFI	0.945	>0.90
RMSEA	0.056	<0.08

Output of above table shows that all the values obtained for CFA model lies within the threshold limits hence the model is good fit.

Table 4.11: Convergent Validity

Factors	Items	Standardized Loadings	AVE	CR
ANA	ANA_3	0.753	0.540	0.854
	ANA_4	0.737		
	ANA_5	0.771		
	ANA_6	0.688		
	ANA_7	0.724		
PERF	PERF_3	0.691	0.562	0.865
	PERF_4	0.716		
	PERF_5	0.802		
	PERF_6	0.754		
	PERF_7	0.780		
TRAIN	TRAIN_4	0.818	0.673	0.859
	TRAIN_5	0.936		
	TRAIN_6	0.689		
RETEN	RETEN_6	0.724	0.552	0.711
	RETEN_7	0.761		
APPR	APPR_5	0.734	0.575	0.730
	APPR_6	0.782		
RECR	RECR_2	0.489	0.379	0.541
	RECR_4	0.721		

Standardised factor loading was greater than 0.60 and AVE was greater than 0.50 except RECR (0.379). CR values were greater than 0.70 except the RECR (0.541). Hence convergent validity established.

Convergent and discriminant validity was established through the EFA. After removing the low loaded and cross loaded items, the remaining items were loaded onto the same factors and all the item loadings were greater than 0.50, therefore, there was evidence of convergent validity. There was no cross-loading and the factor correlation were less than 0.70 hence the discriminant validity was established.

Table 4.12: Discriminant Validity

Factors	APPR	ANA	PERF	TRAIN	RETEN	RECR
APPR	0.758	-	-	-	-	-
ANA	0.457	0.735	-	-	-	-
PERF	0.659	0.508	0.750	-	-	-
TRAIN	0.480	0.366	0.600	0.821	-	-
RETEN	0.191	0.418	0.216	0.120	0.743	-
RECR	0.058	0.317	0.132	0.044	0.162	0.616

Heterotrait-Monotrait Ratio (HTMT) criteria is used to evaluate discriminant validity. As per Henseler et. al (2015) if HTMT values are greater than 0.85 or 0.90 then there is problem of discriminant validity. All the values derived in table 4.12 are less than threshold limit which indicated that there is no validity issue in this model. The correlation between factor was less than the square root of AVE of that factor. Therefore, discriminant validity is established.

Full SEM Model

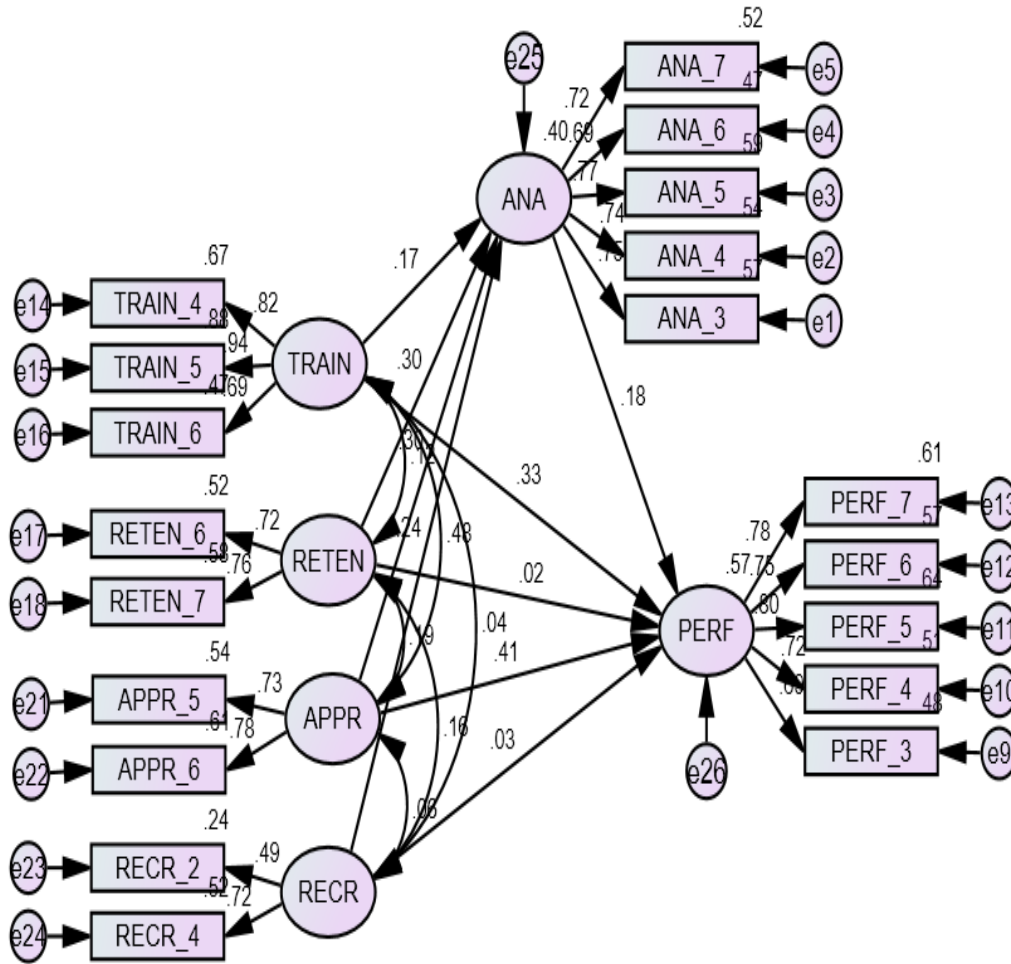


Figure: 4.2 Path diagram of Structural Equation Model

SEM is a part of Confirmatory research. It includes several latent variables, observed variables and error variables. It is desirable to have two observed variables for one latent variable. Normally, error variance is fixed at 1. SEM describes the association and relationship between the latent variables. This model includes description of error variation, which is not explained by this model. In path diagram single arrow shows there exist causal relationship between these variables.

Table 4.13: Full SEM Model Fit Values

Model Fit Indices	Model Fit Values	Recommended Threshold
CMIN/DF	2.038	<5
SRMR	0.042	<0.08
GFI	0.918	>0.90
TLI	0.931	>0.90
CFI	0.945	>0.90
RMSEA	0.056	<0.08

Note. DF-degree of freedom; SRMR--standardized root means square residual; GFI--goodness-of-fit index; TLI-- Tucker-Lewis index; CFI- comparative normed fit index; RMSEA-- root mean squared error of approximation;

Goodness-of-fit is an indication that SEM model is best fit or not and the data structure fits well or not. Therefore, in order to evaluate the SEM model, goodness-of-fit is the basic prerequisite. Malhotra & Dash (2017) Marketing Research, defines that chi square is most basic fit index for a model. In addition to it TLI, CFI, RMSEA, SRMR are also the indicators of goodness-of-fit of the model. Hong (2010), Goodness-of-fit becomes worse if the sample size is small and if the observed variables are many. Output shown in the table clearly depicts that this SEM model qualifies all the benchmarks to be a best fit. All the derived values are under the threshold limits. Chi square value obtained is less than 5, SRMR value is less than 0.08, GFI, TLI and CFI values are more than 0.90, RMSEA is less than 0.08.

Table 4.14: SEM Path Models

Path Models			Unstandardized Estimate	Standardized Estimate	Standard Error	R-square	t value	P value	Result
TRAIN	→	ANA	0.173	0.174	0.067	0.404	2.600	0.009	Sig.
RETEN	→	ANA	0.186	0.300	0.045	0.404	4.164	<0.001	Sig.
APPR	→	ANA	0.255	0.302	0.066	0.404	3.870	<0.001	Sig.
RECR	→	ANA	0.179	0.243	0.058	0.404	3.090	0.002	Sig.
TRAIN	→	PERF	0.358	0.332	0.068	0.570	5.296	<0.001	Sig.
RETEN	→	PERF	0.010	0.016	0.041	0.570	0.253	0.800	NS
APPR	→	PERF	0.377	0.411	0.072	0.570	5.228	<0.001	Sig.
RECR	→	PERF	0.026	0.033	0.052	0.570	0.511	0.610	NS
ANA	→	PERF	0.198	0.182	0.079	0.570	2.511	0.012	Sig.

Path model determines the values of standardised, unstandardized estimates, standard errors, R square, t value and p value. In furtherance, this model also explains the association between endogenous error variables. The values reflected in the table 4.14 shows that training positively influences analytics, since the p value is less than 0.05 (t=2.600, p=0.009). Output shown in the above indicates that retention positively influence analytics as p value is less than 0.05 (t= 4.164, p<0.001) quite significant relationship is established. Results displayed in the table highlights positive association between performance appraisal and analytics with p value less than 0.05 (t= 3.870, p<0.001), this is very significant. Recruitment is positively associated with analytics as results are significant. Values indicated in the above table supports the analysis as p value is less than 0.05 (t= 3.090, p=0.002).

It is quite evident from the results shown in table that training do influence the performance as the values are significant having p value less than 0.05 (t= 5.296, p<0.001), relationship is significant. This study shows that retention does not influence performance as output is insignificant (t=0.253, p=0.800). The relationship between performance appraisal and organisational performance is found to be positive (t=5.228, p<0.001). Results show there is insignificant relationship between recruitment and performance (t= 0.511, p= 0.610). Finally, it is proven that analytics definitely influences performance and is positively associated (t= 2.511, p= 0.012). R square measures the

proportion of variation explained by SEM. As per Cohen (1992) results that fall between .30-.50 medium to large. Results shown in the above table highlight that this model is fit. The R square value between the variables like recruitment, training, appraisal & retention with analytics is determined as 0.404 whereas R square value of Recruitment, training, appraisal and retention with regard to performance is 0.570.

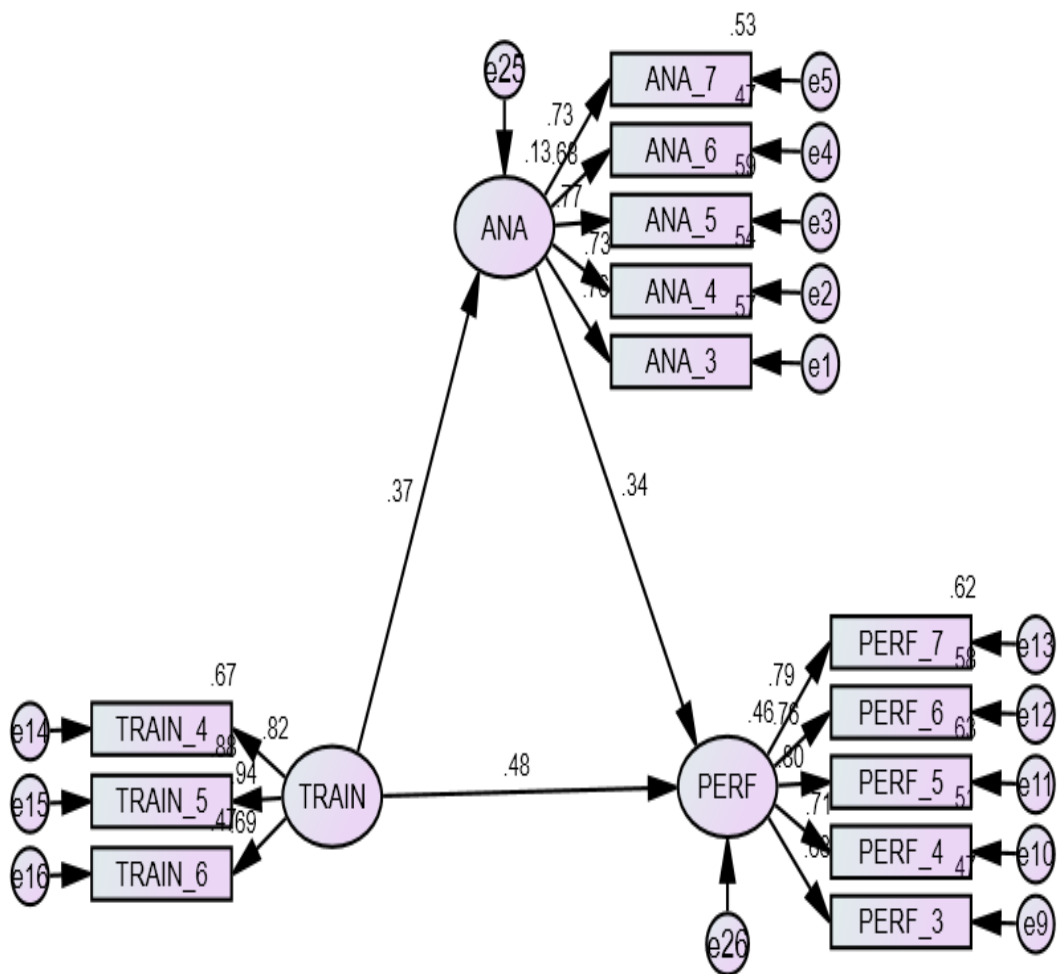


Figure 4.3: Mediation Model 1: Training > Analytics > Performance

Table 4.15: Mediation Model 1 Fit Values: Training > Analytics > Performance

Model Fit Indices	Model Fit Values	Recommended Threshold
CMIN/DF	2.922	<5
SRMR	0.046	<0.08
GFI	0.925	>0.90
TLI	0.928	>0.90
CFI	0.943	>0.90
RMSEA	0.077	<0.08

Note. DF-degree of freedom; SRMR--standardized root mean square residual; GFI--goodness-of-fit index; TLI-- Tucker-Lewis index; CFI- comparative normed fit index; RMSEA-- root mean squared error of approximation.

It qualifies the good fit model as all the calculated values are under the threshold values. For an instance DF 2.922 is <5, SRMR is obtained 0.046 which is less than 0.08, GFI is 0.925 which must be greater than 0.90, TLI value is obtained 0.928 higher than 0.90, output shows CFI 0.943 it must be higher than 0.90, value of RMSEA is 0.077 which is less than 0.08.

Table 4.16: Mediation Model 1: Significance values of Training > Analytics > Performance

Model 1	Estimate	R Square	Lower Bound (BootCI)	Upper Bound (BootCI)	P Value	Result
TRAIN→ANA→PERF	0.123	0.457	0.084	0.171	0.001	Sig.

Note. BootCI= bias-corrected (BC) bootstrap confidence intervals using 2000 bootstrap samples

Mediation analysis was performed using the bias-corrected (BC) bootstrap confidence intervals using 2000 bootstrap samples. Most of the studies are following bootstrap

method to study mediating effect. Analytics positively mediates the relationship between training and performance [BootCI = 0.084, 0.171; $p < 0.001$]. It shows significant relationship. Pattnaik and Sahoo (2020) in their study on 424 employees using SEM in Odhisha, obtained exact results which states that training practices definitely enhances organization's performance. R square value of this model is 0.457 which shows that this model is fit.

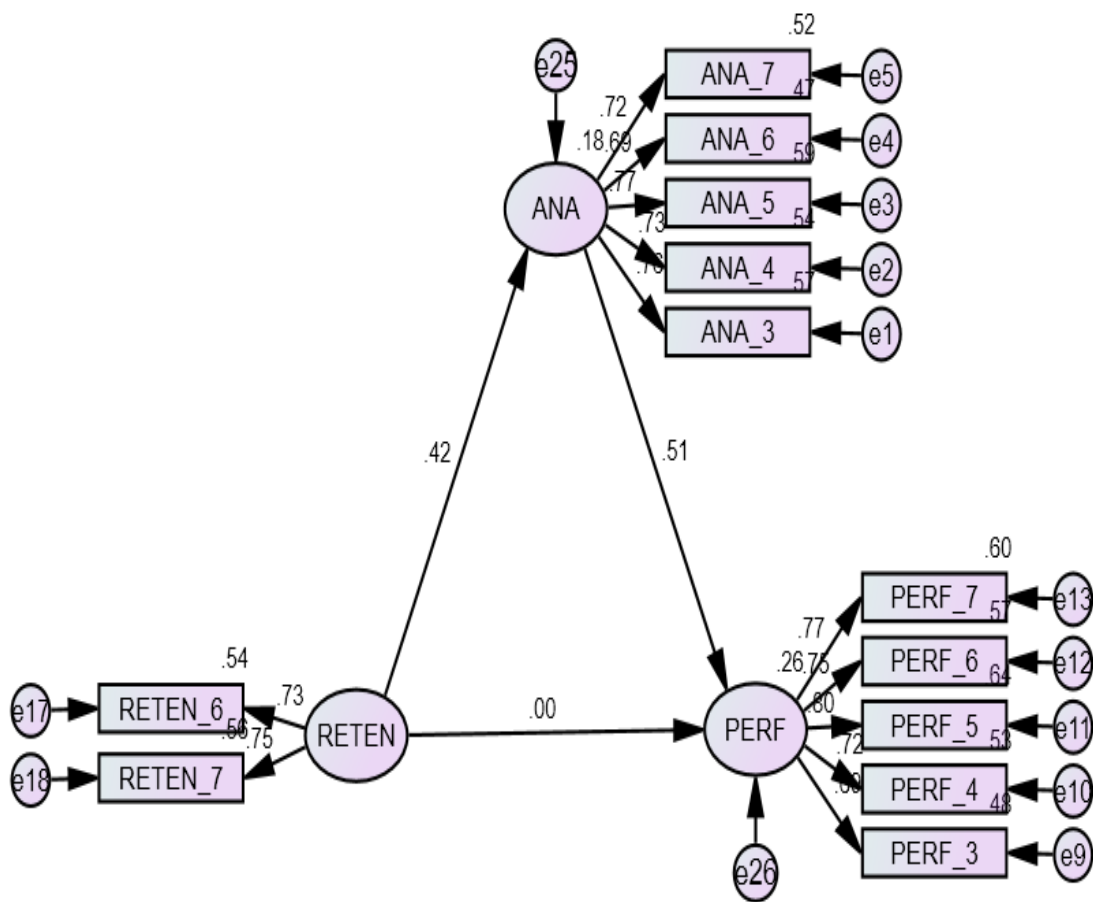


Figure 4.4: Mediation Model 2: Retention > Analytics > Performance

Table 4.17: *Mediation Model 2 Fit Values; Retention > Analytics > Performance*

Model Fit Indices	Model Fit Values	Recommended Threshold
CMIN/DF	3.222	<5
SRMR	0.044	<0.08
GFI	0.924	>0.90
TLI	0.912	>0.90
CFI	0.932	>0.90
RMSEA	0.083	<0.08

Note. DF-degree of freedom; SRMR--standardized root mean square residual; GFI--goodness-of-fit index; TLI-- Tucker-Lewis index; CFI- comparative normed fit index; RMSEA-- root mean squared error of approximation;

This table shows that this model is good fit since all the obtained values are fulfilling the threshold values. For an instance DF 3.222 is <5, SRMR is obtained 0.044 which is less than 0.08, GFI is 0.924 which must be greater than 0.90, TLI value is obtained 0.912 higher than 0.90, output shows CFI 0.932 it must be higher than 0.90, value of RMSEA is 0.083 which is less than 0.08.

Table 4.18: *Mediation Model 2: Significance values Retention > Analytics > Performance*

Model 2	Estimate	R Square	Lower Bound (BootCI)	Upper Bound (BootCI)	P Value	Result
RETEN→ANA→PERF	0.213	0.259	0.140	0.305	<0.001	Sig.

Note. BootCI= bias-corrected (BC) bootstrap confidence intervals using 2000 bootstrap samples.

Mediation analysis was performed using the bias-corrected (BC) bootstrap confidence intervals using 2000 bootstrap samples. Analytics positively mediates the relationship

between retention and performance [BootCI = 0.140, 0.305; $p < 0.001$]. R square value of model 2 is 0.259 which signifies that model is fit.

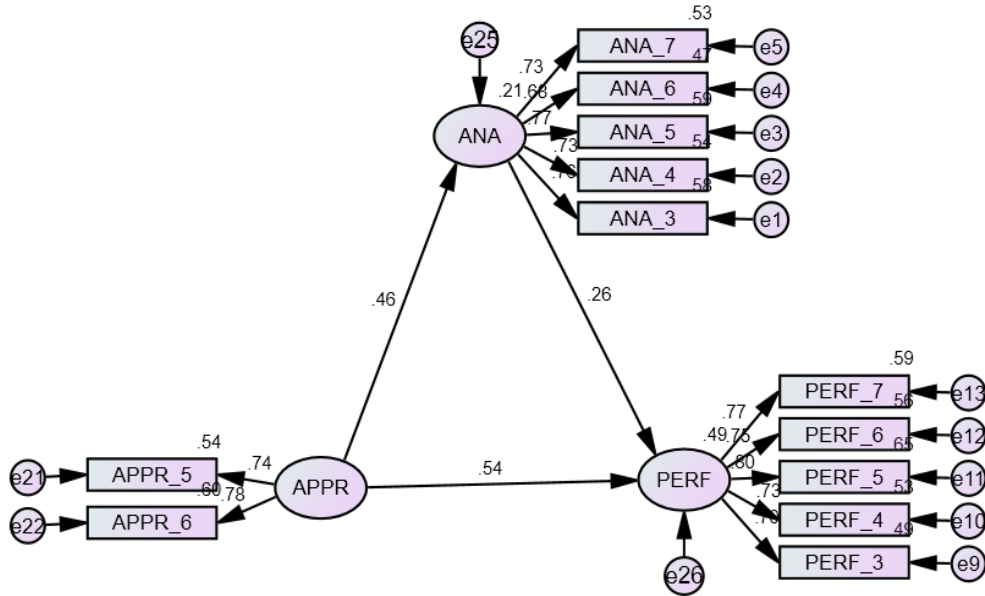


Figure 4.5: Mediation Model 3: Appraisal > Analytics > Performance

Table 4.19: Mediation Model 3 Fit Values: Appraisal > Analytics > Performance

Model Fit Indices	Model Fit Values	Recommended Threshold
CMIN/DF	2.765	<5
SRMR	0.038	<0.08
GFI	0.936	>0.90
TLI	0.933	>0.90
CFI	0.948	>0.90
RMSEA	0.074	<0.08

Note. DF-degree of freedom; SRMR--standardized root mean square residual; GFI--goodness-of-fit index; TLI-- Tucker-Lewis index; CFI- comparative normed fit index; RMSEA-- root mean squared error of approximation;

Output of the table 4.18 makes it evident that this model is a good fit. Results obtained fulfil all the thumb rules. For an instance DF 2.765 is <5, SRMR is obtained 0.038 which is less than 0.08, GFI is 0.936 which must be greater than 0.90, TLI value is obtained 0.933 higher than 0.90, output shows CFI 0.948 it must be higher than 0.90, value of RMSEA is 0.074 which is less than 0.08. Hence, appraisal decisions using analytics does impact the performance of school. Same results are derived by Pattnaik and Sahoo (2020) in their study using SEM. They found that performance appraisal and remuneration practices help in improving the organizational performance.

Table 4.20: *Mediation Model 3: Significance values Appraisal > Analytics > Performance*

Model 3	Estimate	R-square	Lower Bound (BootCI)	Upper Bound (BootCI)	P Value	Results
APPR→ANA→PERF	0.119	0.490	0.075	0.183	<0.001	Sig.

Note. BootCI= bias-corrected (BC) bootstrap confidence intervals using 2000

Bootstrap samples.

Mediation analysis was performed using the bias-corrected (BC) bootstrap confidence intervals using 2000 bootstrap samples. Analytics positively mediates the relationship between appraisal and performance [BootCI = 0.075, 0.183; p<0.001]. It shows significant relationship. Model 3 is also fit as signified by the R value which is 0.490.

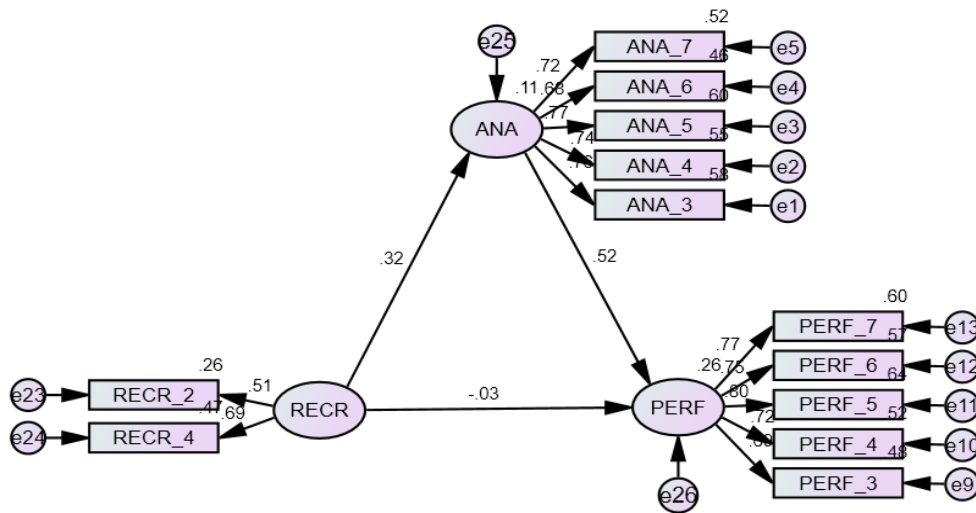


Figure 4.6: Mediation Model 4: Recruitment > Analytics > Performance

Table 4.21: Mediation Model 4 Fit Values: Recruitment > Analytics > Performance

Model Fit Indices	Model Fit Values	Recommended Threshold
CMIN/DF	2.821	<5
SRMR	0.039	<0.08
GFI	0.935	>0.90
TLI	0.922	>0.90
CFI	0.940	>0.90
RMSEA	0.075	<0.08

Note. DF-degree of freedom; SRMR--standardized root mean square residual; GFI--goodness-of-fit index; TLI-- Tucker-Lewis index; CFI- comparative normed fit index; RMSEA-- root mean squared error of approximation;

Output derived from the above table shows that this model is a good fit. Since results obtained are following the threshold values. For an instance DF 2.821 is <5, SRMR is obtained 0.046 which is less than 0.08, GFI is 0.935 which must be greater than 0.90, TLI value is obtained 0.922 higher than 0.90, output shows CFI 0.940 it must be higher than 0.90, value of RMSEA is 0.075 which is less than 0.08.

Table 4.22: Mediation Model 4: Significance values Recruitment > Analytics > Performance

Model 4	Estimate	R-square	Lower Bound (Boot CI)	Upper Bound (Boot CI)	P Value	Results
RECR→ANA→PERF	0.169	0.259	0.090	0.260	0.001	Sig.

Note. BootCI= bias-corrected (BC) bootstrap confidence intervals using 2000 bootstrap samples.

Mediation analysis was performed using the bias-corrected (BC) bootstrap confidence intervals using 2000 bootstrap samples. Analytics positively mediates the relationship between recruitment and performance [BootCI = 0.090, 0.260; $p < 0.001$]. It shows significant relationship. In Pakistan Rana and Malik (2017) conducted a study on 282 workers of Telecommunication sector, results indicate that hiring and selection practices, training and genuine appraisal system is positively related to organizational performance. R square value of model 4 is 0.259, this indicates that the model is fit.

4.5.3 Conclusion:

To conclude, exploratory factor analysis was conducted to explore the factor structure of the construct and CFA was conducted to confirm the factor structure. Reliability and validity of the construct and the model is determined through EFA and CFA. KMO sampling adequacy test proves that the sample size is adequate as it is above the benchmark. Highly significant results are derived from Bratlett's Test of Sphericity, this indicates that there exists strong relationship among variables. Direct and mediated relationships were performed using structural equation model. CFA model fit values confirm to all the threshold limits thereby making this model an ideal. Results of convergent validity shows that there is no cross and low loading among the factors and divergent validity is as per the per the norms highlighting the fact that all the constructs

are not correlated they measure different things. Overall results are impressive and significant. Evidences provided by the output shows there exist direct and mediating relationship between all the constructs. Full SEM model fit testifies that over model is amazing.

Results deduced from Full SEM PATH MODEL states that analytics significantly impacts all the HR functions. HR decisions of recruitment, selection, training, performance appraisal and retention must be driven by analytics using appropriate metrics. In addition to it, regular and need based training of teachers definitely stimulates the performance of the school. Further, fair performance appraisal also motivates the educators eventually institutions performance improves. This study proves that analytics as a mediating factor impacts HR functions which improves performance of the organization. Hence definitely, the decision making will improve if analytics is applied to HR functions of K12 schools.

4.6 COEFFICIENT OF CORRELATION

In order to study the relationship between two variables, correlation coefficient is applied. This tool helps to measure the strength of the relationship. It is symbolized with letter r . The value of r lies between -1 and 1. Statistical significance is indicated with p-value. Hence, correlation is depicted with two key numbers: r and p . The lesser is difference between r and zero, relationship is weak, on contrary to it farther the r from zero relationship is strong. Positive r signifies favourable relationship whereas negative r predicts negative relationship.

Correlation Analysis is a popular technique to investigate the relationship between two quantitative variables whereas Pearson's correlation coefficient (r) is popularly and commonly used to determine the strength, direction and association of the two variables.

Table 4.23: Correlation between recruitment and selection and workforce analytics

		Mean of Recruitment and Selection	Mean of WFA
Recruitment and Selection	Pearson Correlation	1	.473**
	Sig.(2-tailed)		.000
	N	330	330
WFA	Pearson Correlation	.473**	1
	Sig. (2-tailed)	.000	
	N	330	330

** . Correlation is significant at the 0.01 level (2-tailed).

Table 4.23 highlights the result of Pearson's Correlation Coefficient between variables. Results prove that though recruitment and selection have low positive correlation with workforce analytics but the relationship is significant ($r=0.473^{**}$, $p<.01$). This indicates that by applying analytical tools to recruitment and selection function schools can enhance their chances of identifying the best source, right fit, better method of selection of all the available sources.

Table 4.24: Correlation between training and development and workforce analytics

		Training and Development	WFA
Training and Development	Pearson Correlation	1	.456**
	Sig. (2-tailed)		.000
	N	330	330
WFA	Pearson Correlation	.456**	1
	Sig. (2-tailed)	.000	
	N	330	330

** . Correlation is significant at the 0.01 level (2-tailed).

Result obtained from the table 4.24 that training and development has weak positive correlation ($r=0.456^{**}$, $p<.01$) with workforce analytics. From the above table it is evident that results are significant, hence there exists correlation between the analytics

and training & development. Analytics will enhance the training experiences, optimize the training cost and measure training effectiveness.

Table 4.25: *Correlation between performance appraisal and workforce analytics*

		Performance	
		Appraisal	WFA
Performance	Pearson Correlation	1	.507**
	Sig. (2-tailed)		.000
	N	330	330
WFA	Pearson Correlation	.507**	1
	Sig. (2-tailed)	.000	
	N	330	330

** . Correlation is significant at the 0.01 level (2-tailed).

Outcome of the above analysis as depicted in table 4.25 proves that performance appraisal is moderate and positively associated with workforce analytics ($r=0.507^{**}$, $p<.01$). Output indicates that workforce analytics significantly impacts the performance appraisal. Analytics makes system more transparent, employees understand the performance indicators, reduces biasness and improves the precision of performance appraisal backed by data.

Table 4.26: *Correlation between retention and workforce analytics*

		Retention	WFA
Retention	Pearson Correlation	1	.529**
	Sig. (2-tailed)		.000
	N	330	330
WFA	Pearson Correlation	.529**	1
	Sig. (2-tailed)	.000	
	N	330	330

** . Correlation is significant at the 0.01 level (2-tailed).

Lastly output of table 4.26 shows that retention of competent and elite teachers and principal is moderately associated with workforce analytics ($r=0.529^{**}$, $p<.01$). Table values also show that relationship is significant, thereby, giving an insight that analytics will help in identifying who should be retained and what is their motivation source.

4.7 SELECTION TRAINING APPRAISAL RETENTION (STAR) MODEL

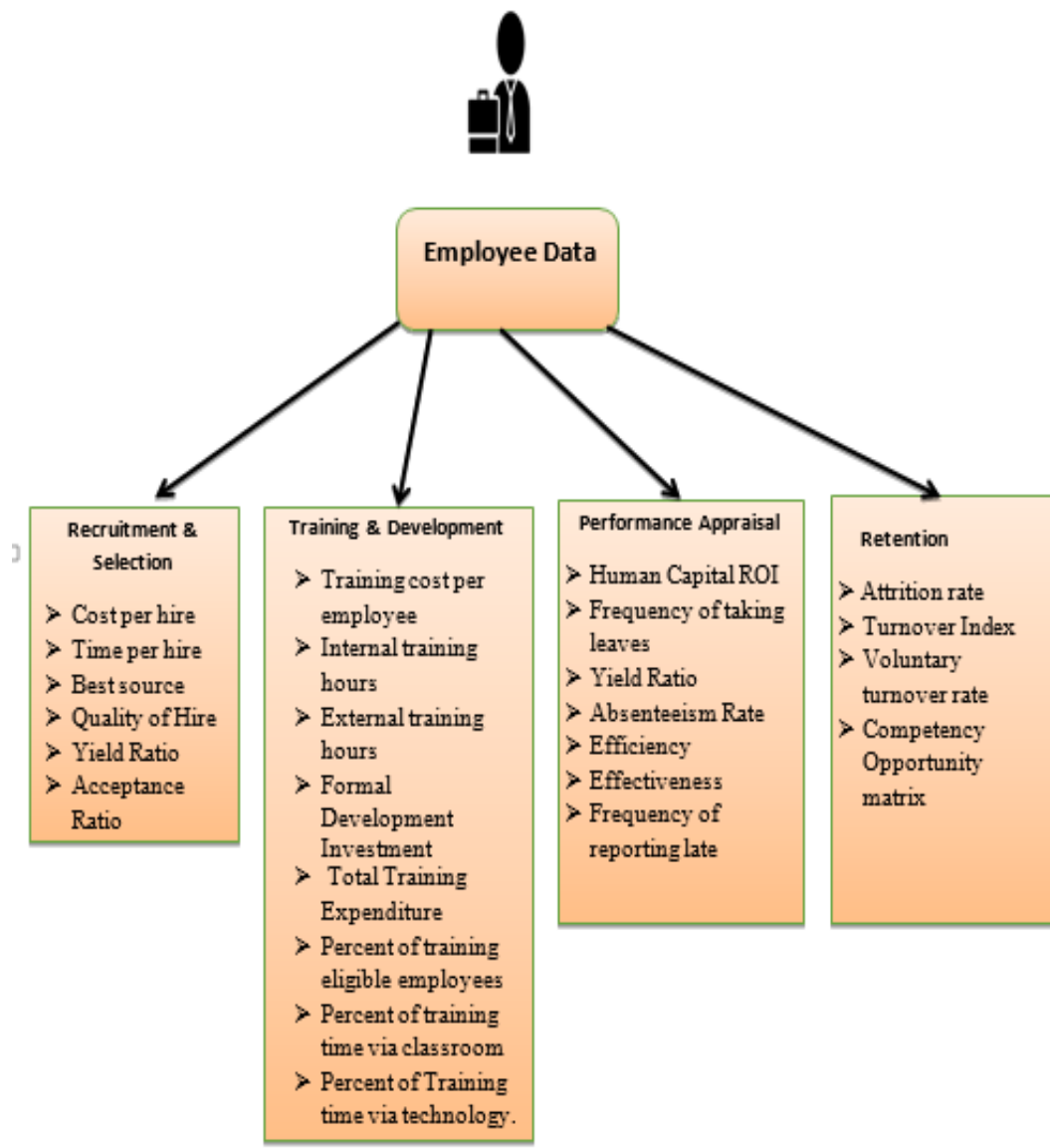


Figure 4.7 Highlights several HR metrics to improve the organizational performance.

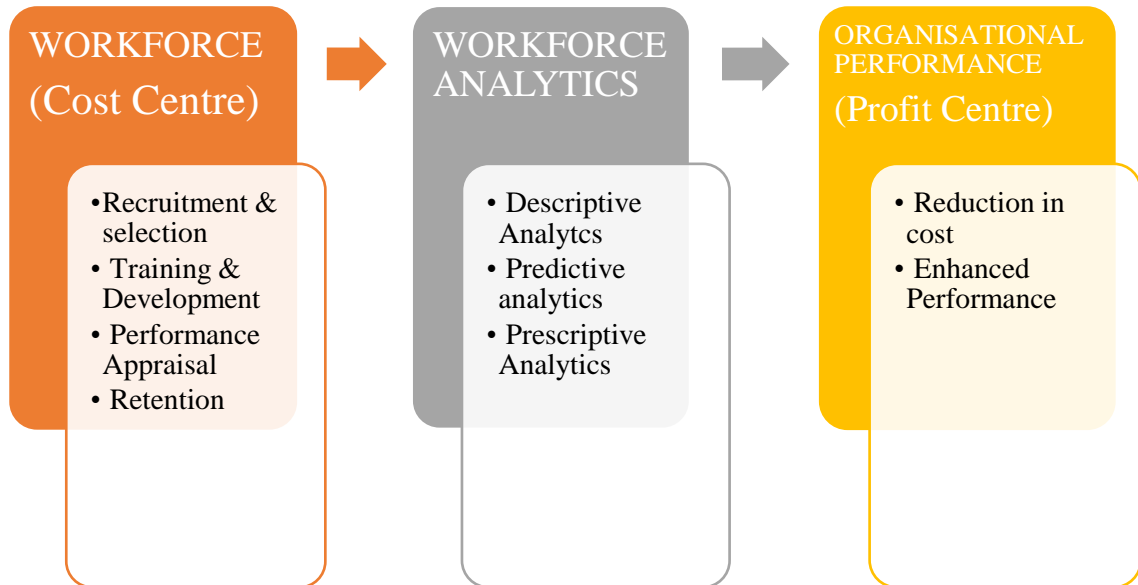


Figure 4.8: Conversion of Human Capital from Cost Center to Profit Center.

The above model 4.8 is proposed to transform HUMAN CAPITAL from cost center to profit center when workforce analytics act as a moderator.

4. METRICS OF VARIOUS HR FUNCTIONS OF K12 SCHOOLS

More than half of organizations expenses constitute human resource cost but rarely companies pay any attention to measure and manage it. HR metrics is a systematic and scientific approach to take fact-based decisions. HRM guru's such as Becker, Fitz-enz, Boudreau, Huselid, Cascio and Philips agree that HRM evaluation is gaining popularity. Further HRM metrics and workforce analytics can largely contribute to organizational success only through quantitative approach (Poloski, Vokic, 2011). Dr. Jac Fitz-enz pioneered and published his work on how to measure Human Resources Management (Fitz-enz & Davidson, 2002). Kaplan and Norton's (1996) refined the work done by Fitz and developed Balanced Score card. HR Metrics and Workforce Analytics collectively

help management to manage HR functions effectively and improve the processes and programs.

RECRUITMENT AND SELECTION METRICS:

Recruitment is a function of human resource management. It is the first step of appointment. Recruitment with context to this study refers to the overall process of attracting, selecting and appointing suitable teachers as per the needs of the institution. It is process in which at the first stage school has to identify the need of faculty department wise, then they advertise it, later on they shortlist the applications received followed by calling the candidates for next phase known as selection. Even process of selection varies from institution to institution.

Table 4.27: *Key metrics of recruitment and selection*

S.No	Metric	Description
1.	Time to fill	Time lag between opening a position and closing the position. Job posting, job joining.
2.	Quality of hire	How well new hire fits the job, newly appointed employees, total employees.
3.	Cost per hire	Per unit cost of new resources hired during the academic year.
4.	Source per hire	Teachers recruited from each source to fill total number of vacant positions.
5	Yield ratio	Total faculty members successfully selected out of the total candidates required.
6	Acceptance Rate	Number of candidates accepted the offer against total candidates whom offer was provided.

Source: analyticsinhr.com

METRIC #1. TIME TO FILL:

Time to fill metric helps to determine time taken to appoint fresh employees and is measured by number of days between a job posting and hiring a teacher.

$$\text{Time to fill} = \frac{\text{Date of Job posting}}{\text{Date of Joining}}$$

Factors of Evaluation:

Unit: Days

Benchmark: Shorter the period better it is and will save the cost of operations for the school.

Relation wrt Company's profit(Y/N): Yes, lesser the time more the profit:

Measurable (Y/N): Yes

METRIC #2. QUALITY OF HIRE:

This metric measures the quality of a new resource appointed. This determines how much beneficial new teacher will be for the organization. Usually, it measures the performance of the new appointee during 6 months / 1 year time period. Poor score indicates a bad hire and this adds considerable cost to the company.

$$\text{Quality of Hire} = \frac{\text{Number of hired candidates considered satisfactory}}{\text{Total Number of candidates hired}} \times 100$$

Factors of Evaluation:

Unit: Year/ Month

Benchmark: Higher the percentage better it is.

Relation wrt Company's profit (Y/N): YES; Good hire would add to the performance of the institution. Measurable (Y/N): Yes

METRIC #3. SOURCE OF HIRE:

For every industry there are various sources of hiring manpower. It is therefore imperative to identify most reliable source to tap so as to have best candidate for an organization. This metrics is used to search the best possible source from various recruitment channels using analytics. We should prefer a source which gives maximum hires. This minimizes the cost and time to hire.

$$\text{Source of hire} = \frac{\text{Number of positions closed from particular source}}{\text{Number of Open Jobs}} \times 100$$

Factors of Evaluation:

Unit: Rs

Benchmark: Single source if selected is better with high rate of selections.

Relation wrt Company's profit(Y/N) : Yes, Cost of advertising and time wasted in recruitment process will be saved in future.

Measurable (Y/N): Yes

METRIC #4. RECRUITMENT FUNNEL EFFECTIVENESS: YIELD RATIO

It is a process which starts from sourcing of applicant and finishes when contract is signed. This metric measures the effectiveness of the recruitment funnel and gives the yield ratio.

$$\text{Yield Ratio} = \frac{\text{Total candidates selected for particular position}^{**}}{\text{Total applications received for particular position}}$$

** (Total applications received- applications rejected-candidates did not appeared)

Factors of Evaluation:

Unit: Number

Benchmark: Higher the ratio beneficial it is as pool of resources is build up for future reference.

Relation wrt Company's profit(Y/N) : Yes, data bank is built up and in future the recruitment cost can be saved.

Measurable (Y/N): Yes

METRIC #5. COST PER HIRE: SOURCING CHANNEL COST

Every time a worker is hired company has to incur certain cost which may be intrinsic or extrinsic. This metric gives an insight where to cut costs during hiring process without compromising candidate's quality and experience.

$$\text{Cost per hire} = \frac{\text{Total cost incurred per position (including internal and external cost)}}{\text{Total Candidates hired per position}}$$

Factors of Evaluation:

Unit: Rs

Benchmark: Minimum cost is beneficial for the school.

Relation wrt Company's profit(Y/N) : Yes, Lesser the cost more the benefit to the institution

Measurable (Y/N): Yes.

METRIC #6. OFFER ACCEPTANCE RATE:

The offer acceptance rate compares the number of candidates who successfully accepted a job offer

with the number of candidates who received an offer.

$$\text{Offer Acceptance Rate} = \frac{\text{Number of candidates accepted the offer}}{\text{Number of candidates received the offer}}$$

Factors of Evaluation:

Number: candidate (nos.)

Benchmark: Higher is better as it shows the prominence of institution.

Relation wrt Company's profit(Y/N) : Yes, with high acceptance ratio the cost and time for recruitment is saved.

Measurable (Y/N): Yes

TRAINING AND DEVELOPMENT

Training and development of human resource will enhance organizational effectiveness and retention of competent employees, *Fitz-enz, Jac (2000). ROI of Human Capital*

Table 4.28: *Key Metrics of training and development*

S.No	Metric	Description
1.	Training Cost per employee	To identify the cost of training per teacher per training programme.
2.	Internal Training Hours	Out of total training hours in a year how many trainings hours were held Internally.
3.	External Training hours	From total training hours during the year how many hours of training was held by the external sources.
4.	Formal Development Investment	This metric indicates the total investment required to impart formal training to teachers inclusive of internal and external training cost
5	Total training expenditures per	To identify the total training cost incurred during the year for per

	training eligible employee	training teacher who is eligible for training.
6	Percent of training eligible employees trained	This metric gives an idea about % of faculty who got trained during an academic year.
7	Percent of training time via classroom	Physical training received by educators against total eligible trainees.
8	Percent of training time via technology	Virtual training imparted to the staff using technology.

METRIC # 1. Training Cost per employee = $\frac{\text{Training Budget}}{\text{Number of employees trained}}$

Factors of Evaluation:

Number: Rs

Benchmark: Moderate.

Relation wrt Company's profit(Y/N) : Yes, too high training cost will impact the profitability

Measurable (Y/N): Yes

METRIC #2. Internal staff training hours percentage =

$$\frac{\text{Internal training hours}}{\text{Total training hours}} \times 100$$

Factors of Evaluation:

Number: %

Benchmark: Higher is better as it shows the prominence of institution.

Relation wrt Company's profit(Y/N): Yes, internal training will help cut down the training cost at the same time motivates the internal trainers.

Measurable (Y/N): Yes

METRIC #3. External staff training hours percentage =

$$\frac{\text{External training hours}}{\text{Total training hours}} \times 100$$

Factors of Evaluation:

Number: %

Benchmark: Need based, must be moderate.

Relation wrt Company's profit(Y/N) : Yes, higher the external training hours more the cost in terms of loss of productive hours and additional training cost.

Measurable (Y/N): Yes

METRIC #4. Formal Development Investment = $\frac{\text{Formal Development Cost}}{\text{Average FTE}}$

Formal development cost = Internal cost (Training expenses + Direct Cost of learning events) + External Cost (training reimbursement + workshop registration fees + outsourcing + other incidental charges) + Hidden cost (HC) = (participant days in training + conference days attended) x average payroll per day. As per Bassi, L., & Ahlstrand, A. (2000) has recommended few below mentioned metrics:

Factors of Evaluation:

Relation wrt Company's profit(Y/N) : Yes, higher the development investment more the financial burden on the institution.

Measurable (Y/N): Yes

METRIC #5: Total training expenditures per training eligible employee =

$$\frac{\text{Total Training Expenditures}}{\text{Total Eligible Employees}}$$

Factors of Evaluation:

Number: Rupees

Benchmark: Varies from school to school depending upon faculty strength and need.

Relation wrt Company's profit(Y/N): Yes, more per head training cost is an extra financial burden.

Measurable (Y/N): Yes

METRIC #6: Percent of training eligible employees trained

$$= \frac{\text{Total Employees}}{\text{Eligible Employees}} \times 100$$

Factors of Evaluation:

Number: candidate in %

Benchmark: Higher is better. Training will enhance the efficiency.

Relation wrt Company's profit(Y/N) : Yes, higher the percentage of trained employees more the efficiency of the workers lesser the losses and

Measurable (Y/N): Yes

METRIC #7: Percent of training time via classroom

$$= \frac{\text{Total Training Hours}}{\text{Classroom Training Hours}} \times 100$$

Factors of Evaluation:

Number: hours in %

Benchmark: Not applicable

Measurable (Y/N):

METRIC #8: Percent of training time via learning technologies

$$= \frac{\text{Total Training Hours}}{\text{Virtual Training Hours}} \times 100$$

Factors of Evaluation:

Number: hours in %

Benchmark: Not Applicable

Measurable (Y/N): Yes

PERFORMANCE APPRAISAL

Employee performance metric is not only a yardstick to measure the pay hike or promotion or demotion of a workforce but also helps to gauge the performance of the company.

Table 4.29: *Key metrics of performance appraisal*

S.No	Metric	Description
1.	Absenteeism Rate	This determines the rate of absenteeism.
2.	Human Capital ROI	This metric determines the knowledge, skills, total revenue, employee benefit cost, operating expenses
3.	Efficiency	Time spent on task completion & resources used.
4.	Effectiveness	Required to measure quantity of work done, complexity of work, features functional task, the results of labor.
5.	Frequency of reporting late	Number of days reported late, total number of working days
6.	Frequency of leaves	Leaves availed; total leaves sanctioned.

METRIC #1. Absenteeism Rate:

As per the survey of Gallup highly motivated and engaged employees avail less leaves up to 37% less. Further, incompetent employees avail more leaves and are less productive which diminishes organizations performance.

$$\text{Absenteeism} = \frac{\text{Average number of employees} \times \text{Missed working days}}{\text{Average Number of employees} \times \text{Total working days}} \times 100$$

Unit: %

Number: In percentage

Relation wrt Company's profit (Y/N): Yes, excessive leaves availed by the employees have adverse impact on the performance of company. This will negatively affect the profitability of the firm and the revenue reduces.

Measurable (Y/N): Yes

METRIC #2. **Human Capital ROI**

Under this metric the value of human capital like knowledge, habits, social and personal traits are assessed. [Dr. Jac Fitz-enz](#) coined this metric.

Human Capital ROI =

$$\frac{\text{Total Revenue}-\text{operating expenses}-\text{employee benefit cost}}{\text{Total Employee Benefit cost}} \times 100$$

Total Employee Benefit cost

Unit: %

Number: In percentage

Relation wrt Company's profit(Y/N): Yes, higher is better.

Measurable (Y/N): Yes

METRIC #3. **Efficiency**

This is also known as work quantity metrics. It is about doing things right. Efficiency is made up of following indicators:

- Quantity of time spent to achieve results
- Resources spent to attain targets

$$\text{Efficiency} = \frac{\text{Output (Students Performance)}}{\text{Input (number of teaching hours)}}$$

Input (number of teaching hours)

Factors of Evaluation:

Number: numbers

Benchmark: Higher is better as it shows the prominence of institution.

Relation wrt Company's profit(Y/N) : Yes, with high efficiency admissions will increase.

Measurable (Y/N): Yes

METRIC #4. Effectiveness

This metric is popularly known as work quality metrics. Analysis of the productivity of the employee vis-à-vis completion of task helps to determine effectiveness. Its KPI are work completed, nature of task, outcome. Doing right things. Effectiveness means assessing employee's ability to find solution to challenges faced at work. Effectiveness, allows firm to innovate and produce high-quality products or services.

$$\text{Effectiveness} = \frac{\text{Students Performance Achieved}}{\text{Students Performance Desired}} \times 100$$

Factors of Evaluation:

Number: Percentage (%)

Benchmark: Higher is better

Relation w.r.t Company's profit (Y/N) : Yes, better the effectiveness best the results will be.

Measurable (Y/N): Yes

Metric # 5. Frequency of leaves

This metric helps in appraisal process. Generally, higher the effectiveness, more the employee is engaged lesser will the leaves availed.

$$\text{Frequency of leaves} = \frac{\text{Leaves availed during the year}}{\text{Annual leaves sanctioned}}$$

Factors of Evaluation:

Number: candidate (nos.)

Benchmark: Higher is better as it shows the prominence of institution.

Relation w.r.t Company's profit(Y/N): Yes, with high acceptance ratio the cost and time for recruitment is saved.

Measurable (Y/N): Yes

Metric # 6. Frequency of reporting late

This metric is helps to assess the commitment of an employee towards his job and also his punctuality. Higher the frequency of this metric more the loss to the firm.

$$\text{Frequency of reporting late} = \frac{\text{Number of days reported late}}{\text{Total number of working days}}$$

Factors of Evaluation:

Number: candidate (nos.)

Relation w.r.t Company's profit(Y/N): Yes, minimum this value better it is for the company.

Measurable (Y/N): Yes

RETENTION TRACKER:

Attrition of human capital refers to the gradual loss of competent faculty over a period of time due to several reasons may be personal or occupational. For any institution high attrition is troublesome and matter of concern. It leads to knowledge and wealth erosion for the organisation. At school level administrators have to formulate numerous

compensation programs, attractive work culture and lucrative motivation system that helps them to retain high performing employees.

Table 4.30: Metrics of Retention

S.No	Metric	Description
1.	Attrition Rate	This measures the total number of teachers who have left their jobs.
2.	Turnover Index/New employee	Total number of new staff members who have dropped their service after joining.
3.	Voluntary Turnover rate	Total employees left their jobs willingly.
4	Competency Opportunity Metric	Remuneration paid to the outgoing employee and remuneration of the new worker.

RETENTION METRICS:

Source: analyticsinhr.com

By and large success of any organisation depends to great extent on the competency and skills of workforce. In prevailing scenario there is crunch of efficient employees, consequently many firms have a challenge to win over a talent retention war. In this wake every company needs to prepare a sound strategy to retain its high caliber employees. With the growing popularity of analytics HR managers are using big data and analytics to reduce the attrition. Following are the metrics of retention:

METRIC #1 Attrition Rate:

Every institution should maintain a record of employees leaving the organization and design metrics to measure the impact and with the help of analytics how it could be anticipated timely to minimize the turnover.

$$\text{Attrition Rate} = \frac{\text{Total number of employees who have departed}}{\text{Total number of employees}} \times 100$$

Unit: %

Number: Persons departed

Relation wrt Company's profit(Y/N): Yes, if attrition is not contained it may cost monetarily and have the impact on profitability and revenue of the firm.

Measurable (Y/N): Y

METRIC #2 New Employee Loss Metric:

This is a major area of concern for which special metrics are needed. The loss of new candidate soon after appointment is a matter of concern. This casts doubt on the entire recruitment process as appointment of a candidate involves huge cost.

New Employee Loss Metric:

$$= \frac{\text{Total number of new joinees left (within 1st year)}}{\text{Total new appointments made}} \times 100$$

Factors of Evaluation:

Number: % or candidate (nos.)

Benchmark: Minimum is better.

Relation wrt Company's profit(Y/N): Yes, if new employee loss metric is high then cost and time for recruitment is increased which will adversely affect the profitability.

Measurable (Y/N): Yes

METRIC #3 Competency Opportunity Metric: This metric states that an organisation suffers uncountable loss when an experienced worker quits and a less experienced employee replaces him. Rise in turnover or failure to retain employees is an attribute of Competence Opportunity Cost.

**Compensation Difference = Annual Compensation of Leaver – Annual
Compensation of Replacement**

Positive result may indicate money saved but the reduction in performance or the output cannot be measured and compensated.

Factors of Evaluation:

Number: Rupees

Benchmark: Should be negligible.

Relation wrt Company's profit(Y/N): Yes, As far as possible this situation should be avoided as it adversely affects the profitability of the organisation.

Measurable (Y/N): Yes

METRIC # 4. Voluntary Turnover Rate:

Voluntarily turnover is not good indication for an organisation. High voluntary turnover indicates poor recruitment process, may be lack of professional growth, and probably uncondusive work culture or environment. This metric will be helpful for the management to dig out the exact problem institution is facing.

Voluntary Turnover rate= $\frac{\text{Employees left voluntarily}}{\text{Total employees left}}$

Factors of Evaluation:

Number: candidate (nos.)

Benchmark: Least is better.

Relation wrt Company's profit(Y/N) : Yes, if voluntary turnover is least then workers stability will be improved and better performance resulting in low recruitment cost.

Measurable (Y/N): Yes

CHAPTER 5

SUMMARY AND CONCLUSION

5.1 Introduction

Analytics is a hot buzz now a days. It is pertinent to note that with the advent of big data analysis techniques analytics has gained popularity in every domain of industry and academia. Analytics based decision making is new trend. Capitalist countries have adopted analytics and almost every function of Management is applying it.

5.2 Summary and Conclusion

The expenditure on education in terms of percentage of GDP is 3.1% in the year 2021. Education is the only way to bridge the gap between the poverty and prosperity. It is rightly remarked as a tool to empower the youth. K12 schools are the feeders to the higher education who in turn will train the Gen Z kids to be competent workforce. Ultimately the prosperity of every economy is directly proportional to skilled workforce which is dependent on the quality education students have received in their schools and colleges. Schools are therefore, responsible to prepare future ready globally competent future leaders. Learner's success is directly proportional to quality of educators. India stands at 35th position in the world with respect to school education. Consequently, if the standard of education is to be improved then K12 schools have to pay special attention towards their HR functions like recruitment and selection, training and development, performance appraisal and retention. These key HR functions of school need to be monitored meticulously. Gone were the days when the HR decisions were solely based on gut feelings. Now, K12 schools have infinite workforce data which needs to be processed using analytics to draw useful insights. Schools' performance can definitely be improved with evidence-based decisions. This study has explored all the major areas of HR functions of K12 schools.

This paper has established the fact that CBSE affiliated K12 schools pay due attention to the recruitment and selection. Recruitment and selection is the first and foremost function of HR. Attracting right talent is an art. Mostly every school has proper policy at place. Schools largely depend on external source of recruitment. Out of various external sources their dependence on advertisement is the most. In the age of technology

and where outsourcing is the new norm still the K12 schools of Punjab rely upon the conventional source, as they find this method to be very reliable. Not only this, schools are also largely dependent upon the direct walk-in candidates who drop their resume. Many schools build up their data bank which they use it later on as the need arises. At the same time the non-conventional recruitment options like consultancy and social media is also gaining popularity in Punjab State. Young educational leaders rely on these new trends of recruitment whereas the Gen X principals may shy away from it. This study also reveals that internal source of recruitment like promotions or references by existing employees is also preferred by several institutes, as it is reliable and cheapest source. To get selected in the schools of Punjab candidate has to face an interview, sometimes written test also but demonstration for the subject they excel is essential. Not every school prefers psychometric tests for the selection of a teacher.

NEP lays due emphasis on human resource development. It is mandatory for every teacher to complete 50 hours of training every year. K12 schools of Punjab regularly plan trainings for their faculty. Study has identified that due to regular training the performance of the educators improve they remain intact with all the latest trends in education, new developments, pedagogy. There is no gain saying that trained teachers will be more confident and subsequently they will perform better. On the Job training is preferred over off the job training by the educators. Results in this paper has discovered that Management of schools in association with the principal undertakes performance appraisal without any prejudice. 360⁰ feedback system is popular in most of the schools where all the stakeholder's opinion is taken while doing teacher's appraisal. Another myth is busted through this study that seniority is not any prime criteria for appraisal, rather individual teachers' performance plays linchpin role. Of course, appraisal may vary as per the category of a teacher.

Results of the study shows that retention is an essential function of the HR to which 53% agree. Teachers are of the opinion that monetary benefits play more important role than non-monetary benefits to retain the efficient teachers. 43% teachers and principal express their preference of monetary benefits over non-monetary benefits of retention. Work life balance and conducive work environment emerges as the chief sources of retention of high-end faculty. Statistical values show that 55.5% advocate this fact. This

study also proves the fact that retention of experienced faculty will reduce the training cost to which 49.1% educators agreed. This paper has established that in K12 schools' recruitment cost can be considerably saved by reducing the attrition of teachers, 50.6% has consented to it, consequently, an educational institution can attract more new admissions if their competent and experienced teachers stay for longer, this is admitted by 50% workforce of K12 schools who participated in the survey. Application of workforce analytics has come to the surface as a tedious task. Either most of the schools are not applying analytics at all, those who are applying are still at descriptive analytics stage. As predictive analytics and prescriptive analytics is at advanced level. Management of K12 schools is impressed with the utility of analytics and are keen to apply but in the absence of infrastructure and competent analytics expert wish to implement it but there is dearth of experts.

Results derived from SEM model indicate there exists relationship between HR functions of school and its performance. Similar results were obtained by Haque (2021) in his study over 200 Bangladeshi employees. Author applied SEM and established positive relationship between strategic HRM practices and perceived organizational performance. Pattnaik and Sahoo (2020) identified that there exists positive relationship between HR functions like training, compensation and performance appraisal and organizational performance. Sabiu et al. (2019) found that performance appraisal significantly impacts organizational performance ($\beta= 0.28$, $t=3.27$). Torlak et al. (2018) in their study conducted on 440 workers of travel agency in Turkey and Iran found similar relationship that HRM practices like training, employment security and career management practices significantly impact organizational performance. Torlak et al. (2018) revealed that training ($\beta=0.153$), job security ($\beta= 0.146$) and career management ($\beta= 0.375$) practices have a significant relationship with organizational performance.

Finally, we have come to the stage to conclude the study.

Education is backbone of any economy. No nation can rise if its human resource is not skilled and competent. K12 schools lay foundation for the prosperity of the nation. Education is a powerful tool to eliminate poverty. In Indian sub-continent the demand of education is increasing at alarming rate. As per a report shared by rating agency CARE Ratings (2018), Indian education sector is fastest growing and largest in the world

with more than 14 lakh schools, 850 universities and over 20 crore students enrolled. It is all set to grow at compounded rate of 11 to 20% in next three years. It is one of the prominent service sectors which serves as a feeder to rest every sector in an economy. With such a whooping growth rate it is likely that the demand for the teachers will soar phenomenally. Resulting, in acceleration in the role of HR department or Principal. All the major HR functions like recruitment, selection, training, development, performance appraisal and retention needs to be managed very immaculately.

Teacher plays a linchpin role in the life of a student. His entire academic journey depends largely upon how well the foundation was laid. Hence, recruitment of competent teachers is a hurricane task. K12 schools of Punjab are more dependent upon conventional methods of recruitment. This study has proved that the school administration is more dependent on external sources. Advertisement, direct walk in by the candidates, reference by existing employees are the preferred and most reliable sources of recruitment adopted by K12 schools in Punjab. Whereas dependence on modern means of recruitment like social media and consultancy is still less popular in this part of the country. Once recruitment is done later follows the crucial task of selection of efficient teachers who can add value to the pupils. The results show that out of various alternatives of selection most of the CBSE affiliated K12 schools in Punjab follow same pattern. Interview is done to shortlist and screen the fit candidates during interview probably the soft skills, leadership attributes, background check and experience is assessed, then selected candidates are invited for demonstration to test their content competency, class room management and understanding of pedagogy. Some of the institutions go a mile extra and they even conduct a written test for faculty. Not many institutions have a practice of conducting psychometric tests for educators. Gone were the days when teaching was considered as every one's cup of tea. In order to teach Gen Z kids of 21st century, educators need to upgrade them continuously to abreast themselves with the latest trends in education. Results of this study highlighted the fact that every school understands the significance of training. It is proved that teachers feel more confident and their efficiency increases with training. Teachers have strong feeling that regular training equip them with modern tools of teaching and they remain updated. Further, on the job training is preferred as compare to off the job training. As being onsite teachers are in better position to learn best practices. On ground training help them

understand classroom dynamics. This minimises the chances of wastage and overlapping, Besides, faculty can learn everything from point zero in real time.

Performance Appraisal is a critical function of HR. As per this research, schools of Punjab prefer 360⁰ appraisals of their staff. General trend is that performance appraisal is generally done by the Management and the Principal. There is a strong belief that no discrimination on the basis of gender or seniority is done in the schools. The appraisal process in the schools is very transparent and unbiased, it is based on the tenure of service and to some extent on the basis of performance. This study has proved a fact that retention is most important function of HR. In this era when there is dearth of competent staff. There is a talent war to attract the high calibre employees in the schools. The outcome of this study shows that monetary benefits are preferred by the employees over nonmonetary benefits. Teachers of Punjab wanted to maintain their work life balance. Institutions are providing conducive work environment to retain experienced teachers. This study has also proved that the retention of efficient teachers helps reduce the recruitment and training cost. Furthermore, if school is able to retain their old trained employees, then the academic performance of the students will improve. Consequently, school will attract more admissions this will help generate more revenue. With increase in the enrolment schools will have to raise their infrastructure and also more faculty will be required. This all will lead to better organisational performance. Not only this good governance and leadership skills of the principal will also enhance the school's performance. Finally, if the management is able to provide better facilities to the students and innovative practices are adopted this will lead to overall growth of the schools.

Outcome of this study shows that Workforce Analytics is new and emerging field. Most of the schools are not familiar with analytics as it is a specialised area. Not every Principal or HR manager of K12 school is accustomed with Analytics. There is an acute paucity of competent staff who can handle analytics. There are very limited schools in Punjab who are applying some sort of analytics to drive decisions related to HR functions discussed in this study. Results have proved that Analytics helps in improving the recruitment process. By using descriptive analytics, the HR managers will shortlist the best possible source of recruitment on the basis of past data, using predictive analytics they can suggest what source is cost effective and then recommend the

preferred sources. Analytics helps in selecting best source of recruitment. Advantage of analytics is that it out of several methods of recruitment administrators can determine which source has provided good candidates. This helps to save the cost of recruitment and even enhances the speed to close the position. Prescriptive analytics will recommend the best source of recruitment for future. This study has proved that by applying analytics to decision making process better staff training is possible. Results have shown that there has been improvement in the performance of teachers after training. Due to ever increasing demand of skilled teachers' attrition is a big challenge. Experienced teachers always have numerous options. Data driven decision helps in retention of the skilled employees. By applying predictive analytics, the possibility of teachers who are planning to leave is identified and then with prescriptive analytics selection of effective factors of retaining competent employees can be determined. Employees are anxious about their appraisal. Generally, there is discontent among teaching fraternity with regard to the performance appraisal process. Academic staff always considers that it is biased. Using analytics performance appraisal can be made more scientific and rational. The crux of the discussion is that analytics-based decision making improves school performance. Finally, this study will provide an extension to the existing literature by highlighting 4 major HRM variables in the light of workforce analytics. This study will be boon for the education sector specially for the K12 schools having phenomenal managerial implications.

5.3 Scope

Predictive and prescriptive analytics goes hand in hand to balance demand and supply of (teachers) workforce in a (school) organization by forecasting and assessing future demand of how many, where, what type and when the (Faculty) workers are needed. These projections are done on the basis of descriptive data, historically available. (Hofmann et al., 2012). In contrast to other assets, value of human resource appreciates with the passage of time. With experience their competencies and skills are enhanced, hence on account of this value addition there is every possibility that these competent resources may switch the firm. Therefore, it is vital to timely identify such an efficient

(teachers) human resource and recognize the difference between human capital and other assets (Hofmann et al., 2012). By applying predictive and prescriptive analytics competent teachers' attrition can be curtailed which would have positive impact on the students' academic performance there by enhancing school's performance.

The present study is confined to K-12 Schools which are integral segment of Education Industry. This is novel research which will provide new insight to the K-12 institutions to tackle their major HR issues of recruitment & selection, training, performance appraisal and retention through analytics effectively. Though, HRD is very comprehensive topic we have shortlisted few functions on the basis of literature review and previous research. Its scope could be extended to Institutes of Higher Studies like Professional Colleges and Universities. This paper could provide direction for further research to develop new insight what are the probable reasons for workforce turnover and how it could be minimized. Even the model of analytics could be later commercialised also.

5.4 Managerial Implications

The emerging field of workforce analytics holds considerable promise for leaders hoping to significantly improve their operational and strategic performance through more effective workforce management. By application of analytics on workforce data management can even help school administrators to take informed employee decisions. Due to privatisation of education sector, number of private schools affiliated to CBSE PAN INDIA have crossed 24000. All the schools are managing manpower which is becoming a complex and tedious job. Functions of human resource like recruitment, selection, training, appraisal, retention are primary functions. Every K12 school has to perform these inevitable functions. This study has highlighted the challenges faced by the schools are retention of competent staff, finding the best and reliable source of recruitment, identifying the need and right person for the training and the impact of training on the performance of the faculty. This study provides the solution to all the challenges mentioned above in the form of a METRIC recommended in this paper. This paper advocates principals and school administrators to shift from conventional

decision-making process to applied direction. By applying analytics to staff's data several strategic decisions can be taken which will eventually, enhance the performance of the school. By leveraging the data with evidence-based approach HR managers at school can take informed decisions through the insights generated by using data, trends and patterns derived by applying analytics and HR metrics. This study demonstrates HR Analytics role in strategic decision making for educational institutes. Workforce Analytics will help school leaders understand the intricacies and complexities of HR functions thereby making HR operations more scientific.

5.5 Recommendation for future studies

Future studies can replicate this research on a larger scale. A more diverse sample, using a larger pool of respondents outside Punjab, should be sought. Researchers can take into consideration few more HR functions like motivation, engagement, performance management, leadership, health and safety etc and extend the study. Longitudinal study from different boards and nations is also recommended. Basis the Analytics Model proposed studies can be even conducted in the field of higher education. Researchers can even try to extend the theoretical framework by adding more dimensions to the organisational performance. Even there is lot of scope to study the application of various forms of analytics like descriptive, predictive and prescriptive in K12 schools. In furtherance, this study and framework model can be applied to fully funded government schools, Jawahar Navodaya Vidyalaya and Kendriya Vidyalaya. Several research studies can be done to establish relationship or to check the impact of workforce analytics on every independent variable taken in this study.

1. How much impact Workforce Analytics will have on Recruitment and Selection process to make it data driven.
2. How much impact WFA will have on Training and Development process to make it more rational than traditional system.
3. Comparative study can be done on the schools which have applied analytics for their HR functions and others which have not.
4. Study can be done on the benefits of application of various types of analytics on the organizational performance.

5.6 Limitations

Every research has some shortcomings, so has this study too. As per the research design data is to be collected as per the affiliation number of schools. While collecting the data some schools refused to fill the questionnaire as either their Management refused or their policies do not permit them to share any information of the school with anyone. Kendriya Vidyalaya which forms an integral part of school education system in India are kept out of this study as they do not cater to the education needs of Kindergarten level. They are established from grade 1 onwards. Further, in our sample majority of the participants are female. Generally, at K12 level the ratio of female faculty in school is comparatively higher than gents.

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LIST OF APPENDICES

#	Appendix	Item	Content
1	Appendix 1	Questionnaire	Survey instrument
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APPENDIX 1: Questionnaire

This is a generic questionnaire and none of the question is specific to any organisation. Kindly spare your precious time and contribute to collect the data for my thesis on the topic “Workforce analytics: Panacea to enhance organizational performance through HR practices of K12 schools in Punjab. The information shared by you will be totally confidential, it’s purely for+ academic research. Please complete the questionnaire with utmost care and honesty.

Background

1. Name
2. Email id
3. School name

Demographic

1. I am working as
 - a. Principal Teacher
2. My experience.
0-5 Years 5-10 years 10-15 years above 15 years
3. Students strength of school.
0-200 200-500 500-1000 above 1000
4. School is located in
Rural Semi –urban Urban
5. Gender
Male Female

**Please mark your response for following statements on 5 point likert scale:
Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree**

1. External source is popular channel of recruitment.
2. In my school, walk in interview is common source of recruitment.
3. In my school, Advertisement is popularly used for recruitment.
4. In my school, recruitment is done through Consultancy channel.
5. In my institution, recruitment is done with through Social media.
6. In my school, for recruitment process existing employees reference is taken into consideration.
7. Internal source of recruitment is reliable method to appoint employees.
8. My Organisation has clear policy on recruitment & selection.
9. In my institution Recruitment is immediately done when vacancy arises.
10. In my school, Interview is conducted to select new candidates.
11. In my school, Written Test is conducted to select new teacher.
12. Psychometric Test is a conducted in my school to select a faculty.
13. Candidate has to give demonstration to get selected in my institution.
14. In my institution Training is a regular feature.
15. Regular training enhances the performance of teachers.
16. In my school, every teacher is provided training.
17. Training programs keep the faculty updated with the latest trends.
18. Training workshops support teachers in doing their job better way.
19. Training programme help schools to achieve objectives.
20. On the job training is suitable method of training.
21. Off the job training is suitable method of training
22. My institution has proper Performance Appraisal policy in place.
23. No discrimination is done while doing appraisal.
24. Performance Appraisal is done on the basis of seniority.
25. Performance appraisal is done by the Management & Principal.
26. Performance appraisal is based on the performance of an individual for the entire year.
27. Performance appraisal system is based on 360 degree feedback.
28. Position of a teacher is one of the criteria of appraisal.
29. Retention of competent faculty is important function of HR Management.
30. In my institution, monetary benefits are offered to retain efficient educators.
31. Non-Monetary benefits are offered to retain teachers in my school.

32. Work-personal life balance is maintained in my school which helps in retention of a teacher.
33. Conducive work environment of my school is source of retention.
34. Retention of experienced teachers reduces training cost
35. Due to retention of competent workforce our school is able to save recruitment cost.
36. I think retention of efficient teachers increases the enrolment.
37. In my school, trained teachers work more efficiently, than untrained faculty
38. Our quality services to parents and children enhances schools performance.
39. Our Management is able to satisfy all stakeholders.
40. Our School Management evolve and adapt changing environment quickly.
41. Our institution keep innovating new services and processes.
42. In our institution teachers happily adopt innovative pedagogy or practices.
43. My school introduces innovative practices which enhances students satisfaction.
44. In last three years, assets of our school has increased consistently.
45. In previous three years, there is continuous rise in the number of teachers in our school.
46. During last three years, strength of students in my school has consistently increased leading to financial growth.
47. Workforce Analytics is a new concept for me.
48. In my institution workforce analytics is applied for HR functions.
49. Usage of Analytics improves recruitment process.
50. With analytics best source of recruitment can be identified.
51. By applying analytics best candidates can be selected.
52. Data driven decisions helps in retention of skilled teachers.
53. Analytics help to select effective factor of retaining competent teachers.
54. Analytics supports unbiased performance appraisal.
55. Analytics provide an insight about which staff members to be trained.
56. Analytics enable us to assess the improvement in the performance of teachers after training.
57. Decisions based on analytics improves school performance.

APPENDIX 2: Summary of Published Research Work

S. No	Title	Publisher	ISBN
1.	IMPACT OF WORKFORCE ANALYTICS ON HR FUNCTIONS OF K12 SCHOOLS TO BOOST ORGANISATIONAL PERFORMANCE	Mukt Shabd Journal (UGC CARE) Jan 2024	2347-3150
2.	A STUDY ON PRACTICES AND PITFALLS OF HUMAN RESOURCE IN K12 SCHOOLS OF PUNJAB	MATHEMATICAL STATISTICIAN ENGINEERING APPLICATIONS (SCOPUS) May 2022	2094-0343
3.	A STUDY ON RELATIONSHIP AND FACTORS INVOLVED IN RETENTION OF TEACHERS TO ENHANCE SCHOOLS PERFORMANCE	VEGUETA. (SCOPUS) Aug 26th, 2022	2341-1112
4.	RELATIONSHIP OF RECRUITMENT AND SELECTION PRACTICE WITH THE PERFORMANCE OF K12 SCHOOLS	INTERNATIONAL JOURNAL Of CREATIVE RESEARCH THOUGHTS (UGC CARE) Feb 23rd, 2022	2320-2882
5.	TO IDENTIFY THE FACTORS INFLUENCING HR FUNCTIONS AND WORKFORCE ANALYTICS	International Conference Dec 3-4, 2021	978-93-90631-34-6
6.	WORKFORCE ANALYTICS: PANACEA TO TALENT ACQUISITION IN K-12 SCHOOLS	MEASURE, MANAGE & FACILITATE CHANGE TO HARNESS ORGANIZATIONAL POTENTIAL PIMS, Gwalior (International Conference) Dec 2018	978-93-86608-29-1

APPENDIX 3

FREQUENCY DISTRIBUTION OF HR FUNCTIONS

Frequency distribution of Recruitment and Selection

		Frequency	Percent	Cumulative Percent
External Source is a popular channel of recruitment				
Valid	Strongly Disagree	13	3.9	3.9
	Disagree	38	11.5	15.5
	Neutral	97	29.4	44.8
	Agree	167	50.6	95.5
	Strongly Agree	15	4.5	100.0
	Total	330	100.0	
Advertisement is popularly used for recruitment				
Valid	Strongly Disagree	8	2.4	2.4
	Disagree	22	6.7	9.1
	Neutral	33	10.0	19.1
	Agree	153	46.4	65.5
	Strongly Agree	114	34.5	100.0
	Total	330	100.0	
Walk in by candidates is common source of recruitment				
Valid	Strongly Disagree	18	5.5	5.5
	Disagree	80	24.2	29.7
	Neutral	34	10.3	40.0
	Agree	145	43.9	83.9
	Strongly Agree	53	16.1	100.0
	Total	330	100.0	

Recruitment is done through consultancy

Valid Strongly Disagree	33	10.0	10.0
Disagree	136	41.2	51.2
Neutral	48	14.5	65.7
Agree	87	26.4	91.9
Strongly Agree	26	7.9	100.0
Total	330	100.0	

Recruitment is done through social media

Valid Strongly Disagree	25	7.6	7.6
Disagree	145	43.9	51.5
Neutral	53	16.1	67.6
Agree	86	26.1	96.6
Strongly Agree	21	6.4	100.0
Total	330	100.0	

Reference by existing employees is source of recruitment

Valid Strongly Disagree	21	6.4	6.4
Disagree	88	26.7	33.1
Neutral	66	20.0	53.1
Agree	129	39.0	92.1
Strongly Agree	26	7.9	100.0
Total	330	100.0	

Internal source of recruitment

Valid Strongly Disagree	6	1.8	1.8
Disagree	36	10.9	12.7
Neutral	94	28.5	41.2
Agree	170	51.5	92.7
Strongly Agree	24	7.3	100.0
Total	330	100.0	

Interview is conducted to select an employee

Valid	Strongly Disagree	2	0.6	0.6
	Disagree	0	0.0	0.0
	Neutral	6	1.8	2.4
	Agree	139	42.1	44.5
	Strongly Agree	183	55.5	100.0
	Total	330	100.0	

Written test is conducted for selection

Valid	Strongly Disagree	3	0.9	0.9
	Disagree	24	7.3	8.2
	Neutral	34	10.3	18.5
	Agree	141	42.7	61.2
	Strongly Agree	128	38.8	100.0
	Total	330	100.0	

Psychometric test is used for selection

Valid	Strongly Disagree	6	1.8	1.8
	Disagree	81	24.5	26.4
	Neutral	102	30.9	57.3
	Agree	112	33.9	91.2
	Strongly Agree	29	8.8	100.0
	Total	330	100.0	

Candidate has to give demonstration

Valid	Strongly Disagree	1	0.3	0.3
	Disagree	5	1.5	1.8
	Neutral	21	6.4	8.2
	Agree	148	44.8	53.0
	Strongly Agree	155	47.0	100.0
	Total	330	100.0	

Table 4.3: Frequency distribution of Training and Development

		Frequency	Percent	Cumulative Percent
Training is regular feature				
Valid	Strongly Disagree	1	0.3	0.3
	Disagree	2	0.6	0.9
	Neutral	20	6.1	7.0
	Agree	138	41.8	48.8
	Strongly Agree	169	51.2	100.0
	Total	330	100.0	
Training enhances performance of teachers				
Valid	Strongly Disagree	2	0.6	0.6
	Disagree	1	0.3	0.9
	Neutral	3	0.9	7.0
	Agree	108	32.7	48.8
	Strongly Agree	216	65.5	100.0
	Total	330	100.0	
Every teacher is provided training				
Valid	Strongly Disagree	0	0	0
	Disagree	4	1.2	1.2
	Neutral	24	7.3	8.5
	Agree	125	37.9	46.4
	Strongly Agree	177	53.6	100.0
	Total	330	100.0	
Training keeps faculty updated				
Valid	Strongly Disagree	0	0	0
	Disagree	0	0	0
	Neutral	8	2.4	8.5
	Agree	97	29.4	31.8
	Strongly Agree	225	68.2	100.0
	Total	330	100.0	

Helps teachers do their job in a better way

Valid	Strongly Disagree	0	0	0
	Disagree	1	0.3	0.3
	Neutral	9	2.7	3.0
	Agree	107	32.4	35.5
	Strongly Agree	213	64.5	100.0
	Total	330	100.0	

Help schools to achieve objectives

Valid	Strongly Disagree	0	0	0
	Disagree	0	0	0
	Neutral	16	4.8	4.8
	Agree	135	40.9	45.8
	Strongly Agree	179	54.2	100.0
	Total	330	100.	

On the job training is suitable method

Valid	Strongly Disagree	0	0	0
	Disagree	1	0.3	0.3
	Neutral	28	8.5	8.8
	Agree	182	55.2	63.9
	Strongly Agree	119	36.1	100.0
	Total	330	100.0	

Off the job training is suitable

Valid	Strongly Disagree	3	0.9	0.9
	Disagree	74	22.4	23.3
	Neutral	151	45.8	69.1
	Agree	81	24.5	93.6
	Strongly Agree	21	64.5	100.0
	Total	330	100.0	