RESEARCH ARTICLE

E-HRM: Learning approaches, applications and the role of artificial intelligence

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Abstract

Electronic human resources management (E-HRM), which is derived from the concept of human resources management (HRM) plays a significant role in automating certain key processes in the department of human resources. One of the modules of E-HRM is the training or the learning module, which when combined with a digital source turns out to be an electronic learning (e-learning) or electronic training (e-training) module. This is a transformation of converting the learning platform from an offline to an online mode. The organizations to increase their level of training from their employees should look for a fast-paced solution at a shorter turn-around time and the prime way to perform such a strategy is to automate the whole process of training and predict the training need and outcome. This research paper is focused on two aspects of e-learning i.e., how an e-learning system is collaborated with an intelligent system in the form of artificial intelligence and the other aspect is how an employee turn over data fetched from organizations in the information technology (IT) sector can help understand the real requirements of learning among employees in the IT organizations.

Keywords: Electronic human resources management, E-learning, Artificial intelligence, Information technology.

Introduction

There are numerous activities carried out in the field of human resource management in an organization and each of the activities carried out consists of several time consuming and routine activities. One of such activities is the learning and development activity of employees in organizations. Since there are multiple activities involved in human resource management, it is often viewed as a productive base for the application of artificial intelligence(AI) (W Rodgers, 2022). This research paper emphasizes relatively broad, but clear functionalities of technology that can be applied in the lines of Artificial Intelligence and Human Resources. The role of employees is significant in the information technology (IT) sector. The IT skills are niche, and it requires certain additional learning skills to learn and develop from an employee perspective.

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There is a scarcity of adequate skills in the IT sector. The IT organizations are facing tough challenges in retaining their employees that is preventing businesses to achieve productivity and performance (Goodwin, 2018; Khan & Sikes, 2014; McKinsey & Company, 2016). One of the reasons being the lack of career development and growth. The other challenge encountered by the IT organizations is filling the IT job openings with the right skill sets (Blumenstyk, 2018; Cukier, 2003; Trauth, 1999). In reference to the annual global talent shortage survey conducted by Manpower Group, it is the IT skills that stood first with skill shortage and it is the skill set the organizations are seeking most.

In this paper, the AI is having a dual role, i.e., first to capture the employee turnover reasons with the skill set of the employee leaving the organization. This information is fed into the system with the help of human resource professionals working in IT organizations. The second role is to capture all the skill sets of those employees who left the organization and compare their skills with the existing employees, thereafter, identify the skill gap between the employees who left the organization and employees working in the organization.

The AI further augments the data received and recommends proper training to the employees and their managers with the help of a recommender engine. The remaining portion of the paper is organized as follows: A problem statement being identified that explains the research objectives, summarizing the theoretical

background followed by research method adopted. The findings are presented, as appropriate. The paper also elaborates on the result discussions, limitations and conclusions.

Problem Statement

In today's world that is changing fast, and the role of digital platform and communication is a Greatest of all time (G.O.A.T). Under such a scenario, it is important for organizations to examine how their business is steadily growing. One of the core elements of the successful businesses is their human resources or the employees in an organization (Heskett *et al.*, 2015). The employee development plays a significant role in successful running of the business. The current era of employees in the IT organizations especially due to the kind of skills they possess and the overall demand and shortage of such skillsets in the job market.' The challenge that an organization faces with such group of employees who are termed as 'software professionals' is their attitude and expectations towards work and career growth. They expect faster growth in career by developing their skills. To upkeep these challenges the role of human resources department (HRD) becomes important. It is the duty of the HRD to proactively nurture the talent in the organization and help them to retain those key talents. In such scenarios, it is important to proactively predict the needs of the employees and it is equally important to execute those needs. Various study on employee attrition had thrown enough lights and given strong indications that one of the primary reason of employees leaving the organization is due to 'lack of career development and progress'. However, with the application of proper technology and proactively predicting the learning and development requirements for the employees, it can help the organizations to mitigate some of the on-going challenges faced towards the employee attrition. The conceptual model of e-learning and artificial intelligence supported by relevant data is a possible solution during such scenarios.

Research Objective

- Realize artificial intelligence and how it applies to E-HRM.
- Realize human resources in the IT sectors and challenges faced in the employee turnover.
- Assess the learning gaps in the IT sectors and how is that related to employee turnover.
- Provide relevant recommendations based on the research findings and draw conclusions.

Theoretical Background

Sakhawalkar, & Thadani (2015) While performing research on the IT organizations based out of Pune using a structured questionnaire that was rolled out to employees working in those IT organizations, it was concluded that there is a significant level of awareness among employees about the E-HRM practices that can be adopted, and the advantages related to it. It was further revealed that the organizations are looking at various employee-related activities to boost the overall cheeriness of the work environment.

Watanabe (2005) emphasized 3 principles of e-learning namely: On campus mode of learning, distance learning and online learning. It was observed by (Dublin, 2004) that there is no such guarantee that can be offered for a complete success of e-learning, which is executed without any plans and procedures in place.

Employee plays an important role in an organization. An employee with the right skills can add value to the organization. Most of the leaders running the corporate business expects employees to develop their skills in a continuous manner and through various forms (Whiting, 2020).

The concept of artificial intelligence is stated as the study of 'intelligent agents' that when it connects with any device, it can sense the surrounding environment to enhance its presence and success to achieve a certain goal (Song and Wang, 2020). In the line of education and learning, the role of artificial intelligence is becoming significant, aiming to improve the objective of learning and increase the overall efficiency in education and related learning channels (Tang *et al.*, 2021). The modalities of artificial intelligence when combined with e-learning have helped the students or the employees who are bringing different skill sets with different backgrounds of experience. This sensory system of imparting the learning contents to employees to update their knowledge, skills and abilities has proved very useful to the employees as well as for the organization (Kavitha and Lohani, 2019).

There is another set piece in the whole process and that is the recommender engine or recommender system. The recommender system is one of the main tools for personalized content filtering in the education domain (FL da Silva, 2023). The concept of digital technologies is well connected to different applications. This is very commonly viewed in the educational or learning environment. The environment of computers coupled with human interface to fetch for information pertaining to educational methodologies are a common scenario that is observed regularly (Becker, 1993).

In such cases, the educational recommender system plays a significant role for both students/employees and learning administrators (Maria *et al.*, 2019). For instance, a learning instructor can contribute to their pedagogical practices that can help improve the overall planning and assisting educational resource filtering. However, in the case of employees or students who are learning the subject, it can help the learning by setting up the learning preferences by indicating personalized learning contents (Garcia-Martinez & Hamou-Lhadj, 2013).

Experimental Study and Methodology

Here, the research was carried out by following the principles of qualitative and quantitative analysis. With the help of a questionnaire and interview method wherein the respondents are HR and software engineering professionals working in the IT organizations within the city of Bengaluru which are into providing healthcare solutions to different clients or customers that they have predominantly in USA, Canada, Europe and Australia, New Zealand (ANZ). The questionnaire was scrutinized through item-total correlation with the help of Pearson's formula. The reliability of the questionnaire was assessed through Cronbach's alpha formula. The convergent validity was assessed to know whether the indicators that is building a factor had a similar set of observations theoretically underlying the same constructs. The entire 'experimental study' is categorized into 3 (three) parts namely: Experimental Study – Part 1, Experimental Study – Part 2, Experimental Study – Part 3.

Experimental Study – Part 1

The first set of experiments is conducted by collecting the data by approaching the HR professionals working in different IT organizations across Bengaluru. A total of about 25 organizations got shortlisted. These HR professionals are the final respondents of the questionnaire. The expectation from the respondents is to provide a set of information related to employee attrition at least in the past one year that has occurred in their organization.

Experimental Study – Part 2

The researcher in parallel to the earlier experiment evaluated the challenges associated with the traditional training model or the traditional corporate training model. This evaluation process was conducted with the help of interviewing around 80 software professionals working in different IT organizations across Bengaluru.

Experiment Study – Part 3

Apart from discussing various issues on the challenges towards the acceptance of the e-learning system, the research also focused on receiving certain key inputs from an employee point of view. A formal questionnaire was rolled out to a group of 80 participants working in the IT organizations across the city of Bengaluru. The purpose is to identify the impact of e-learning and its related tools and software from an employee perspective and identify what are all the real take away from an e-learning mode of training. The participants were asked to provide a rating on a Likert scale between 1 to 5 (1– Strongly Disagree, 2– Disagree, 3– Neutral, 4– Agree, 5– Strongly Agree). These ratings were purely based on merit i.e., based on the experience of the participants who had undergone the e-learning mode of learning. The calculated Cronbach alpha value of the questionnaire is 0.89. The background of the participants is all from the software engineering background

having at least 1 year or more experience in the IT industry. The responses received from the respondents are captured and presented in Table 1.

Here, and among the selected group of respondents were given a few training modules where the topic and contents of the training materials were arrived from certain key inputs as part of the training requirements identified through and by means of employee turn-over data. A schematic model of the learning requirement analysis coupled with the concept of artificial intelligence and a recommender engine is presented in a pictorial form as shown in Figure 1.

Here, as referred in Figure 1, the learning repository has the learning contents that are specifically designed to meet the skill set of the employee (software engineer who is scheduled to attend the training). These learning contents are arrived through a primary source of information that is captured through the employee turnover data that addresses the core characteristics of the learning requirements within the organization. The HR professionals working in these organizations helped to source the required data of employee turnover connected with learning needs. The students or employees who are attending the training were mapped to the employees who left the organization due to reasons such as: employer unable to provide the training to develop skills of an employee, employer unable to deploy an employee due to skill gap, employee leaving the organization due to lack of skill enhancement.

Once a proper learning predictions was done by means of predicting the learning requirements through artificial intelligence, then the learning contents were developed by virtue of proactively identifying the training needs and later coupling the learning contents with a similar set of employees who left the organization or were asked to leave the organization due to lack of skill and training imparted. This said functionality is taken care of by a recommender engine.

The strategy of the organization towards training and developing their employees must be on par with the expectations of the employees and it should be mutually beneficial for both the employee and the employer.

Results

The results of employee attritions reasons which are in the form a data is given in Figure 2. It is explicitly evident that the core reason of employees leaving the organization is
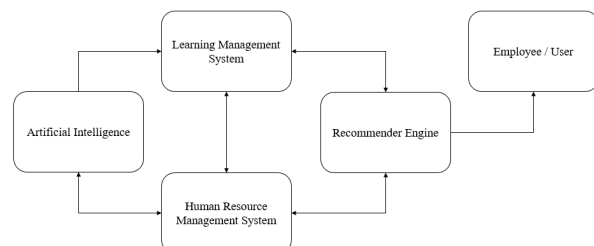

Figure 1: Schematic model: Learning requirement analysis
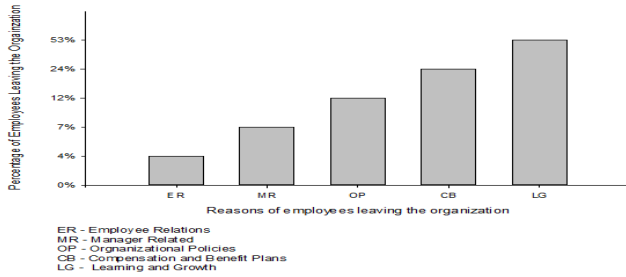
Figure 2: Employee attrition reasons

due to the lack of learning and growth opportunities, which is denoted in the Figure 2 as learning and growth (LG) with 53% of the respondents agreeing to this viewpoint. This is way ahead of any other reasons for employees leaving the organization that are in the form of compensation and benefits (CB), which is about 24%, then comes organizational policies (OP), which is about 12%. A group of respondents of about 7% agreed to MR (Manager Related) reasons of employee leaving the organization, and lastly about 4% agree to employer relations (ER), as a reason of employee leaving the organization. The employees think that if there is a scope of proper development by way of learning new technologies and upgrading their skills, then they can always be in demand in the current job market. There is a zeal among employees to learn new technologies and upskill it.

Out of the many feedback received on the traditional training model, there were at least top 4 challenges quoted by the respondents and they are categorically classified and shown in the Figure 3 as:

- The traditional training model does not meet the expectations of the digital workforce as it proved to be too burdensome – Around 90% respondents agreed with this viewpoint. This is represented in Figure 3 as lagging on workforce expectations (LWE).
- The traditional training model lacks personalized experience as it is too old fashioned, which brings the concept of being a monotonous way of learning - Around 83% respondents agreed to this viewpoint. This is represented in Figure 3 as personalized experience is missing (PEM).
- The traditional training model proved to be too lengthy and at times spread across with too much unwanted
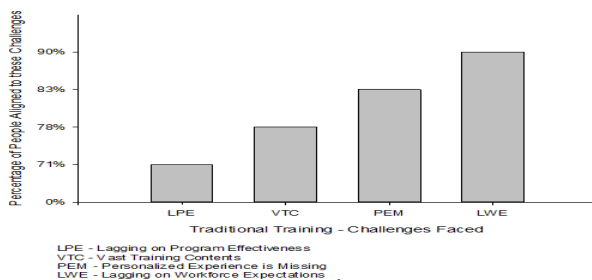

Figure 3: Traditional training model – Challenges faced

information - Around 78% respondents agreed to this viewpoint. This is represented in Figure 3 as vast training contents (VTC).
- The traditional training model lacks overall effectiveness as it was not able to deliver the program as per the requirement of the training participants - Around 71% respondents agreed to this viewpoint. This is represented in Figure 3 as lagging on program expectations (LPE).

It is inferred from Table 1 that there is a difference in the overall training experience when compared to the training received by an employee in person versus training received by an employee equipped with e-learning platform. Almost all the participants are in complete agreement i.e., either agree or strongly agree to the statement that due to the presence of e-learning platform:

- The flow of e-learning tutoring is seamless.
- Overall improvement in the learning of the subject by means of e-learning platform.
- There is relatively easiness to understand the subject by means of the e-learning platform.
- There is an overall improvement in the skill sets of the employees who have undertaken training by means of the e-learning platform.
- There is an equal agreement of having a similar approach that can be considered not just for one module of learning but across multiple learning modules.
- The users/employees also agree to the view that there is plenty of scope for improvement and development by attending the skill-based courses by means of e-learning platform.

However, there are instance where the respondents either disagree or strongly disagree to the statement due to the presence of e-learning platform, but it is on a constructive note:

- The respondents have completely denied the fact that the quality of the learning material is not upto the expectations.
- The respondents have completely denied the fact that e-learning was not meeting the expectations of the course guidelines as set by the learning administration.
- The respondents have completely denied the fact that e-learning contents used is not user friendly.
- The respondents have completely denied the fact that e-learning courses are not flexible enough to maneuver from a user perspective.

Discussion

Artificial Intelligence is a system that helps to perform various tasks having the requirement of human intelligence (Miyazawa, 2019). It can interpret rational thinking and rational behavior that helps to provide possible solutions to human related issues in the form of decision making, translations, predictions, and many other parameters (Kok *et al.*, 2009).

Table 1: Analysis of overall training experience

S. No.	Statement	Responses in percentage (%)				
		Strongly Disagree	Disagree	Neutral	Agree	Strongly agree
1	The flow of e-learning tutoring is seamless				10	90
2	There is an overall improvement in the learning of the subject *via* e-learning mode				20	80
3	It is generally easy to understand the subject while it is presented *via* e-learning				12	88
4	The quality of the e-learning study material is not up to a satisfactory level	87	12	1		
5	Similar approach of e-learning can be considered for various other modules and learning purposes				11	89
6	The e-learning tool was not effective at ensuring the required guidelines of learning	89	11			
7	The e-learning contents used in the process was not easy to use	95	5			
8	There is an improvement in the skill that got developed after attending the courses through e-learning				7	93
9	The courses offered through e-learning focussed on to develop the areas of improvement from a participant or student point of view				15	85
10	It was not easy to manoeuvre the e-learning software from a user perspective	84	16			

The challenge that an organization is facing when it comes to managing the employees or the workforce is how to upkeep the morale and motivation of the employees (Hackman and Oldham, 1980). This is an important point as this challenge is directly impacting the overall attrition in the organizations. It also indicates that the retention of employees is proving to be difficult in organizations, especially in the IT organizations (Dhillon M, 2017). Again, the primary reason of the employees leaving the organization as per the study conducted is found to be 'lack of learning and growth'. There are organizations wherein they have a learning methodology, but that again is a traditional approach, which does not go well with the IT workforce.

Here, the role of E-HRM comes handy. When we discuss E-HRM from an organization perspective, it is all about connecting with employees digitally to complement organizational needs (Strohmeier, 2007). Here the actual requirement being learning; hence, the e-learning module of E-HRM comes into the equation. There are ample advantages of e-learning method and when it is rolled out to the employees of the organization, then it creates the desired impact. The employees in the organizations are looking for new ways of learning that would help them to manage their high paced work schedule as well as provide them with a window where they can learn and develop their skills (Kim, Hong & Song, 2019). Managing the work, time and learning new skills are all equally important. It is up-to the employee on how they are managing their time and develop their learning skills (Shearer & Park, 2018). However, with the kind of flexibility that an e-learning platform can provide, it then becomes a solution that is a win-win for both the employees and its organization.

As the technology progresses to the next level, it is of utmost importance that the organization also upkeep themselves and remain competitive in their line of business (Parker *et al.*, 1999) Again, the role of the work forces in the organization plays a crucial role. With the advancement of technology and introduction of artificial intelligence, the overall learning model gets a boost. This presents a scenario where with the help of HR department and using the learning prediction method by means of artificial intelligence, the learning requirements are predicted to proactively close those learning gaps and at the same time address the learning needs within the organization, which is taken care with the help of a recommender engine. The role of artificial intelligence does not end by just predicting the learning requirements proactively, but it can also be used in certain other areas like: Predicting the type of learning to be imparted, type of work force that require the learning, predicting the learning outcomes, predicting how the learning imparted can influence the performance of the business in the organization, creating the personalized learning paths, better decision making and advance analytics, and many other parameters (Huang J. *et al.*, 2021).

Limitations

A detailed explanation of the product and process specifications using AI combined with E-HRM is unavailable

due to the hindrances faced to fetch the software code details. These hindrances are notably at an acceptance level as it may potentially violate the ethics, copyright, and patent procedures of the software coding as well as the E-learning product functionalities. The role of a recommender engine is described to summarize the whole functionality and its in depth contents are not covered due to certain ongoing patent rights. However, the research has given an overview of the process flow from a user requirement as well as an advanced level of insight of the e-learning platform, capability, and analysis.

Conclusion

The present era of the workforces, which is also known as millennials is very dynamic and they do not believe much in the traditional way of doing things. This throws up a major challenge in how the business in the organizations should operate. It calls for a change management approach wherein the transformation approach starts from changing the business operating model from a traditional to a much more advance level of operations. This is required from an organization standpoint and without which it becomes that difficult for an organization to step up and remain competent. The collapse of Nokia or Kodak are some of the classic examples of not being able to transform their business to the current need and coming down drastically in a way where it proved to be a complete failure.

It is high time to understand and accept that it is the workforce or employees in an organization that makes or break the business. Considering the business model ramping up due to globalization, it is important for the organizations to think about their key employees and provide them with sufficient learning and growth opportunities. These are challenges faced by the department of human resources in the organizations. Here, the approach should be pro-actively address these challenges and provide a workable solution. To mitigate some of these issues and challenges, the role of technology becomes very useful. The concept of E-HRM system that helps to connect with the work force both locally and globally is very much significant. The E-learning module derived from E-HRM plays a vital role in addressing the challenges of learning opportunities within the organizations. The presence of artificial intelligence when connected with e-learning platforms for all the learning related requirements in the organizations can be a game changer that will help to boost the learning opportunities for employees and help the organizations to meet one of their key business objectives, which is 'employee retention'.

Acknowledgment

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