Gamification for Recruitment and Job Training: Model, Taxonomy, and Challenges

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ABSTRACT The recruitment, engagement, and training of the employees are among the core and critical roles for running an organization successfully. Gamification has been proven to be a promising tool that offers many innovative solutions for various domains. This study presents a systematic literature review (SLR) of research studies involving gamification for recruitment, engagement, and training of employees. The SLR has been synthesized by reviewing carefully selected research studies published between 2014 and 2019 in well-reputed venues. Apart from reviewing the state-of-the-art studies on gamified solutions for recruiting and job training problems, a taxonomy of gaming elements based on the context of use in different environments has also been proposed. Similarly, the gamification model to develop gamified solutions to problems has also been presented. Lastly, the research gaps in terms of open issues have been presented to provide future directions for the researchers in the area of gamified solutions for recruitment and job training.

INDEX TERMS Gamification, recruitment, employee engagement, employee training, and gaming elements.

I. INTRODUCTION

Recruitment and employee training have a significant impact on organizational growth [1]. One of the critical factors that reflect the change in an organization or its culture is its employees [2]. The progress of the organization lies in its methodologies that yield, train, and retain the skilled resources for the organization [3]. Therefore, the most challenging task for the organization is to devise efficient techniques to recruit and train the most perfect and ideal employees. Those employees have been responsible for bringing a positive, growing, and healthy change to the organization and its environment [4], [5].

The traditional recruitment process includes job advertisement, resume submission, test conduction, and interview conduction. These conventional methods of recruitment have helped to predict job performance to some extent but have proven to be outdated, tedious, and time-consuming. Most of the companies have been still using traditional techniques of recruitment, training, and retaining the employees. Moreover, the organizations also face significant challenges like long hiring cycles, ineffective candidate hiring, high hiring costs, and shallow advertisement coverage [6]. Thus, the conventional techniques of the recruitment process need to be replaced with the modern techniques of recruitment to get the maximum out of the candidate at the stage of recruitment [7]. In most cases, job seekers have found to be completely unaware of the nature of the advertised jobs and the culture of the organization before appearing in a formal interview. Similarly, the organizations consider job interviews as a tiresome task as they are exercising the recruitment process in traditional style. It has also been a challenge for the fresh candidates who seems to be appearing for the very first time for a formal job interview with such traditional style [8].

Moreover, most of the organizations have not been able to manage the recruitment process due to a lack of resources such as job portals, digital marketing, and global coverage. They prefer to outsource recruitment tasks to the recruitment agencies. Moreover, this practice of recruitment process outsourcing is creating biasness and domination of recruitment agencies. These recruitment agencies sometimes encourage job seekers to change their resumes according to the requirements of the client organization, irrespective of the job seeker interest [9]. Therefore, the organizations have been struggling to transform their traditional recruitment and job training practices into self-managed automated techniques. These
TABLE 1. Serious games for recruitment and job training.

| Recruitment             | Job Training               |
|-------------------------|----------------------------|
| My Marriott Hotel       | Ignite Samurai Leadership  |
| PlantsVille             | SAP Road Warrior          |
| Reveal                  |                            |

This game is used by Marriott hotels and resorts to recruit human resources across India and China. My Marriott Hotel provides the users with the virtual experience of working in a hotel environment. The game has been devised by a German company “Siemens”. Plantsville provides the user with the virtual environment of constructing a plant and managing it. The game is considered significant in recruitment as it provides the user to experience plant infrastructure. L’Oréal has developed this game with an objective of hiring and learning. The game provides a virtual working environment for problem-solving to the players and receives feedback.

Techniques will require less human effort to satisfy the current global needs of recruitment [10]. Moreover, every organization has a goal and a vision. The organizations put all its best efforts, energies, and resources to make all the employees follow those goals. Therefore, an organization usually develops service-structure and career paths to explain each detail of the business process to its employees [11]. These career paths have been designed to keep the employees motivated and in line with the organization’s goals. Therefore, employee training programs have been designed to enhance the skills and knowledge of the employees. These training programs play a significant role in the improvement of employee contribution to the organization. Most of the organizations have been using traditional training programs such as workshops and seminars to polish and enhance the skills of the employees [12]. However, these methods require a lot of time and effort by the organization. Sometimes organizations are unable to spare employees due to busy schedules and over commitments, especially in a small organization.

The concept of gamification has emerged around 2010. The technique of gamification has been into practice to make the interviews more engaging, interactive, and fruitful. Moreover, it has also been adopted in the recruitment process. This automated method has been in practice to evaluate a candidate comprehensively and his ability to perform the required job in a requisite manner. The basic concept behind the idea is to develop a game based solution. This solution has multiple challenges relevant to the position announced by the organization [16]. Due to this reason, the recruitment game must present a realistic impression of the job nature and pre-selection process. The gamified solutions help the organization to judge the performance of the candidate in a better way. Similarly, it provides the candidate with more space to express its original talent and ability. Therefore, a game based personnel selection and assessment techniques have been adopted to predict job performance beyond the traditional methods [17], [18].

This technique can also be helpful in training and engaging the employees on modern lines. The game-based learning has been considered beneficial as it has provided a fun learning on a relaxed, safe, and controlled platform. Moreover, it has been beneficial to provide an environment of creativeness and self-exploration [19]. Therefore the employee feels motivated and enjoys the process of learning.

The area of recruitment and job training has seen a rapid trend in the adoption of game mechanics. Moreover, several gamified employee recruitments and training applications have been developed so far to facilitate the human resource department. Several gamified applications have been mentioned in Table 1. A number of organizations have adopted gamified solutions for their recruitment and job training processes. The reason besides the adoption of gamification is the involvement of entertaining and motivating game elements in other systems.

These game elements make the audience feel motivated. However, these gamified systems usually employ motivational features such as scores, badges, stars, levels, challenges, or points. These features keep users motivated to achieve targets or activities. Fig. 1 represents the milestones of gamification.

The major focus of the paper is to present a systematic literature review of existing researches that explicitly defines...
the adoption of game elements deployed to solve the problems of the job recruitment process and job training. The study explores the state-of-the-art research conducted so far to address employee recruitment and training problems using gamification. The novelty of this work is the taxonomy of gaming elements presented to help the developers. The developers can use this taxonomy in selecting gaming elements according to the environment and context of use. Moreover, a gamification application has been presented, which identifies the process of developing a gamified solution to a problem. Lastly, research gaps have been identified for future researches.

The research study has been sub-divided into seven main sections: Section II presents an overview of the related search studies conducted in a similar area so far; Section III discusses the methodology for conducting Systematic Literature Review by defining the research questions, search strategy, inclusion-exclusion criteria, quality assessment, and results; Section IV presents the discussions on the obtained results; Section V presents threat to the validity; and finally the article has been concluded in Section VI.A

II. RELATED WORK

Gamification has been a promising approach to solving job recruitment and job training problems. Several gamification applications in the area of recruitment and job training have already been in practice. Even some researches have been conducted to design gamified solutions of recruitment and training process. Therefore, few systematic reviews have been conducted to evaluate the researches presenting gamified solutions to recruitment and job training problems.

Lisette Guy [20] reviewed the benefits of gamification in psychometric assessments. He concluded that in comparison to traditional assessment techniques, there is still room available for gamification techniques. Several available gamified methods can be used to assess candidate dedication, experience, and motivation, but still lacks to satisfy the robust properties of their counterparts. Therefore, practical gamified assessment tools need to be developed through a thorough definition of their target and understanding the right method to trigger them. The paper presented a review of the importance of gamified psychometric solutions. However, gamified solutions of psychometric assessments developed so far have not been discussed.

Ferreira et al. [21] presented a systematic review of 35 articles. The analysis highlights the research on applications of gamification in the work domain or workplace. The results concluded that very limited researches had been conducted on gamification in the work domain. Similarly, the investigations even found is mostly exploratory. However, the studies selected have been conducted using small samples and simple research designs.

Hernández and Moreno [22] have presented a systematic literature review of 60 papers. The review has been focused on game-based office training activities. The performance of a company depends on the growth of employees. Almost all companies use traditional methods and techniques to train their employees, but those techniques take time and require a cost. The paper reviewed the gamified training techniques and concluded that most of the employees have positive feedback towards the gamification techniques adopted so far for the training purpose. However, those techniques still hold the room for improvement.

De Sousa Borges et al. [23] conducted a systematic mapping of 26 papers. The study focused on examining how gamification techniques are applied to education to increase the learning and interest of students. The results concluded that several studies are conducted on the gamified application of education and learning. Although the students have been welcoming these gamified approaches in learning still, there is a lack of procedures and methods defined to build a bridge between gamification and computer-supported collaborative learning (CSCL). However, the study has not been focused on the effect of learning concerning the job environment.

Although several literature reviews suggest the indication for the effectiveness and suitability of gamification in the workstation [24], significant limitations are found in the researches. Most of the studies conducted so far presented a review of gamification applications in the area of training. However, the gamification applications in the area of recruitment have not been considered. Moreover, the reviewers have also not presented any model or taxonomy to help the researchers and developers. A detailed comparison of other studies is shown in Table 2.

However, this study presented a systematic review of the recent researches conducted on the gamified solutions of recruitment and job training problems. The novelty of this work is that we have presented a taxonomy of gaming elements which will help the developers in selecting gaming elements according to the situations. Moreover, a model has been defined to design gamified applications for any problem. Lastly, open issues and directions for future research have been identified.

III. RESEARCH METHODOLOGY

A literature review is generally conducted to identify those critical gaps and neglected areas of the research which require any further analysis or investigation. However, any proper evaluations or aggregation of results regarding a specific topic can be done by conducting a Systematic Literature Review (SLR). The SLR helps identify the directions for future researches and address research gaps. As SLR evaluates all
the researchers undertaken so far on specific topics, thus it requires sufficient effort and time, but a reliable research methodology can enhance the comprehensiveness of SLR. The following research methodology is adopted while conducting SLR.

The research was started by conducting an initial literature review related to the topic. During the initial search, a few pieces of research related to the issues are identified. Therefore the problem was finalized for conducting SLR. Later, a search string comprised of primary, secondary, tertiary and additional keywords was chosen to select all the potential research studies for the SLR. Fig. 2 shows the process for conducting the review.

A. OBJECTIVES
The process of gamification for recruitment and employee training is a reasonably new approach; the concepts behind the idea have found support from numerous psychological theories. This research study comprises of the following objectives:

- More focused state-of-the-art research work has been identified in the field of Gamification
- To evaluate whether gamification has also been adopted for solving problems found in recruitment and training.
- A taxonomy of gaming elements based on its use has been proposed
- To identify the research gaps in terms of open issues and challenges.

B. RESEARCH QUESTIONS
The goal of the research work is to explore the applications designed and research conducted on gamification in the area of recruitment. The systematic literature review addresses four research questions to achieve a detailed study on the topic. Table 3 presents the research questions selected for the study.

C. SEARCH STRATEGY
The articles selected for conducting the research are collected from the following resources: IEE Digital Library,
TABLE 3. Research questions.

| Research Questions                                                                 | Motivation                                                                 |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| RQ1 How the research on recruitment and employee training using gamification       | To explore the current research trends of shifting recruitment and employee |
| techniques spread over the years?                                                  | training to gamification                                                    |
| RQ2 Which gaming elements are used to motivate the candidates to use the gamified   | To identify the gaming elements which are a source of motivation for users  |
| process?                                                                          |                                                                            |
| RQ3 Which substantial challenges or problems, are mostly handled using gamification?| To identify the major challenges faced in the process.                     |
| RQ4 What is the actual target audience to be considered?                           | This question explores whether the gamification is playing any role in     |
|                                                                                   | attracting the audience that is not intrinsically interested in becoming   |
|                                                                                   | the part of any such target activity                                       |

FIGURE 3. Search string used to identify studies to include in our review.

Science Direct, ACM Digital Library, Wiley Online Library and Springer Link. Google Scholar was also considered to seek gray literature inform of white papers or technical reports.

The search string was defined to search related content in all digital libraries using the following combination:

∀ Primary ∧ ∀ Secondary ∧ Tertiary ∧ ∀ Additional

The details of primary, secondary, tertiary and additional keywords have been shown in Fig. 3.

D. INCLUSION/EXCLUSION CRITERIA

The study focusses on high-quality scholarly work that relates to gamification in recruitment. Based on the most appropriate and relevant state-of-the-art, the following inclusion criteria are defined.

- Research papers presenting research on the application of gamification in recruitment.
- Research paper discussing or comparing recruitment gamification applications.

E. QUALITY ASSESSMENT

The quality of each research paper reviewed is analyzed by rating each study on a score of 1-3. The research study has been scored against each of the three dimensions listed below in Table 4. The score 3 represents high, rating 2 represents medium and score 1 represents low.

- Research papers discussing aspects and emerging ideas of gamification in recruitment.
- Research papers focusing on building individual interests for job skills and employment.

However, the paper appeared in more than one source is considered only once. The prior work was to find articles on each source against the mention search string, the articles with duplicate titles or not directly related to the review were then eliminated. All the articles found against the search string on any of the mentioned source is included. However, the studies the met at least one of the following exclusion criteria were excluded:

- EC1: Papers that are not related to recruitment, employment or e-recruitment
- EC2: Paper focusing on employee career building
- EC3: Papers not related to gamification
- EC4: Papers not written in the English language
- EC5: Papers not in the form of full research article i.e., either an essay, tutorials, presentations, or in the form of an abstract.

F. ASSESSMENT AND DISCUSSION OF RESEARCH QUESTIONS

The research paper selection process adopted to identify and finalize the studies for the systematic review is shown in
| Year | Gaming elements | Problems tackled | Audience tackled | Quality Assessment | Total Score |
|------|----------------|-----------------|-----------------|-------------------|-------------|
| 2015 | [30] Game board, Unlocking, Tips, Badges, Forum, Voting, Profile, and Leaderboard | Motivate newcomers | Newcomers | Criteria 1: 1, Criteria 2: 1, Criteria 3: 1, Criteria 4: 2 | 5 |
| 2015 | [30] Stars | Measure entrepreneurial traits | General | Criteria 1: 1, Criteria 2: 1, Criteria 3: 1 | 4 |
| 2015 | [30] Points, leaderboard | Assessing their training valence | General | Criteria 1: 1, Criteria 2: 1, Criteria 3: 2 | 5 |
| 2015 | [30] Feedback, points Badges, Trophies, Leaderboard, Progress Bar progress visualization, scores, and leaderboards | Human resource tasks | General | Criteria 1: 1, Criteria 2: 1, Criteria 3: 1 | 4 |
| 2015 | [30] Recruit and Retain Blood Donors | General blood donors | General | Criteria 1: 1, Criteria 2: 1, Criteria 3: 1 | 4 |
| 2015 | [30] Gamification in production and services | 0.5 | Criteria 1: 1, Criteria 2: 0.5, Criteria 3: 1 | 3.5 |
| 2017 | [31] Points | Training and recruitment | General and students | Criteria 1: 1, Criteria 2: 1, Criteria 3: 0.5 | 4.5 |
| 2014 | [32] Scores and levels. | Recruit, integrate and Train your employees | General | Criteria 1: 1, Criteria 2: 1, Criteria 3: 1 | 4.5 |
| 2014 | [32] Score, feedbacks | Training advanced skills for manufacturing | General | Criteria 1: 1, Criteria 2: 1, Criteria 3: 1.5 | 5.5 |
| 2017 | [33] Rounds | Training | Employees subcontractors and clients | Criteria 1: 1, Criteria 2: 1, Criteria 3: 2 | 5 |
| 2017 | [33] Score | Job training | General | Criteria 1: 1, Criteria 2: 1, Criteria 3: 2 | 5 |
| 2017 | [33] Points, levels, badges, points, badges and leaderboards, badges, levels, and leader boards | Employee training | Employees | Criteria 1: 1, Criteria 2: 1, Criteria 3: 1.5 | 4.5 |
| 2017 | [33] Health bar, timestamp and score Points, leaderboard, badges, certificates, and Socialisation | Increase employee skills | Employee | Criteria 1: 1, Criteria 2: 1, Criteria 3: 0.5 | 4.5 |
| 2017 | [33] Learning and training | Manufacturing training | Employees | Criteria 1: 1, Criteria 2: 1, Criteria 3: 1 | 4 |
| 2017 | Level, experience points | Training for assembly processes on manual workplaces | Trainee and employees | Criteria 1: 1, Criteria 2: 1, Criteria 3: 0.5 | 3.5 |
| 2017 | Leaderboard, evolution stages, levels, activities, missions, and badges | Enterprise Resource Planning Systems training | General | Criteria 1: 1, Criteria 2: 1, Criteria 3: 2 | 5 |
| 2017 | Level | Employee Induction | Employee | Criteria 1: 1, Criteria 2: 1, Criteria 3: 0.5, Criteria 4: 0.5 | 3 |
| 2017 | Progress bar, life points Stars, flags, leaderboard, tips | Industrial training | Employee | Criteria 1: 1, Criteria 2: 1, Criteria 3: 1 | 4 |
| 2017 | Worker engagement | Learning based on learner preferences | Employees and customers | Criteria 1: 1, Criteria 2: 1, Criteria 3: 1 | 4.5 |
| 2017 | | Workers | Employees and customers | Criteria 1: 1, Criteria 2: 1, Criteria 3: 2 | 5 |
| 2017 | | Enhance staff motivation | Employees and customers | Criteria 1: 1, Criteria 2: 1, Criteria 3: 2 | 5 |
| 2017 | | Improve production ramp-up | General | Criteria 1: 1, Criteria 2: 1, Criteria 3: 0.5 | 3 |
| 2017 | | Emotions during work environment | General | Criteria 1: 1, Criteria 2: 1, Criteria 3: 0.5 | 3 |
| 2017 | | Improve the working experience of employees | General | Criteria 1: 1, Criteria 2: 1, Criteria 3: 1 | 4.5 |
| 2017 | | Staff training | General | Criteria 1: 1, Criteria 2: 1, Criteria 3: 1 | 4.5 |
| 2017 | | Training | General | Criteria 1: 1, Criteria 2: 1, Criteria 3: 1 | 4.5 |
| 2017 | | Employee selection | General | Criteria 1: 1, Criteria 2: 1, Criteria 3: 1 | 4.5 |
Fig. 4. A total of 30 studies are selected for conducting this review. After gathering and analyzing the results of each question defined at the beginning of the review, the results are summarized.

RQ1: How the research on recruitment and employee training using gamification techniques spread over the years?

Fig. 5 shows the evolving trend of studies conducted in the area of gamification to solve employee recruitment and training problems. We identified 27 studies assessing the role of gamification on job recruitment and training since 2014, which shows an average of 5 studies per year. The results, if compared with previous studies, shows that the studies are inclining towards gamification in solving recruitment and training problems. Past studies show a low average of reviews in this area across the years [22].

RQ2: Which gaming elements are used to motivate the candidates to use the gamified process?

The majority of the studies have adopted gaming elements to motivate users.

The study [43] has been designed a gamified system to allow the user to learn about the Enterprise Resource Planning System (ERP). The users have been expected to use this system for daily activities. Moreover, the gamified system has considered “activities” as a gaming element. This gaming element has been motivating users to complete more events, as the users have been rewarded based on the completed activities.

Similarly, another research study [40] has adopted certificates in learning environments. A learning platform for cybersecurity awareness has been gamified to make learning an attraction. The certificates provide continuous feedback to the user and motivate them to improve and progress.

Moreover, [28], [33] have proposed a gamified application for employee engagement and skill training in sustainable manufacturing. The studies have implemented “feedback” as a gaming element to motivate users to learn. The positive feedbacks act as a source of motivation for the users to move forward and attain more milestones.

Furthermore, [49] have used “flag” as a gaming element to create a learning environment for the learners. These flags keep users motivated to move forward to attain more goals.

However, most of the studies have adopted badges, points, and leaderboards in their studies. The studies [29], [36], [37] have shown that badges are collectible prizes that mark task completions. Badges have been widely adopted in the majority of the gamified applications. They urge users to
move forward and achieve the next target. Similarly [38], [40], [43], [56] have also adopted badges to motivate the users.

On the other hand, the studies [30], [48], [52] have been adopted leaderboard as a game element. The leaderboard creates a sense of competition among the users. Thus users feel motivated to compete and win. Similarly, [37], [38], [40] have also applied leaderboards in their gamified solution as they consider it useful for learning.

The studies [53]–[55] have used points to motivate the users. A point has been assigned to the user against each completed task. The point thus motivates them to achieve more targets for a better score.

The studies [26], [46] used “stars” as gaming element to motivate the users. The researches have used stars as scoring element. Each time a user achieves a target, a star is given to the user. This keeps the user motivated.

A number of other gaming elements are also adopted. Fig. 6 shows the details of the gaming elements employed in the selected studies to motivate the users. The graph, however, clearly indicates that badges, leaderboards and points were the most frequently used game elements in gamifying recruitment and training applications. About 50% of the studies presented the integration of collectible records like points and 37% of the reviews have used badges for user motivation. Almost 40% of the reviews have incorporated a social comparison element like leaderboards. The leaderboards act as a tool to motivate users by competing with their peers. Several other gaming elements as shown in Figure 6, are also used in the studies to drive the user in completing the desired task. However, those elements were not as commonly integrated as points, badges, and leaderboards.

Hence by the analysis of the studies indicates that three gaming elements: badges, points, and leaderboard also dominates in gamifying recruitment and job training like other gamified applications [58].

However, many critics have refuted the prevalence of these three gaming elements. The critics believed that using these gaming elements without judging the context of use will be mere “pontification” [58]. The researchers still choose these three gaming elements as they can be easily integrated into already existing applications. Studies, however, have shown that these three gaming elements used in most of the applications neither increase nor decrease the motivation of the users. Instead, these three gaming elements are just progressing indicators [59].

Altogether 24 different gaming elements are identified in the literature, as shown in Table 6.

RQ3: Which significant challenges or problems, are mostly handled using gamification?

The analysis of the results has shown that employee training is the major problem that has been addressed by most of the studies using the gamification technique. Most of the researchers believe that training employees using serious games not only motivates them to work but also to learn advanced skills that may be required during their jobs.

Few pieces of research have focused on gamifying recruitment or hiring process as the researchers believe that recruitment is not only a tiring process for an organization but also a hectic task for the candidates too. By applying the gamification techniques in the hiring process, the organizations can easily judge the candidates according to the skills required.

Table 7 represents the problems identified and tackled by the studies under consideration:

The studies [25], [30], [53], [52] presented a gamified application for the user training and motivation and then evaluated the performance of application. The overall result remains positive. The users believe that incorporating gaming elements into an application helps more users and even newcomers to get attracted.

Besides the studies mentioned above, [48], [58], [51], [68] proved the importance of gamification in engaging and training users. Moreover, gaming elements play a significant role in increasing learning outcomes.

The studies [26], [28], [40], [49] focused on defining how gamification and different gaming elements work to trigger the user motivational mechanism. Moreover, the studies [55], [29] presented a game-based solution to recruit and retain blood donors. The resolution was offered by considering how gamification affects behavior change. Other studies [55] have also presented the applicability of gaming elements in hiring or recruitment.

The studies [32] pinpointed the impact of gamification on HRM activities like recruitment and training. The serious games had considerably improved HRM performance. In addition to the studies mentioned above, [62] explored whether serious games benefit participants with developmental disabilities. The results have proven that playing serious games increases the speed, accuracy, and, therefore, the overall performance of the participants.

The study [42] presented the solution to creating cybersecurity training using gamification. Cybersecurity awareness
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TABLE 6. Gaming elements identified in the studies

| Gaming Elements | Studies |
|-----------------|---------|
| 1. Activities   | I. Alcivar et al. 2016, C. Toscani et al. 2018, L. Sardi et al. 2019, R. N. Landers et al. 2014, M. B. Armstrong et al. 2018, M. Pereira et al. 2018, J. Holdsworth et al. 2017, I. Alcivar et al. 2016, Isidyanto et al. 2016, R. M. C. Leite et al. 2016, K. Robson et al. 2016, M. Liu et al. 2018 |
| 2. Badges       | J. Holdsworth et al. 2017 |
| 3. Certificate  s | R. M. C. Leite et al. 2016 |
| 4. Engagement   | I. Alcivar et al. 2016 |
| 5. Evolution    | D. Saha et al. 2017, S. Perini et al. 2017 |
| 6. Feedback     | B. Monterrat et al. 2015 |
| 7. Flag         | C. Toscani et al. 2018 |
| 8. Forum        | C. Toscani et al. 2018 |
| 9. Game board   | K. Li et al. 2017, C. Toscani et al. 2018, R. N. Landers et al. 2017, L. Sardi et al. 2019, O. Korn et al. 2015, M. B. Armstrong et al. 2018, M. Pereira et al. 2018, J. Holdsworth et al. 2017, I. Alcivar et al. 2016, Isidyanto et al. 2016, B. Monterrat et al. 2015, K. Robson et al. 2016, M. Liu et al. 2018 |
| 10. Health bar  | O. Allah-Cherif et al. 2014, R. N. Landers et al. 2014, M. Pereira et al. 2018, B. C. Muller et al. 2016, I. Alcivar et al. 2016, C. Oleoxova et al. 2016 |
| 11. Leaderboard | I. Alcivar et al. 2016, R. N. Landers et al. 2017, D. Saha et al. 2017, O. Korn et al. 2015, O. Allah-Cherif et al. 2017, R. N. Landers et al. 2014, M. B. Armstrong et al. 2018, J. Holdsworth et al. 2017, B. C. Muller et al. 2016, A. Hamza et al. 2016, Isidyanto et al. 2016, R. M. C. Leite et al. 2016, K. Robson et al. 2016, A. Kampker et al. 2014, M. Liu et al. 2018, T. Foster et al. 2018, D. Nguyen et al. 2019, K. Georgiou et al. 2019 |
| 12. Level       | L. Sardi et al. 2019, A. Hamza et al. 2016, D. Nguyen et al. 2019, O. Korn et al. 2015, O. Allah-Cherif et al. 2014, S. Perini et al. 2017, J. Kwon et al. 2016, K. Li et al. 2017, O. Korn et al. 2015, K. Georgiou et al. 2019 |
| 13. Mission     | C. Toscani et al. 2018 |
| 14. Points      | M. Binninger et al. 2017 |
| 15. Progress    | M. Ismail et al. 2018, B. Monterrat et al. 2015 |
| 16. Score       | L. Sardi et al. 2019, I. Alcivar et al. 2018 |
| 17. Profile     | C. Toscani et al. 2018 |
| 18. Round       | M. Binninger et al. 2017 |
| 19. Stars       | M. Ismail et al. 2018, B. Monterrat et al. 2015 |
| 20. Trophies    | L. Sardi et al. 2019 |
| 21. Tips        | C. Toscani et al. 2018, B. Monterrat et al. 2015 |
| 22. Unlocking   | C. Toscani et al. 2018 |
| 23. Voting      | C. Toscani et al. 2018 |
| 24. Others      | K. Li et al. 2017, J. Holdsworth et al. 2017, I. Alcivar et al. 2016, M. Liu et al. 2018, D. Nguyen et al. 2019 |

TABLE 7. Issues addressed in the studies.

| Problems                  | Studies |
|---------------------------|---------|
| 1. Motivating New Comers  | C. Toscani et al. 2018, M. Ismail et al. 2018, R. N. Landers et al. 2017, D. Saha et al. 2017, O. Korn et al. 2015, J. Hense et al. 2014, R. M. C. Leite et al. 2016, S. Perini et al. 2017, M. Binninger et al. 2017, J. Kwon et al. 2016, M. B. Armstrong et al. 2018, M. Pereira et al. 2018, K. Li et al. 2017, J. Holdsworth et al. 2017, B. C. Muller et al. 2016, I. Alcivar et al. 2016, A. Hamza et al. 2016, T. Foster et al. 2018, M. Liu et al. 2018, O. Allah-Cherif et al. 2017, L. Sardi et al. 2019, O. Allah-Cherif et al. 2014, R. M. C. Leite et al. 2016, K. Georgiou et al. 2019, D. Nguyen et al. 2019 |
| 18. Job training          | K. Li et al. 2017, J. Holdsworth et al. 2017, I. Alcivar et al. 2016, M. Liu et al. 2018, D. Nguyen et al. 2019 |
| 19. Recruitment/hiring    | R. M. C. Leite et al. 2016, K. Georgiou et al. 2019, D. Nguyen et al. 2019 |
| 24. Others                | I. Alcivar et al. 2016, M. Liu et al. 2018, D. Nguyen et al. 2019 |

being a dry area is always a challenge for the employees to learn. Gamified learning builds a path for employees to learn quickly.

The player expectations towards the gaming features always vary. Therefore most of the time, the players abandoned playing games just because of its features. The study [46] consequently proposed a model to select the gaming features as per the player’s profile. The study [44] discussed the effects of gamification technique on transparency and user engagement. The studies [36], [54], [56], [59] also discussed the general training problems and discussed a gamified solution for user training in different environments.

The overall results showed that gamification had proven a vital technique to motivate users. However, results have demonstrated that a lot of models and applications have been designed for employee training, but still, a lot of work needs to be done in the area of recruitment.

RQ4: What is the actual target audience to be considered?

A wide range of audiences has been targeted throughout the entire research reviewed. The range varies from the general audience to employees.

The study [40] targeted 3 types of audiences. Standard employees who have been employed in the hotel and interact with any sensitive computer data or emails. Privileged employees who have the authority to supervise lower staff and Management who have any member of managers. The study has not considered whether the persons to be trained are intrinsically motivated towards gamification or not. Moreover, the studies [33], [50], [64] gamified the training of users in the area of manufacturing. Several constraints need to be considered in the process of manufacturing. These gamified solutions help the user to train themselves for those problems.
study presented the solution for general individuals, without focusing on how the gaming elements affects the intrinsically motivated and unmotivated individuals differently.

Moreover, the studies [47], [46], [57] also discuss methods to motivate users. These studies have not targeted any particular group of people. However, the studies stated that any organization or person can use it for training. Besides those studies, [33] presents a gamified training solution for sustainable manufacturing. The paper particularly targeted learners of an industry. Moreover, the study also stated that it can be used for manufacturing skill development for the young generation. The study discussed the effects of gaming elements on the learners but still lacks the effect of this solution on unmotivated learners.

The studies [34] presented a serious game for takt planning and control. The game targeted contractors, sub-contractors, and managers for training. The study targeted a particular audience for the evaluation of the game still the effect of the game on the unmotivated audience even needs to be addressed. Similarly, the studies [37], [38], [56] discussed serious games for the training of the employees. These studies targeted the general audience for the proposed solution. Here also the effect of serious games on the intrinsically motivated and demotivated audience has not targeted.

The results have shown that almost 59% of the studies have proposed or implemented gamified solutions for a general audience. The studies haven’t targeted any particular audience for their solutions. Moreover, the studies haven’t defined their contribution towards those audiences who were not intrinsically motivated towards gamification.

However, 38% of the studies have implemented gamified solutions for their employees. These studies even have not suggested any pre-training for the employees to use those serious games. Lastly, 3% of the studies targeted newcomers as the audience for serious games. Neither had they specifically dealt the users who are not intrinsically motivated for the serious games. Fig. 7 represents an overview of the percentage of targeted audiences in the discussed research studies.

**IV. DISCUSSIONS**

The SLR collected the search studies conducted on the gamification of recruitment and job training. Those studies have been used to answer the research questions proposed at the beginning of this study. The results show that more gamified solutions have been proposed to find the gamified solutions for the problems in the area of recruitment and training.

**A. PROPOSED TAXONOMY**

In the game design, a game element has been used to stimulate the player interaction with the game. Integrating game elements within the learning experience is the first step to gamification. The review conducted on the research studies on gamified applications of recruitment and job training identifies multiple gaming elements. These gaming elements have used to motivate users in different contexts. The gaming elements have been therefore categorized into six main categories based on their use: achievement, reward, personalization, time, and micro-interactions.

Gamers always have a feeling of satisfaction upon accomplishment of any goal or any skill development. The achievement shows the continuous effort of the users. These elements show the increasing progress of the users. This increasing progress always keeps the users motivated. However, rewards have a close relationship with achievements. Reward shows the motivation and recognition for the time and effort. Rewards have been attained by completing certain milestones and represent the learning experience. In designing games, both fixed and variable rewards have previously used.

The rewards can depend on the milestones completed or distributed across the game board at intervals. The user struggles more to reach or attain those rewards.

Moreover, a quest scenery, a thwarting tragedy situation, or a suspense setting always triggers the learner’s attention, and their motivation is a story. The story engages learning in the form of a narrative or an ongoing setting. The user enters in a situation where he plays to either solve a mystery, a quest, or try to reach the end.

Similarly, from selection, customization and choosing desired settings. This provides a sense of feel-free options. These elements are designed to accommodate user choices and preferences, which is known as personalization. However, a common trope used in most of the games is timer or counters. The gaming element is used to create a sense of urgency. Time limits and schedules urge the users to complete the tasks as quickly as possible.

Lastly, micro-interactions provide interactive features. That links multiple users together. Micro-interactions create a learnable environment based on user interactions. Numerous users can judge or vote for each other. Even they can interact to guide.

These six categories represented the use of gaming elements in serious games as the use of gaming elements varies based on the context of serious games, as the audience differs.
from the environment to the environment. This categorization could help us in identifying the game elements in different serious games. A taxonomy of these gaming elements has been proposed in Fig. 8 to help the designers in selecting gaming elements.

**B. GAMIFICATION MODEL**

A gamification model has been designed to define the process of building a gamification application. The model has been divided into 3 phases: Define, Build, and Assess Outcomes.

The define phase has been adopted to identify the problem, and the targeted users. The phase includes five steps: identify and define the problem; define users; identify user needs; identify user motivation, and identify user success. This phase has been designed to emphasize the problem to be solved, the users who are going to be involved, what kind of motivation they need to progress, and then finally the parameters to define users' success.

After accurately identifying all the relevant details for creating a gamified solution to the problem, the design phase has been started. The design phase starts by designing the tasks to be performed by the users. Then the elements for the user’s motivation and mechanics have been appropriately implemented. The game elements are essential to bringing motivation to the users. The motivation is required so that the users keep on moving towards the goals. Finally, the user response has been analyzed. The design has been revised again if the results have been unsatisfactory. However, if the results are satisfactory, then the learning outcomes have been analyzed in the end. A complete gamification model has been presented in Fig. 9.

This gamification model also provides managers with a tractable model. This model will be helpful to influence the motivation and performance of the employee or the candidate. Moreover, the model will be helpful for organizations to monitor the increasing performance and motivation.

**C. OPEN ISSUES AND CHALLENGES**

Most of the studies have adopted badges, points, and leaderboards to present a gamification solution to their problem. But critics believe that these gaming elements are the mere source of scoring. These elements neither motivate a user to play and learn, neither demotivate them. However, still, numerous gamified solutions have adopted these three gaming elements because of the ease of integrating them into their solutions. Therefore, a need to adopt other gaming elements in the gaming solutions has been therefore required to enhance user motivation.
The other current problem focused on most of the studies is employee training and motivation. Numerous studies focused on presenting a gamified solution for employee training and motivation. However, employee recruitment is the most primary step to select candidates for the job. A wrong selection not only costs heavily to the organization but to the candidate also. Therefore more gamified solutions of recruitments need to be addressed.

Lastly, the audience targeted in serious games is also a critical task. Most of the studies proposed gaming solutions for the general audience. However, the effect of serious games on different audiences would be different. A need to address the effects of serious games on intrinsically motivated vs. nonmotivated audiences is still there. As the way how the gaming solution affects a motivated candidate would always be different from those, who are not motivated to play games.

**D. FUTURE DIRECTIONS AND RESEARCH GAP**

The complete discussion concluded that several studies had been defined for solving recruitment and job training problems using gamified solutions. However, there is a need for more well-formulated studies on a gamified solution for this problem.
We need to design serious games for this problem that should be more than mere progress indicator. As discussed previously, gaming elements act as a backbone towards user motivation. Most of the studies focused on using badges, leaderboards, and points for their gamified solutions without knowing the context. Therefore, there is a need to develop serious games in which gaming elements should be adopted based on the context being used. Those gaming elements will, thus, help in motivating the users.

Moreover, developing a serious game should focus on those users also who are not intrinsically motivated. So that gamified solutions should help both inherently motivated and non-motivated users.

V. THREAT TO VALIDITY
This SLR may include few threats to its validity, including an incomplete selection of research studies, inaccurate data collection and quality assessment.

A. SELECTION OF RESEARCH STUDIES
A complete guideline for the selection of research studies has presented in Section IV. The subsection “Inclusion and Exclusion Criteria” presented the clear strategy to select research studies. However, still there lies a possibility that few relevant papers have been overlooked. The primary reason for this possibility is the existence of gray literature like Thesis and technical reports. In this Systematic study, thesis and technical reports were not included.

The second possibility could be the selection of search string. The detailed search string is although discussed in Section IV, but still there lies a possibility that few research studies might require some other keywords for searching. The search string defined in section IV is refined multiple times so that we can find most of the relevant studies, but there still lies a hole for the new keyword.

B. INACCURATE DATA COLLECTION
Another possible reason for imprecise results is incomplete data collection. This possibility has been reduced by reviewing the collected data three times.

C. QUALITY EVALUATION
The quality evaluation of an SLR is one of the major tasks as an incomplete quality assessment could lead to inaccurate conclusions. A proper method to assess the quality of the selected research studies has been drawn and discussed in Section IV.

VI. CONCLUSION
This study reports a systematic literature review of gamification in the area of recruitment and job training. This comprehensive review has been based on 32 studies. After having an in-depth study of the previous researches, it has been concluded that the problem of recruitment and job training is inclining towards serious games for problem-solving. Considering this inclining situation, we have also defined a gamification model for developing gamified applications. In addition to this, we also have identified the gaming elements presently adopted to gamify the recruitment and job training process. Furthermore, we have defined a taxonomy of gaming elements. This taxonomy will help the developers to select gaming elements according to the environment and context.

The potential future directions for this work involve identification of how these gamified solutions are helping intrinsically unmotivated audiences. Moreover, the review presented that most of the models and applications involve points, badges, and leaderboards as gaming elements for motivation. Although, these three gaming elements are considered as progress evaluator, but they did not have any effect on user motivation. Thus, applications and models need to be developed that should include those gaming elements which intrinsically or extrinsically motivate users.

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