

Effect of New Technologies with Gamification Elements for Enhancing Employability Skills on Engineering Graduates' Perceived Performance

Niraja Saraswat ¹, Irum Alvi ², C. Divya Jyot Kaur

¹ Department of Humanities & Social Science, Malaviya National Institute of Technology Jaipur

² Department of Humanities, English & Applied Sciences, Rajasthan technical University, Kota

³ Department of Languages, Literatures & Cultural Studies, Manipal University Jaipur

¹ niraja.hum@mnit.ac.in

² irumalvi@gmail.com

³ 2019rhs9115@mnit.ac.in

Abstract— Gamification has the potential to play a pivotal role in fostering the employability skills of engineering graduates. Although prior research suggests it may be instrumental in enhancing the skills of engineers, no in- depth empirical study has investigated the effect of new technologies with gamified elements/ gamified training on for enhancing employability skills among engineering graduates and their perceived performance, particularly in developing countries such as India. The current paper proposes to study the effect of gamified training for enhancing Communication skills, Adaptability and flexibility, Interpersonal skills, Teamwork and relatedness, Competitiveness, Need for Achievement, Creativity, and Problem-solving skills on Self-Perceived Performance. Using data from 289 participants, the present study examines the relationships between the effect of gamified training for enhancing each of these skills and engineering graduates' self-perceived performance. To test the hypotheses formulated, a structured online questionnaire comprising of 30 items, based on prior studies was used, which quantified the effect of

gamified training on skills and perceived performance. Data was analysed using SPSS v26. Descriptive statistics, Cronbach's Alpha, and Multiple Linear Regression analysis were used. The gamified training for enhancing communication skills, Teamwork and relatedness, Competitiveness, Need for Achievement, Creativity, and Problem-solving skills contributed significantly to the prediction of the self-perceived performance of the engineering graduates, indicating the affirmative role of new technology with gamification features. However, the results indicated that gamified training had no statistically significant effect on enhancing interpersonal skills, adaptability and flexibility on the self-perceived performance of the engineering graduates. Implications of the findings were discussed.

Keywords: Communication Skills; Competitiveness; Creativity; Gamification; Gamified Training; Need for Achievement, Problem Solving; Team work and relatedness

1. Introduction

The abundance of Engineering graduates, unsuitability of the curriculum, lack of qualified teachers, the existing tough competition to acquire and sustain a job, the lack of communication and soft skills have resulted in a serious job crunch for the Engineering graduates of Rajasthan. Moreover, there are almost 179 engineering colleges and thousands of engineering students graduate every year. This has

Niraja Saraswat

Department of Humanities and Social Sciences,
Malaviya National Institute of Technology, Jaipur, India
niraja.hum@mnit.ac.in

caused serious turbulence in the job market and the employability of engineering graduates has become paramount in the educational and industry sector. As per India Skill Report (2019), Rajasthan neither figures as a state with maximum hiring capacity nor in the maximum supply of employable talent. With India, battling wave after wave of COVID-19, the employability and employment prospects of engineering graduates have inched to a serious downfall. New technologies with gamification elements in this era can assist and motivate the engineering students to acquire skills. Incorporating gamification apps into the curriculum can foster active engagement by transforming lessons into interactive experiences. These apps provide a dynamic platform for educators to align learning objectives with captivating challenges, encouraging students to apply knowledge in real-world scenarios and enhancing their overall comprehension. This paper aims to focus on illuminating perceptions of engineering graduates in Rajasthan on the inclusion of new technologies with gamification elements or gamified training for enhancing the skills. The paper may contribute towards better appreciation of how gamification can offer immense prospects for enhancing the employability skills of engineering graduates.

With the pandemic, the educational systems explored several ways of joyful teaching and learning, which contributed to a significant shift in students' perceptions of education (Kaur et al., 2021) and gamification served a saviour during difficult times. Gamification is termed as a new innovation, which empowers the engagement of users (Noorbehbahani et al., 2019; Rodrigues et al., 2013, 2019a, b). It is specified as the usage of game design in non-game contexts (Deterding et al., 2011; Al Hayani & Ilhan, 2020; Alhayani and Abdallah, 2020). Gamification is a new technology which is implemented in educational settings and results in better learning if implemented effectively (Toda, 2019). It not only embellishes problem solving skills but also contributes in increasing motivation and curiosity of the students (Da Silva et al., 2019; Jabbar et al., 2016; Toda et al., 2019; Vanduhe et al., 2018).

COVID-19 affected all sectors of the society. The workers were deprived of their jobs due to the lockdowns; businessmen had low or no business at all. Either the employees were terminated or had to bear serious losses in terms of pay cut. During such an unprecedented time, the students were equally

affected. The campuses were closed for a long time, hence online education flourished. The worst affected were the students of engineering institutes as the companies did not visit the campuses and the vacancies were unfulfilled. Gamification emerged as a means for motivating the engineering graduates and for enhancing their skills. Through advanced technologies and multimedia, the students could not only continue with their courses but also the teachers explored innovative ways to inculcate the requisite skills among the learners.

Employability skills are a gamut of personal, interpersonal, and attitudinal skills. To advance the students' foray in all these skills, gamified training presented the opportunity to train the engineering graduates.

Engineering education is at a different pedestal these days. Though basic engineering concepts and theories have not undergone a shift yet there is a sea change in the skill set which is needed in today's engineers. The expansions of knowledge, the competitive world, the complexity of the work environment, and the continuous changes in the global economy have necessitated the shift in use of new and novel technologies. The workplaces need engineers who are creative, adaptable, problem solvers, confident, and can take up the initiative. Unfortunately, the structure of classes, heavily laden with theoretical concepts, may get them proficient in concepts but fail to empower them in skills that are essentially needed in the workplace. Hence an integrated approach is needed to embellish their skills. Educators explored new technologies, which helped them to stay motivated and work in teams. This was a silver lining in a dark cloud, as institutions tried creative approaches of gamification to instil learning amongst the students. In short, educational institutions resorted to the use of new and novel technologies. Thus, the present study becomes even more important as these technologies using gamification for training have never been tried before in India. Moreover, employability skills have never been examined in light of the advent of gamified training.

Though several institutes and researchers have tried to explore the requirement of employers (BOSTES, 2014; Conference Board of Canada, 2013; Graduate Management Admission Council, 2012; Heffernan, Feng, Angell, & Fang, 2010; Institute for Employment Studies, 2015; Institute of

Technologists, 2011; Lauder & Bliip Global Employability, 2013; NACE, 2014). There is a lack of research on employability skills and their enhancement using new technologies with gamification features. In some studies, qualitative data is provided but to the best of the authors' knowledge, no quantitative analysis is available for the topic. Moreover, there are some studies available from developed nations, but there is a lack of research in developing nations. Though SCANS (1991), the Skills Gap Report by the USA National Association of Manufacturers (2005), the UK City and Guilds' Report (Humphries, 2006), DEEWR (2012) in Australia, and Kajihara (1997) in Japan have provided the general skill indexes yet there is a dearth of studies about the impact of gamification on employability skills in the developing nations. Moreover, acceptance of technology-based learning/training is a hot topic for research nowadays (Alvi, 2021). Having looked at the gaps in extant research, the proposed paper intends to address the following research questions:

Does gamified training enhance the skills of engineering graduates?

What is the effect of gamified training for enhancing the skills of the engineering graduates on their perceived performance?

2. Literature Review

A Gamification

Some authors have conceded that it is difficult to trace the origin of gamification (Kim, Song, Lockee & Burton, 2018). It can be defined as a behaviour shift through playful experiences (Reiners & Wood, 2015). The term is in limelight for the past ten years. Games are efficient and alluring as they ensure learner's engagement. Welbers et al. (2019) have argued that learning experiences become more engaging with the game elements. Stieglitz et al. (2017) stated that efficiency of human work and execution gets multiplied with the gamification. It helps an individual reach points where there is complete concentration in the activity or loses track of time and consciousness (Kim, Song, Lockee & Burton, 2018). Hakak (2019) argued that gamification tends to enhance the process of learning. It can be termed as a special arranged system which comprises diverse activities, aimed at efficient learning and good educational results.

The most recent studies have focused on applying gamification in the education sector to promote the learning process (Hakak, 2019). Dichev and Dicheva (2017) have justified the gamification on the grounds for increasing engagement in educational settings. Fardo (2014) has stated that the games generate involvement amongst the learners. The chief objectives of gamification are to foster abilities, making learning purposeful, engaging students, optimizing learning and introducing behaviour change amongst the learners (Knutas et al., 2014; Krause et al., 2015; Dichev & Dicheva 2017; Borges et al., 2013). Hakulinen & Auvinen (2014) and Tvarozek & Brza (2014) have emphasised the increase in engagement and retention with a simultaneous increase in user retention, knowledge and cooperation with gamification techniques.

B. Employability skills

Employability skills can be defined as the ability to seek employment that requires certain attributes among engineers. Business dictionaries (2017) define employability skills as essential qualification for any job offer and hence are mandatory for any student's success in a workplace. Jackson (2016) remarked that the graduates' employability is a combination of soft skills and graduate attributes. Lane (2017) conducted an interesting study about the myth of job readiness in which job readiness was analysed with the written competence of a graduate. Monteiro (2016) researched engineering graduates and concluded that communication, social, and emotional competencies are needed the most for employability skills. Gaughan et al. (2017) stressed the need of developing self-awareness in an engineering student and the student should also be facilitated to improve his individual development. Evans et al. (2017), through his investigation, suggested that applied skills such as communication skills, critical thinking, and the ability to collaborate are the most needed employability skills.

Since 1990, Government, industry, educationists, and researchers have insisted that higher education sector should associate learning and training with employment skills (Mason, 2006). Nowadays, employability skill is also used interchangeably as generic skills, 21-century skills, non-technical skills, and key skills. Today graduate attributes have become more significant than their degrees. During recent times, online education provided more opportunities for exploring the use of gamification technologies.

The teachers opted for the latest technological ways to impart training to the learners. As a result, game-based training/gamified training became ubiquitous. The current study's main objective is to investigate the effect of gamified training for enhancing the engineering students' skills on their perceived performance. The present paper explores the several skills which may have been affected by the introduction of the latest technologies of gamification. Sailer et al. (2017) has suggested that game-based elements help to develop work competencies and address psychological needs for competence, autonomy, and relatedness and thereby increase learners' motivation in working or learning contexts. As such the present study focuses on the effect of gamified training on the following skills:

1) Interpersonal skills

Every organization needs personal and professional interaction on the part of employees and hence interpersonal skills acquire a major role in employability skills. Ward et al. (2005) argued that good interpersonal skills contribute to the overall persona of a candidate as he is found to be optimistic, confident, and willing to help others. According to Robles (2012), interpersonal skills are also termed as people skills and are highly valued in any organization. These skills promote a conducive environment in the organization and also develop a rewarding relationship with the customers.

With the advent of gamification in the teaching and learning process, interpersonal skills have been affected as the students had to come out of their shells and had to collaborate with other students. Sometimes the game or the task posed a need to interact with their partners and hence interpersonal skills were directly affected. Waytz and Gray (2018) have said that social links are generated through games. Cruea (2020) supports it on the ground of improving mental health and Valkenburg and Peter (2009) consider that games are an important measure to reduce isolation amongst learners:

H1: Gamified training for enhancing the interpersonal skills of the engineering graduates has a significant positive effect on their self-perceived performance.

2) Adaptability and flexibility

Organizations generally employ individuals who are flexible in their approach and can acclimatize

themselves as per the needs of the company and environment. MacDuffie (1995) defined flexibility as the trait where employees do not have any rigid notions about their roles and can perform any tasks as per the need. Bedwell et al. (2014) remarked that adaptability is essential needed by all organizations as it ensures that business can pass through any phase.

Emerging technologies have impelled the teachers to opt for gamification hence there is a transformation in the teaching pedagogy and learning strategies. The students could overcome their notions about learning and adapt themselves as per the changing scenario. The flexibility was imparted through gamification and it provided the students new scope to unleash their potential. Varonis and Varonis (2015) have argued that games help student master new concepts and then enable the students to apply these concepts to solve challenging situations and apply previous knowledge for new situations. The following hypothesis was framed:

H2: Gamified training for enhancing the adaptability and flexibility of the engineering graduates has a significant positive effect on their self-perceived performance.

3) Communication skills

Communication skills have become a prerequisite in today's time. It requires the interaction between two parties at mutually benefitting propositions. At a workplace too, the employee is supposed to communicate with colleagues, workers, and higher officials. The lack of communication can create barriers to relationships and efficient work. Crawford et al. (2011) remarked that a student, having better communication skills, has an advantage over others. Conrad (2011) also remarked that communication is beneficial for employees as well as for organizations. Du Babock (2006) states that communication skills are essential for nourishing relationships among customers and employees and are the key force for the success of any organization. Crawford (2011) maintains that communication skill is a broad term covering several facets of communication, including oral communication, written communication, social media communication, communicating pleasantly and cordially, and asking good questions is also included in it. Dicheva et al. (2015) have argued that knowledge can be supported and reinforced by using games in learning. Moreover, it also embellishes collaboration, communication and problem- solving

skills. Albiladi et al. (2018) have supported the usage of games and movies and have termed them as authentic and engaging tools of learning in language classrooms.

With the help of gamification, the communication skills of the students can be strengthened. The teachers can introduce several gaming activities in their classes and the communication in pair or group could be feasible which ultimately led to enhancement of communication skills amongst students. Jahanke (2010) remarked that online discussion forums increased the students' competence in communication and they learned the concepts better with their peer group. P.S .et al. (2018) very aptly remark that the students, graduating in this era, should be quite conversant with forms of communication on all electronic portals. As such, the following hypothesis was framed:

H3: Gamified training for enhancing the communication skills of the engineering graduates has a significant positive effect on their self-perceived performance.

4) Teamwork and relatedness

Teamwork is composed of different individuals who have distinct characteristics, working on one platform. Scarniti (2001) has rightly remarked that with teamwork, ordinary people can achieve extraordinary results. Fisher et al. (1997) argue that a team should necessarily have a common purpose and a goal. Griffin (2013) maintains that employers also want to recruit those employees who are good at teamwork so that they can work well with their peers and seniors. Evans et al. (2017) conducted a study in which he ascribed team skills as one of the foremost skills for employability. Yang et al. (2016) remarked that collaboration and teamwork are prerequisites for any workplace. Matthews and Mclees (2015) ascribed the success of an organization to working together with different people with different expertise, skill, and attributes. Maruping and Magni (2015) said that modern organizations rely more on teamwork as it enhances innovation and exceptional performance.

With gamification, the students are given adequate opportunities to collaborate which results in the enhancement of team-building capacities and perceived performance in personal life and workplaces. Balakrishnan (2021) remarks that dynamics, components and mechanisms are the

diverse elements of gamification. Dynamics is the structure and mechanics is the method of the game hence game increases the dynamics and mechanics. Based on the extant literature, the following hypothesis was framed:

H4: Gamified training for enhancing the teamwork and relatedness of the engineering graduates has a significant positive effect on their self-perceived performance.

5) Competitiveness

It is needed by all organizations as in the increasingly competitive environment, the challenges have grown manifold. Hence a dynamic learning atmosphere is needed to develop the required skills among the engineering graduates. Ananthram and Nankervis (2014) remarked that all businesses require a different set of skills in employees and hence occupation orientation should suit the requirements of the current business trends and market so that they can tackle the problems at large. The technology of gamification assists the trainees in unravelling their competitiveness and in developing an understanding to solve problems and compete with others. Buckley et al. (2016) and Silva et al. (2021) have remarked that gamification induces motivation and interest amongst students. Buckley et al. (2016) has deemed motivation, skills, flow and learning by the teachers as well as the students responsible for the increasing popularity of gamification in higher educational institutions.

H5: Gamified training for enhancing the competitiveness of the engineering graduates has a significant positive effect on their self-perceived performance.

6) Need for Achievement

The need for achievement is one of the important employability skills. Companies are willing to recruit individuals who are ready to take up the initiatives, think on their own, and remain committed to exploring new avenues and have a need for accomplishment. Andronic (2011) said that the people with initiative-taking capacity are widely respected in society and bring long-term success and survival for individuals. With the new technology of gamification, there is tremendous growth in the capacity of students. It ranges from planning the activity, utilizing the time significantly to various interpersonal activities in the

class and executing the activity optimally which again necessitates the initiative-taking capacity of an individual. Kirillov et al. (2016) has supported the use of gamification as it increases student involvement and active participation in the teaching-learning process which becomes vital for learning.

H6: Gamified training for enhancing the need for achievement of the engineering graduates has a significant positive effect on their self-perceived performance.

7) Creativity

Birgili (2015) defines creativity as an asset of action, keeping in mind specific tasks, objectives with which people come up with unique ways to solve an issue. Lee and Benja (2015) said that the constant changes in the work environment have stressed the need for creativity and innovation. Sripirabaa and Maheswari (2015) argued that looking at the changing business scenario and the challenges posed by economies; every employee has to be creative and innovative. Employers always look for people who can come up with creative solutions to emerging problems and add out-of-the-box solutions to imminent problems. With gamification, creativity is enhanced as the students learn to rely upon their ways of thinking and resolve the problems on their own. It not only increases their analytical thinking but also provides creative solutions to the problems. Vartanian and Beatty (2015) have supported gamification as it enhances creativity amongst students.

H7: Gamified training for enhancing the creativity of the engineering graduates has a significant positive effect on their self-perceived performance.

8) Problem-solving skills

Problem-solving skills are essentially needed in a workplace as the competition and environment keep posing one or another issue before the employees and they need to tackle them with their intellect and acumen. Gordon (1998) said that a constructive and enriched curriculum, coupled with practical exercises, can train the students to face practical problems and they become proficient in handling them with ease. Wood et al. (1989) remarked that problem-solving skills can be developed with a learning schedule in which multifarious skills are taught to the learners. The current educational scenario provided ample opportunity to the students to have a discussion with

their peer groups on case studies and simulations. This assisted them to solve the problems at hand and enriched their employability skills. Kapp (2013) has recommended gamification and has termed it as an emerging trend as it promotes learning, develops problem solving skills amongst learners and embellishes their overall experience.

H8: Gamified training for enhancing the problem-solving skills of the engineering graduates has a significant and affirmative effect on their self-perceived performance.

9) Self-Perceived performance

Till date no study has investigated the effect of gamified training to enhance the skills of engineering graduates and its impact on their performance, as such it needs further exploration. Andreu and Treiblmaier (2020) have remarked that gamification affects the intrinsic and extrinsic motivation of the students and helps increasing their devotion towards completing a particular task. Hong et al. (2021) have argued that gamification creates an interesting environment in the classroom setting and helps in fostering the curiosity of the students and is able to hold their attention for a long time. Luu and Thi (2010) have justified it on the basis of motivational strategies which result in the increase of attention span amongst the students. Gamification can influence their efficacy and they also provide fun and pleasure in the execution of their duties (Stiegitz et al., 2017).

3. Research Methodology

Instrument and participants

This study employed a descriptive cross-sectional survey. The survey instrument was developed through an extensive literature review to identify a scale incorporating effect of gamified training on skills of engineering graduates. The survey forms were circulated among the respondents. The e-questionnaire used consisted of a 30-item scale; it was separated in 2 sections, one comprising items on demographics, e.g. gender, age, etc., and second comprising items on gamified training for enhancing select skills and engineering students' self-perceived performance. The scale was adapted and modified from Alvi and Sharma's (2018) study on employability skills and perceived performance of engineering students in India. To assess the students' perception of the effect of gamified training on the

select skill and its impact on their self-perceived performance all items were modified and rephrased. The survey included items for measuring the gamified training for enhancing the skills (sample item: The gamified training helps me improve my interpersonal skills, etc.). A five-point Likert scale was utilized, with 1 representing "Not significant" and 5 representing "Most significant."

The participants included engineering students (n=289) from the two colleges from the State of Rajasthan. The participants were recruited through random sampling. The engineering students eligible for the study had been given ample opportunity to use these new technologies with gamification features for a period of one year. Gamified training was adopted to enhance their skills with gamification features including Blinkist, Kahoot, Quiz Up, Duolingo, Socrative, Tiny Cards, Maven, Course hero, Memrise, etc. Using gamified training, the interaction between engineering students as trainees and teachers was achievable. Gamified training also helped the trainees to connect with their peers and ultimately fostered desirable skills. Feedback on the use of gamified training for enhancing the engineering students' skills was sought after one year at the end of the academic session 2020-21.

Pilot Study

To test the quality of the instrument, a pilot survey involving 20 randomly selected engineering students/trainees preceded the main study. The first part contains questions about the age, gender, etc. of the respondents. The next section consists of statements divided into eight constructs in the study. Having met the Cronbach's alpha threshold of .07 as recommended (Faizan & Zehra, 2016), the instrument was deemed fit for the main study.

Data Analysis

SPSS ver. 26 was used to analyse the gathered data. Descriptive and inferential statistics (correlation and multiple regression analyses) were carried out to show the nature and contribution of the predictive factors (independent variables) on the students' perceived performance (dependent variable). Results were then used to draw relevant conclusions of the study.

4. Results

An overview of the demographic variables related

to their gender, age, and branch of the study of the respondents participating in the present research is presented in the given tables. The distribution of the respondents according to gender depicted that among the respondents, 76 % were male while 24% were female. Thus, males dominated the females in the sample. Based on the frequency of respondents according to their branch, it was found that the majority of the students were from the Computer Science (36%), followed by Electronics (20%), Electrical (18%), Mechanical (15%), and Civil Engineering branches (11%).

Reliability

Cronbach alpha test was used to test the reliability of the questionnaire. Cronbach's alpha, the reliability of the scale must be >0.6 for such studies as per Nunnally and Bernstein (1994). Table II shows the reliability measurements of all the constructs, which range from 0.832 for Gamified Training for Competitiveness to 0.920 for Gamified Training for Problem-solving skills, were much higher than 0.6. This established that the instrument was reliable and fit for the further analysis.

Table 1 :
Reliability Measures

Construct	CA	Number of items
GT for Interpersonal skills	.846	3
GT for Adaptability and flexibility	.908	3
GT for Communication skills	.850	3
GT for Teamwork and relatedness	.907	3
GT for Competitiveness	.832	3
GT for Need for Achievement	.905	4
GT for Creativity	.839	3
GT for Problem-solving skills	.920	4
Self-Perceived Performance	.843	3

Table II shows the mean and standard deviation of all the select constructs. The mean score ranged from 9.41 to 13.59; Need for Achievement (13.59) had the highest mean score and interpersonal skills (9.41) had the lowest mean score. Through the high mean scores, it could be inferred that gamified training for enhancing skills were significant in the perception of the engineering graduates. The students were extremely positive about gamified training they

Table 2 :
Mean, Standard Deviation, Skewness, And Kurtosis

Construct	Min	Max	Mean	Std. Error	Std.D	Skewness	Kurtosis
Age	16	24	18.90	.071	1.202	1.113	2.849
GT for Interpersonal skills	3	15	9.43	.191	3.232	-.235	-.623
GT for Adaptability and flexibility	3	15	9.65	.193	3.272	-.353	-.543
GT for Communication skills	3	15	9.41	.199	3.364	-.186	-.781
GT for Teamwork and relatedness	0	15	9.65	.205	3.479	-.359	-.691
GT for Competitiveness	3	15	10.73	.193	3.265	-.611	-.267
GT for Need for Achievement	4	20	13.59	.249	4.226	-.388	-.433
GT for Creativity	3	15	10.49	.201	3.411	-.445	-.684
GT for Problem-solving skills	4	20	11.92	.277	4.694	.042	-.955
Self-Perceived Performance	3	15	9.64	.193	3.273	-.196	-.604

GT- Gamified Training

received. Living in a world of technology, relying on self-paced and self-directed modes of training, enticed them. Next, Multiple Linear Regressions, MLR was conducted to validate the eight hypotheses formulated.

To examine which factors have a significant association with self-perceived performance of the engineering students, multiple linear regression MLR model was used for the present study. The approach was useful when there was no theoretical / analytical structure available from extant literature; moreover, this methodology is normally utilized for exploring and maximizing prediction (Pedhazur, 1997). Field (2009) maintains that in MLR checking issues of multi-collinearity violation is important; the variables must not be connected closely with each other, for which Pearson Correlation test was conducted. The results were found to be satisfactory. Additionally, tests for variance inflation factor (VIF) and tolerance level estimations (Field, 2009) were conducted. Significance level at $p < .05$ was maintained which is normally used (Krawthol & Anderson, 2001). For scrutinizing the significance and comparative significance of the predictive factors in the present study, the unstandardized coefficient beta values and

the standardized beta values were scrutinized. Next, the R² revealed the relations among the select eight predictive factors and the dependent factor. The independent predictive factors explained 84.0% of the variation in the dependent factor (Adjusted R²= .840) in the context of gamified training for enhancing skills of engineering students.

The main objective of this research was discovering the influence of the predictive factors (effect of gamified training on Communication skills, Adaptability and flexibility, Interpersonal skills, Teamwork and relatedness, Competitiveness, Need for Achievement, Creativity, and Problem-solving skills) and the dependent factor- Self-Perceived Performance (SP). The test was administered to find out the prominent factors which may predict the self-perceived performance of the engineering graduates. The Model Summary results are shown in Table III.

Table 3 :
Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.919 ^a	.845	.840	1.308	.845	189.192	8	278	.000

a. Predictors: (Constant), Interpersonal skills, Adaptability and flexibility, Communication skills, Teamwork and relatedness, Competitiveness, Need for Achievement, Creativity, and Problem-solving skills

Table IV, Anova specifies the total significance of the model; this advocates that the regression model is statistically significant as the p-value is less than 0.05, i.e., there is an association between self-perceived performance and gamified training for enhancing the skills of the engineering graduates.

Table 4 :
Anova

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2588.577	8	323.572	189.192	.000b
	Residual	475.458	278	1.710		
	Total	3064.035	286			

Dependent Variable: SP

b. Predictors: (Constant), Interpersonal skills, Adaptability and flexibility, Communication skills, Teamwork and relatedness, Competitiveness, Need for Achievement, Creativity, and Problem-solving skills

As shown in Table V, the beta values and significance p values were observed. Founded on the

outcomes of the beta values, two predictive factors were found to have no insignificance. T-values were significant at a 95% level of confidence, which also indicates the same. There exists a positive impact of Gamified training for enhancing the Interpersonal skills of the students on their self-perceived performance as beta (0.008) is positive, but the p-value > 0.05 indicates that the relationship is not statistically significant. The same goes for Gamified training for enhancing Adaptability and flexibility, since beta (0.058) is positive, but p-value is more than 0.05. The impact Gamified training for enhancing Communication skills on self-perceived performance is significantly positive as the beta value (.105) is positive and p is less than 0.05 (0.017). There exists a positive and significant influence of Gamified training for enhancing Teamwork and relatedness ($\beta=.151, p=.000$), Competitiveness ($\beta=.134, p=.001$), Need for Achievement ($\beta=.164, p=.000$), Creativity ($\beta=.115, p=.002$), and Problem-solving skills ($\beta=.503, p=.000$) on the dependent variable self-perceived performance. In the light of these findings, all hypotheses framed except H1 and H2 were validated.

The results presented in Fig. 1 help in understanding the relationships between gamified training for enhancing the skills of engineering

graduates and its impact on their perceived performance. They also indicate the significance of investigating gamified training further as a means of motivating the engineering students and assisting them in acquiring skills needed for the present era.

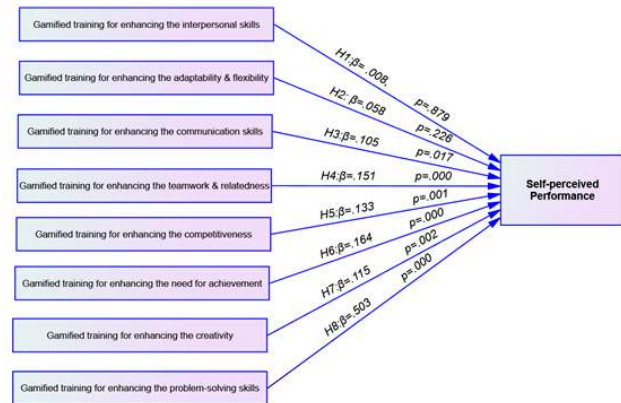


Fig. 1: Research Model based on authors' calculations

5. Discussion

The main objective of the study was to explore the association between each predictive variable (effect of gamified training on select skills) and the dependent variable (self-perceived performance of undergraduate students). An extended and modified proposed model, Fig. 1, was introduced and evaluated using empirical data. Using the multiple linear regressions, the following predictive variables were examined: effect of gamified training on Communication skills, Adaptability and flexibility, Interpersonal skills, Teamwork and relatedness, Competitiveness, Need for Achievement, Creativity, and Problem-solving skills. The study was conducted in two reputed institutes in the State of Rajasthan using sample collected from engineering students ($n=289$), who received gamified training for a period of one year. It is worthy to note that high mean scores of all the selected variables also indicated that students consider them to be vital determiners of their self-perceived performance.

The skills were selected based on their significance grounded on extant literature. Hesketh (2000) conducted a study where he ascribed communication skills as one of the nine skills which play a prominent role in getting him hired. According to Benett (2002), teamwork and interpersonal skills are the foremost employability skills and play a positive role in the perceived performance of a learner. Humburg and Velden (2015) also insisted on interpersonal skills to

Table 5 :
Coefficientsa

Model	Unstd. Coefficients		Std. Coefficients	T	Sig.	95.0% Conf. Interval	
	B	Std. Error				LL	HL
(Constant)	.087	.301		.289	.773	-.506	.680
H1: GT for Interpersonal skills	.008	.055	.008	.153	.879	-.100	.117
H2: GT for Adaptability and flexibility	.058	.048	.058	1.214	.226	-.036	.152
H3: GT for Communication skills	.102	.042	.105	2.406	.017	.186	.019
H4: GT for Teamwork and relatedness	.142	.038	.151	3.760	.000	.068	.217
H5: GT for Competitiveness	.134	.039	.133	3.441	.001	.057	.210
H6: GT for Need for Achievement	.127	.034	.164	3.706	.000	.060	.195
H7: GT for Creativity	.110	.035	.115	3.178	.002	.042	.178
H8: GT for Problem-solving	.351	.031	.503	11.319	.000	.290	.412

GT= Gamified training, LL =lower level, HL= higher level

be the key factor in recruitment. Velasco (2012) credited the personal qualities of an individual for employability. Several studies emphasized adaptability and flexibility as the core factors to ensure employability skills of an individual (Wats & Wats, 2009; Touloumakos, 2011; Robles, 2012; Ballesteros-Sánchez et al., 2017). Several researchers (Cimatti, 2016; Succi, 2019; Thompson, 2019) consider creativity and problem-solving as the traits needed in an individual for his employability. Interpersonal skills including team building are needed the most to be employed in any organization (Kantrowitz, 2005; Bancino & Zevalkink, 2007; Succi & Canovi, 2019; Thompson, 2019). Thus, gamified training for improving each of these skills can influence the students' self-perceived performance, particularly gamified training for enhancing communication skills, Teamwork and relatedness, Competitiveness, Need for Achievement, Creativity, and Problem-solving skills contributed significantly to the prediction of the self-perceived performance of the engineering graduates, indicating the affirmative role of new technology with gamification features. However, results indicated that Gamified training for enhancing Interpersonal skills as well as adaptability and flexibility of the engineering students on their self-perceived performance was positive, but the relationship was not statistically significant.

Da Rocha Seixas et al. (2016) have argued that gamification technique is a new technique which has the potential to increase the engagement of the participants by turning their tasks into more enjoyable activities. Trusova (2018) has also agreed that the participants can generate novel ideas through gamified teamwork instead of non-gamified teamwork. Gamified training has promoted teamwork by motivating the different members and it also improves their communication skills, helping them perform better in all scenarios (Knutas et al., 2014). Ozhan and Kocadere (2020) have stated that the gamified tools instigate the curiosity amongst the students which help them discover new things and keep them motivated in the task. Mokeddem (2019) has also agreed that the learners hone their cognitive skills and adapt competitiveness to increase their performance in all spheres with gamified training. Bayat (2014) has confirmed that the use of educational games ensures the participation from all the students including even the shy ones and this helps to arouse the interest and aptitude towards learning a particular course. Active participation of the students

enables them to express their ideas and thoughts and nurtures their creativity too (Uberman, 1998). Figueroa Flores (2015) remarks that gamified training accords the students a sense of engagement, feedback, feeling of achieving something and helps them battling a challenge and overcoming it. Huang and Hew (2018) have remarked that gamification requires a challenge, some feedback, competitive spirit and levels of achievement.

4. Recommendations

The consequences of the current study have several practical and theoretical implications. Looking at the relevance of gamification techniques and apps in enhancing the employability skills amongst the engineering the graduates, it will be vital for administration to implement the gamified training for enhancing the engineering students' skills. A lot needs to be done in sensitising people towards the benefits of these gamification elements and their proper implementation in higher education. There is a lot of scope for technical departments to develop and provide gamified training and resources which can help train the students for the competitive job market. Moreover, the faculty should also be trained and be ready to take up the initiative and learn the nuances of applying these techniques in their classes so that its success can be ensured. The policy makers can organise sessions to spread the awareness about gamified training so that the techniques can be implemented in other institutes as well. The policymakers, technical department, educators and government bodies need to be proactive in seeking ways of augmenting the use of gamified training.

7. Limitations & Future Scope

The sample size in this study is not enough to generalize the outcomes, due to financial and time constraints. Thus, it is suggested to increase the sample size in future studies to generate more reliable results. This study only gathered information from students of two select institutes from the state of Rajasthan; therefore, it is not a representable population. Secondly, the study should be conducted in other States in India as well to validate the proposed model. The study is based on a few selected skills; more skills may be studied in forthcoming researches to broaden the focus of research. Our study's reliance on a single test may not capture the full spectrum of employability skills. Moreover, due to time constraints, the study's duration was relatively short,

potentially limiting the depth of insights into long-term effects.

Conclusion

The study explored the connection between gamified training for enhancing the skills of students and their self-perceived performance. The topic under research is critical for enhancing the employability of engineering graduates since getting employment after the completion of professional education is the ultimate aim of all professional students. The study concludes that gamified training using new technologies played a major role in improving the self-perceived performance of engineering graduates. It is important to note that the students were highly positive about gamified training they received. Living in a world of technology, relying on self-paced and self-directed modes of training, enticed them. Hence, their perception, observation and implementation are paramount. The study concludes that new technologies with gamification features and gamified training have immense potential to improve the skills of the students as well as their performance.

Appendix Questionnaire

Questionnaire on the use of new technologies with gamified elements for enhancing Communication skills, Adaptability and flexibility, Interpersonal skills, Teamwork and relatedness, Competitiveness, Need for Achievement, Creativity, and Problem-solving skills on engineering students' Self-Perceived Performance.

The Likert scale ranges from 1 to 5, where 1 represents "Strongly Disagree" and 5 represents "Strongly Agree."

Gamification tools refer to tools with gamification features including Blinkist, Kahoot, Quiz Up, Duolingo, Socrative, Tiny Cards, Maven, Course hero, Memrise, etc.

Interpersonal Skills (3 Items)

Gamified elements in new technologies assist me to relate with other people and communicating with them in everyday interactions.

Gamified elements in new technological tools make me confident of speaking/ presenting comfortably in front of an audience.

I can overcome hesitation, interact with new people and make connections easily using Gamified elements.

Adaptability/ Flexibility (3 Items)

Technological tools with Gamified elements are easy to use.

Gamified elements in new technologies provide me a flexible learning environment which can fit well in my daily schedule.

Through Gamified elements present in new technologies I can complete tasks at my own pace.

Communication (3 Items)

Gamified elements in new technologies help me learn new words (vocabulary).

Due to the assistance provided by Gamified elements of technologies I am more comfortable speaking during verbal discussions with my colleagues.

Gamified elements provided by new technologies help me learn correct sentence structures.

Team Work/ Relatedness (3 Items)

Gamified elements in new technologies facilitate working in groups which saves time.

Technologies with Gamified elements help to work together on tasks in order to make the best use of everyone's skills.

Through Gamified elements provided by new technologies I can guide and support others in order to accomplish something.

Competitiveness (3 Items)

The integration of new technologies with gamified elements motivated me to compete with others.

The leaderboard and competitive features in the new technologies encouraged me to strive for better performance.

The interactive and engaging nature of the gamified elements fueled my competitive spirit and pushed me to improve my skills.

Need For Achievement (4 Items)

The use of new technologies with gamified elements provided a sense of accomplishment when I achieved goals or milestones.

The badges and rewards system in the new technologies motivated me to complete tasks and challenges.

The clear objectives and targets set within the gamified elements of the new technologies inspired me to work harder and achieve more.

The progress tracking and analytics features in the new technologies helped me monitor my achievements and progress over time.

Creativity (3 Items)

The incorporation of gamified elements in new technologies stimulated my creative thinking and problem-solving abilities.

The interactive challenges and puzzles in the new technologies encouraged me to come up with innovative solutions.

The immersive and exploratory nature of the gamified elements in the new technologies inspired me to think outside the box and explore new ideas.

Problem Solving Skills (4 Items)

The use of new technologies with gamified elements improved my ability to analyze problems and find effective solutions.

The problem-solving scenarios and simulations provided by the gamified elements in the new technologies helped me develop my skills.

The real-time feedback and guidance provided by the gamified elements in the new technologies enhanced my problem-solving approach.

The collaborative features within the gamified elements of the new technologies allowed me to work with others and solve complex problems more effectively.

Self-perceived Performance (3 Items)

Gamified elements within new technologies help me learn efficiently.

Gamified elements within new technologies provides me find authentic learning material.

Through the new technologies with Gamified elements, I can take control of my own learning.

References

- Albiladi, W. S., Abdeen, F. H., & Lincoln, F. (2018). Learning English through movies: Adult English language learners' perceptions. *Theory and Practice in Language Studies*, 8(12), 1567-1574. <https://doi.org/10.17507/tpls.0812.01>
- Alvi, I. (2021). College students' reception of social networking tools for learning in India: an extended UTAUT model. *Smart Learning Environment*. 8 (19). 10.1186/s40561-021-00164-9
- Alvi, I., & Sharma, A. (2018). Analyzing Professional students' employability Skills and their Contribution on the Perceived Performance. *International Journal of Management, Technology and Engineering*, 8(9), 622-632. <https://doi.org/16.10089.IJMTE.2018.V8I11.17.2078>
- Ananthram, S., & Nankervis, A.R. (2014). Outcomes and benefits of a managerial global mind-set: An exploratory study with senior executives in North America and India. *Thunderbird International Business Review*, 56(2), 193-209.
- Andrews, J., & Higson, H. (2008). Graduate employability, soft skills versus 'hard' business knowledge: a European study. *Higher Education in Europe*, 33(4), 411-422.
- Andronic, R., & Andronic, A. (2011). Counselling and guidance of volunteers in Romania-a psychological approach. *Procedia-Social and Behavioral Sciences*, 30, 1852-1856.
- Balakrishnan, N. B. (2021). Endorsing gamification pedagogy as a helpful strategy to offset the COVID-19 induced disruptions in tourism education. *Journal of Hospitality, Leisure, Sport & Tourism Education*.

- Ballesteros-Sánchez, L., Ortiz-Marcos, I., Rivero, R. R., & Ruiz, J. J. (2017). Project management training: an integrative approach for strengthening the soft skills of engineering students. *International Journal of Engineering Education*, 33, 1912–1926.
- Bancino, R., & Zevalkink, C. (2007). Soft skills: the new curriculum for hard-core technical professionals. *Techniques: Connecting Education and Careers*, 82, 20–22.
- Bayat, S., Kılıçarslan, H., & Şentürk, Ş. (2014). Investigating the effect of educational games in science and technology course on the academic success of students at grade 7. *Abant İzzet Baysal University Faculty of Education Journal*, 14(2), 204-216.
- Bedwell, W.L., Salas, S.M., & Eduardo. (2014). Developing the future workforce: An approach for integrating interpersonal skills into the MBA classroom. *Academy of Management Learning & Education*, 13(2), 171-186.
- Bennett, R. (2002). Employers' demands for personal transferable skills in graduates: a content analysis of 1000 job advertisements and an associated empirical study. *Journal of Vocational Education & Training*, 54(4), 457–476.
- Birgili, B. (2015). Creative and critical thinking skills in problem-based learning environments. *Journal of Gifted Education and Creativity*, 71-80.
- Board of Studies Teaching and Educational Standards (BOSSES). (2014). Employability skills in retail services. Crown in right of the State of New South Wales, Sydney, Australia.
- Borges, S.D.S., Reis, H.M., Durelli, V.H., Bittencourt, I.I., Jaques, P.A., & Isotani, S. (2013). Gamificação aplicada à educação: um mapeamento sistemático. *Brazilian Symposium on Computers in Education: Sociedade Brasileira de Computação*, 24, 234. <https://doi.org/10.5753/cbie>.
- Buckley, P., Doyle, E. (2016). Gamification and Student Motivation. *Interactive Learning Environment*, 24, 1162 - 1175.
- <https://doi.org/10.1080/10494820.2014.964263>.
- BusinessDictionary.com. (n.d.). Employability skills. Retrieved March 25, 2017, from <https://businessdictionary.info/definition/employability-skills/>
- Cimatti, B. (2016). Definition, development, assessment of soft skills and their role for the quality of organizations and enterprises. *International Journal of Quality Research*, 10, 97–130.
- Conference Board of Canada. (2013). Employability skills 2000. The Conference Board of Canada. Retrieved from http://www.conferenceboard.ca/Libraries/EDUC_PUBLIC/esp2000.sflb
- Conrad, D., & Newberry, R. (2011). Business Communication Skills: Attitudes of Human Resource Managers versus Business Educators. *American Communication Journal*, 13(1): 4–23.
- Crawford, P., Lang, S., Fink, W., Dalton, R., & Fielitz, L. (2011). Comparative Analysis of Soft Skills: What is Importance for New Graduates? Washington DC: Association of Public and Land-grant Universities.
- Cruea, M. (2020). Gaming the Mind and Minding the Game: Mindfulness and Flow in Video Games. In R. Kowert (eds.), *Video Games and Well-Being* (pp. 97-107), Macmillan. https://doi.org/10.1007/978-3-030-32770-5_7.
- Da Rocha Seixas L., Gomes A.S., De Melo Filho I.J. (2016). Effectiveness of gamification in the engagement of students. *Computers in Human Behavior*, 58, 48-63.
- Da Silva, R.J.R., Rodrigues, R.G., & Leal, C.T.P. (2019). Gamification in Management Education: A Systematic Literature Review. *Brazilian Administration Review*, 16. <https://doi.org/10.1590/1807-7692bar2019180103>
- Deepa, S. & Seth, M. (2013). Do soft skills matter? - Implications for educators based on recruiters'

- perspective. IUP Journal of Soft Skills, 7-20.
- Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011). From Game Design Elements to Gamefulness: Defining “Gamification”. Proceedings of the 15th International Academic MindTrek Conference: Envisioning Future Media Environments, 9–15.
- Dicheva, D., Dichev, C., Agre, G., & Angelova, G. (2015). Gamification in education: A systematic mapping study. *Journal of Educational Technology & Society*, 18(3), 75-88.
- Dichev, C., & Dicheva, D. (2017). Gamifying education: what is known, what is believed and what remains uncertain: a critical review. *International Journal of Educational Technology in Higher Education*, 14(1), 9.
- Du-Babcock, B. (2006). Teaching business communication: Past, present, and future. *Journal of Business Communication*, 43(3), 253-264.
- Dymora, P., & Niemiec, K. (2019). Gamification as a Supportive Tool for School Children with Dyslexia. *Informatics*, 6. <https://doi.org/10.3390/informatics6040048>.
- Evans, S. G., Davis, J., & Wheeler, M. (2017). An Analysis of School-to-Work Readiness. Saint Louis University.
- Fardo, M.L. (2014). A gamificação como estratégia pedagógica: estudo de elementos dos games aplicados em processos de ensino e aprendizagem [Master's thesis, Universidade de Caxias do Sul]. *D Space*. <https://repositorio.ucs.br/handle/11338/457>.
- Field, A. (2009). *Discovering statistics using SPSS* (3rd ed.). SAGE Publications.
- Figueroa Flores, J. F. (2015). Using gamification to enhance second language learning. *Digital Education Review*, 27, 32–54. <http://revistes.ub.edu/index.php/der/article/view/11912/pdf>
- Fisher, S. G., Hunter, T. A., & Macrosson, W. D. K. (1997). Team or group? Managers' perceptions of the differences. *Journal of Managerial Psychology*, 12(4): 232-242.
- Gaughan, K., Craps, S., Pinxten, M., Saunders, G., & Leandro-Cruz, M. (2017). Professional Roles and Employability of Future Engineers [Paper Presentation]. 45th SEFI Conference, Azores, Portugal.
- Golshan, N., & Tafazoli, D. (2014). Technology-enhanced language learning tools in Iranian EFL context: Frequencies, attitudes and challenges. *Procedia - Social and Behavioral Science*, 136, 114-118.
- Gordon, R. (1998). Balancing real-world problems with real-world results. *Phi Delta Kappan*, 79(5), 390-393.
- Graduate Management Admission Council. (2012). Corporate recruiters survey. <http://https://www.gmac.com/market-intelligence-and-research/research-library/employment-outlook/2012-corporate-recruiters-survey-survey-report.aspx>
- Griffin, M., & Annulis, H. (2013). Employability skills in practice: The case of manufacturing education in Mississippi. *International Journal of Training and Development*, 17(3): 221-232.
- Hakulinen, L., & Auvinen, T. (2014). The effect of gamification on students with different achievement goal orientations [Paper Presentation]. 2014 International Conference on Teaching and Learning in Computing and Engineering (LaTiCE). <https://doi.org/10.1109/latice.2014.10>
- Hara, N., & Kling, R. (2008). Student distress in Web-based distance education. *Educause Quarterly*, 3.
- Heffernan, T., Feng, W., Angell, R., & Fang, Y. (2010, November 29-December 1). The identification

- of marketing focused employability attributes for graduates in China [Paper Presentation]. 2010 Australian and New Zealand Marketing Academy conference, Christchurch, New Zealand, 1–7.
- Hesketh, A.J. (2000). Recruiting an Elite? Employers' perceptions of graduate education and training. *Journal of Education and Work*, 13, 245–271.
- Hong, J., Hwang, M., Liu, Y., & Tai, K. (2021). Effects of gamifying questions on english grammar learning mediated by epistemic curiosity and language anxiety. *Computer Assisted Language Learning*, 1-25.
- Huang, B., & Hew, K. F. (2018). Implementing a Theory-Driven Gamification Model in Higher Education Flipped Courses: Effects on out-of-Class Activity Completion and Quality of Artifacts. *Computer Education*, 125, 254–272. <https://doi.org/10.1016/j.compedu.2018.06.018>.
- Humburg, M., & Velden, R. (2015). Skills and the graduate recruitment process: Evidence from two discrete choice experiments. *Economics of Education Review*, 49, 24–41.
- Humphries, C. (2006). Skills in a Global Economy: Ten Proposals for a UK Skills Policy. *Local Economy*, 21(3), 241-248. <https://doi.org/10.1080/02690940600823924>
- Hylton, K., & Levy, L. (2016). Dringus; utilizing webcam-based proctoring to detect misconduct in online exams. *Computer Engineering*, 53-63.
- Institute for Employment Studies. (2015). IES annual review- 2015. Brighton, UK: City Gate.
- Institute of Technologists. (2011). Development of employability skills. Institute of Technology. Tokyo, Japan.
- İsmail, Y., Ersin, T. Y., & Selahattin, K. (2021). The effect of gamification on motivation in the education of pre-service social studies teachers. *Thinking Skills and Creativity*.
- Ithaca Group. (2012). Employability Skills Framework stage 1: final report, DEEWR, Canberra.
- Jackson, D. (2016). Skill mastery and the formation of graduate identity in Bachelor graduates: evidence from Australia. *Studies in Higher Education*, 41(7), 1313-1332.
- Jahnke, J., 2010. Student Perceptions of the Impact of Online Discussion Forum Participation on Learning Outcomes. *Journal of Learning Design*.
- Kajihara, K. (1997). The student's impression which is expected by an enterprise. *Management Consulting Journal*, 44, 100–103.
- Kantrowitz, T. M. (2005). Development and Construct Validation of a Measure of soft Skills Performance [Doctoral thesis, Georgia Institute of Technology. SMARTech. <https://smartech.gatech.edu/handle/1853/6861>.
- Kapp, K. M. (2013). The gamification of learning and instruction fieldbook: Ideas into practice. John Wiley & Sons.
- Kaur, D. J., Saraswat, N., & Alvi, I. (2021b). Exploring the Effects of Blended Learning using WhatsApp on Language Learners' Lexical Competence. *Rupkatha Journal on Interdisciplinary Studies in Humanities*, 13(4), 1 – 7. <https://doi.org/10.21659/rupkatha.v13n4.60>
- Kirillov, A. V., Vinichenko, M. V., Melnichuk, A. V., Melnichuk, Y. A., & Vinogradova, M. V. (2016). Improvement in the learning environment through gamification of the educational process. *International Electronic Journal of Mathematics Education*, 11(7), 2071-2085.
- Koohang, A., J. & Paliszkievicz. (2013). Knowledge construction in e-learning: An empirical validation of an active learning model. *Journal of Colloid and Interface Science*, 53(3), 109-114.
- Knutas, A., Ikonen, J., & Nikula, U. (2014, June 27-

- 29). Increasing collaborative communications in a programming course with gamification [Paper Presentation]. 15th Int. Conf. on Computer Systems and Technologies, Ruse, Bulgaria , 3 7 0 – 3 7 7 . <https://doi.org/10.1145/2659532.2659620>.
- Krause, M., Mogalle, M., Pohl, H., & Williams, J.J. (2015). A playful game changer: Fostering student retention in online education with social gamification [Paper Presentation]. ACM Conference on Learning, New York, U.S, 95-1 0 2 . <https://dl.acm.org/citation.cfm?id=2724665>.
- Krawthol, D., & Anderson, L. (2001). A taxonomy for learning, teaching, and assessing. College Press.
- Lane, A. (2017). The systemic implications of constructive alignment of higher education level learning outcomes and employer or professional body-based competency frameworks. *Advances in Social Science, Education and Humanities Research*, 102, 341.
- Lauder, S. (2013). Employability skills: The connection between skills and Employment. *G l o b a l E m p l o y a b i l i t y* . <http://hdl.voced.edu.au/10707/287004>.
- Lee, C., & Benza, R. (2015). Teaching innovation skills: Application of design thinking in a graduate marketing course. *Business Education Innovation Journal*, 7(1), 43-50.
- Levy, Y., & Ramim, M. (2015). An assessment of competency-based simulations on e-learners' management skills enhancements. *Interdisciplinary Journal of e-Skills and Lifelong Learning*, 11, 179-190.
- Lu, T.N., & Thi, M.D. (2010). Teaching English grammar through games. *Studies in Literature and Language*, 1(7):61–75.
- MacDuffie, J. (1995). Human resource bundles and manufacturing performance. *Organizational logic and flexible production systems in the world auto industry*. *ILR Review*, 48(2), 197-221.
- Maruping, L.M., & Magni, M. (2015). Motivating employees to explore collaboration technology in team contexts. *MIS Quarterly*, 39(1), 1-16.
- Mason, G., Williams, & Cranmer, S. (2006). Employability Skills Initiatives in Higher Education: What Effects Do They Have On Graduate Labor Market Outcomes?. *RePec*.
- Matthews, R., & Mclees, J. (2015). Building effective projects teams and teamwork. *Journal of IT and Economics Development*, 6(2), 20-30.
- McAllister, G., & Irvine, J. (2000). Cross cultural competency and multicultural teacher education. *Review of Educational Research*, 70(1), 3-24.
- Mitchell, G.W., Skinner, L.B., & White, B.J. (2010). Essential soft skills for success in the twenty-first century workforce as perceived by business educators. *The Journal of Research in Business Education*, 52(1), 43–53.
- Mokeddem, A., Plaisent, M., & Prosper, B. (2019). Learning with the Games: a Competitive Environment based on Knowledge. *Journal of e-Learning and Higher Education*, 1–6.
- Monteiro, S. C., Almeida, L. S., & Vasconcelos, R. (2016, November 14-16). Engineering graduates' perception of competencies and preparation for the labor market transition [Paper Presentation]. *ICERI Proceedings, Spain*, <https://doi.org/10.21125/iceri.2016>
- Morreale, S.P., & Pearson, J.C. (2008). Why Communication Education is Important: The Centrality of the Discipline in the 21st Century. *Communication Education*, 57(2), 224 – 240.
- National Association of Colleges and Employers (NACE). (2014). Job outlook 2014. National Association of Colleges and Employers.
- Navarro, P., & Shoemaker, J. (2000). Performance and perceptions of distance learners in cyberspace. *American Journal of Distance Education*, 14 (2), 15-35.
- Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). McGraw-Hill.
- Özhan, Ş. Ç., & Kocadere, S. A. (2020). The Effects of

- Flow, Emotional Engagement, and Motivation on Success in a Gamified Online Learning Environment. *Journal of Educational Computing Research*, 57(8), 2006–2031. <https://doi.org/10.1177/0735633118823159>.
- Pedhazur, E. J. (1997). Multiple regression assumptions. *ERIC Digest*. <https://files.eric.ed.gov/fulltext/ED470205.pdf>
- Prensky, M. (2010). Teaching digital natives. Corwin press.
- Prieto Andreu, J.M. (2020). A systematic review about gamification, motivation and learning in high school. *Teoría Educ*, 32, 73–99.
- Rajesh, A., & Ara, D. (2006). Technical-skills training in the 21st century. *The New England Journal of Medicine*, 2695.
- Robles, M. M. (2012). Executive perceptions of the top 10 soft skills needed in today's workplace. *Business Communication Quarterly*, 75(4), 453–465. <https://doi.org/10.1177/1080569912460400>.
- Sailer, M., Hense, J., Mandl, H., & Klevers, M. (2017). Fostering development of work competencies and motivation via gamification. *Competence-Based Vocational and Professional Education*, 795–818.
- Scarnati, J. T. (2001). On becoming a team player. *Team Performance Management: An International Journal*, 7(1/2), 5-10.
- Silva, D.F.O., Cobucci, R.N.O., Lima, S.C.V.C., & De Andrade, F.B. (2021). Prevalence of Anxiety, Depression, and Stress among Teachers during the COVID-19 Pandemic: Systematic Review. *medRxiv*. <https://doi.org/10.1097/MD.00000000000027684>.
- Skills USA & NOCTI. (2004). Skills assessment study guide. National Occupational Competency Testing Institute, USA.
- Sripirabaa, B., & Maheswari, S.T. (2015). Individual creativity: Influence of job autonomy and willingness to take risk. *SCMS Journal of Indian Management*, 12(4), 110-118.
- Stieglitz, S., Lattemann, C., Robra-Bissantz, S., Zarnekow, R., & Brockmann, T. (Eds.). (2017). Gamification. Using Game Elements in Serious Contexts. Switzerland: Springer. <https://doi.org/10.1007/978-3-319-45557-0>
- Succi, C. (2019). Are you ready to find a job? Ranking of a list of soft skills to enhance graduates' employability. *International Journal of Human Resource Development & Management*, 19, 281–297. <https://doi.org/10.1504/IJHRDM.2019.100638>.
- Touloumakos, A. K. (2011). Now You See it, Now You Don't: The Gap Between the Characteristics of Soft Skills in Policy and in Practice [Doctoral dissertation, Oxford University].
- Treiblmaier, H., & Putz, L. (2020). Gamification as a moderator for the impact of intrinsic motivation: Findings from a multigroup field experiment. *Learning Motivation*, 71.
- Trusova, P. (2018). The Effect of Gamified Teamwork on Business-related Idea Generation. *Journal of Games, Game Art, and Gamification*, 3 (1), 21-29.
- Tvarozek, J., & Brza, T. (2014). Engaging students in online courses through interactive badges. 2014 International Conference on e-Learning, Spain, 89–95. <https://pdfs.semanticscholar.org/fe68/5176c8d4bf7f6507f3870815f56a65097c89.pdf>
- Uberman, A. (1998). The use of games for vocabulary presentation and revision. *Forum Online*, 36(1), 20.
- US Department of Labor. (1991). The Secretary's Commission on Achieving Necessary Skills (SCANS). SCANS Blueprint for Action: Building community coalitions. Washington, DC: US Department of Labor, The Secretary's Commission on Achieving Necessary Skills (SCANS)

- Valkenburg, P., & Peter, J. (2009). Social Consequences of the Internet for Adolescents: A Decade of Research. *Current Directions in Psychological Science*, 18, 1–5. <https://doi.org/10.1111/j.1467-8721.2009.01595.x>
- Varonis, E. M., & Varonis, M. E. (2015). Deconstructing Candy Crush: What Instructional Design Can Learn from Game Design. *International Journal of Information and Learning Technology*, 32, 150–164. <https://doi.org/10.1108/IJILT-09-2014-0019>
- Vartanian, O., & Beatty, E. (2015). Cognitive brain training, video games, and creativity. *Video Games and Creativity*, 185–198. <https://doi.org/10.1016/B978-0-12-801462-2.00009-6>
- Velasco, M.S. (2012). More than just good grades: candidates' perceptions about the skills and attributes employers seek in new graduates. *Journal of Business Economics and Management*, 13, 499–517.
- Ward, C., Bochner, S., & Furnham, A. (2005). *The psychology of culture shock*. Routledge.
- Wats, M., & Wats, R. K. (2009). Developing soft skills in students. *International Journal of Learning*, 15, 1–10. <https://doi.org/10.4324/9780429276491-1>
- Waytz, A., & Gray, K. (2018). Does Online Technology Make Us More or Less Sociable? A Preliminary Review and Call for Research. *Perspectives on Psychological Science*, 13, 473–491. <https://doi.org/10.1177/1745691617746509>
- Wood, R., & Bandura, A. (1989). Impact of conceptions of ability on self-regulatory mechanisms and complex decision making. *Journal of Personality and Social Psychology*, 56(3).
- Yee, M., Yunos, J.M., Othman, W., Hassan, R., & Mohamad, T.T. (2015). Disparity of learning styles and higher order thinking skills among technical students. *Procedia-Social and Behavioral Sciences*, 204, 143–152.