
GAMIFICATION AS A PERSUASIVE ART: UNVEILING FACTORS HINDERING STUDENT'S CREATIVITY

Shagufta Faryad

MSCS Scholar,
Department of Computer Science, Riphah International University Faisalabad,
Punjab, Pakistan.
Email: shaguftafaryad@gmail.com

Ali Abbas

Senior Lecturer,
Department of Computer Science, FOITCS, University of Central Punjab, Lahore,
Punjab, Pakistan.
Email: ali.abbas@ucp.edu.pk

Muhammad Kashif

Lecturer,
Department of Software Engineering, Govt. College University Faisalabad,
Punjab, Pakistan
Email: kashifmsse@gmail.com

ABSTRACT

Creativity among students is a critical component of effective learning and innovation, yet many educational environments fail to nurture it adequately. Rigid and conventional teaching methods, socio-economic constraints, and a lack of freedom to explore new ideas are identified as significant barriers to student creativity. The overarching goal of this study is to ascertain the underlying drivers of low creativity among students and to examine how persuasive techniques like gamification in learning environments can empower students' creativity by changing their behaviors. A mixed-method approach was deployed to gather data from a diverse pool of administrators, teachers, and experts. Key responses were scrutinized to highlight the root causes of low creativity and to evaluate the impact of gamification on student behavior and creativity. Various evaluation matrices, including student engagement degree, frequency of creative outputs, and feedback from both students and teachers, were used to quantify the efficacy of gamification. The study found that traditional teaching tactics, socio-economic constraints, and restricted exploration opportunities are primary factors contributing to low creativity among students. Expert opinions indicated that gamification, with its persuasive power, has a positive impact on student

behavior, promoting creativity and enhancing effective learning. The analysis revealed that gamification substantially inspires students to elevate their creativity by providing an interactive and thought-provoking learning space. This approach also proved productive in developing critical and innovative skills like problem-solving. The findings recommend that gamification has the potential to revolutionize effective teaching by fostering creativity among students through behavior influence. To achieve a high degree of creativity, incorporating gamified elements into teaching practices is essential. Future research should investigate the long-term influence of gamification on creativity by identifying and deploying specific game-based elements most effective in various educational contexts.

KEYWORDS

Gamification, Creativity, persuasive technology, interactive learning, effective teaching, gamified teaching

INTRODUCTION

Creativity is the trait of productive innovation, many times considered as the skill to discern new elucidations to problems or discover new modes of creative manifestation. The immeasurable ability of an individual to make and do something new, useful and valuable is referred to as creativity (Araújo, 2024; De Dreu, Nijstad, & Baas, 2023). Creativity in relation to the contemporary world of education promotes innovations in every discipline of life e.g. science, literature art, etc. (Sawyer & Henriksen, 2024). Meanwhile, our traditional learning atmosphere with rigid teaching methods, traditional learning approaches hinders student's creativity (Khalil, Tairab, Qablan, Alarabi, & Mansour, 2023; Watini & Setyowati, 2023).

Other socio-economic factors, behavioral changes limit the problem-solving and cognitive abilities of a student. So, creativity dies, even if it sacrifices the compliance and learning comfort of students (Akhmedov, Makhmudova, & Akhmedjonov, 2024; Elbyaly & Elfeky, 2023). The mental processes that help an individual to think critically beyond the boundaries to provoke original ideas can be inspired by gamification (Lampropoulos, 2024). Gamification initiates the concept of using game-based components in a non-game context, especially as a strategy that can change the behavior of students by using gamified features e.g. leaderboards and pinpoints, etc. (Araújo, 2024; Hamari, Xi, Legaki, & Morschheuser, 2023; Khaldi, Bouzidi, & Nader, 2023).

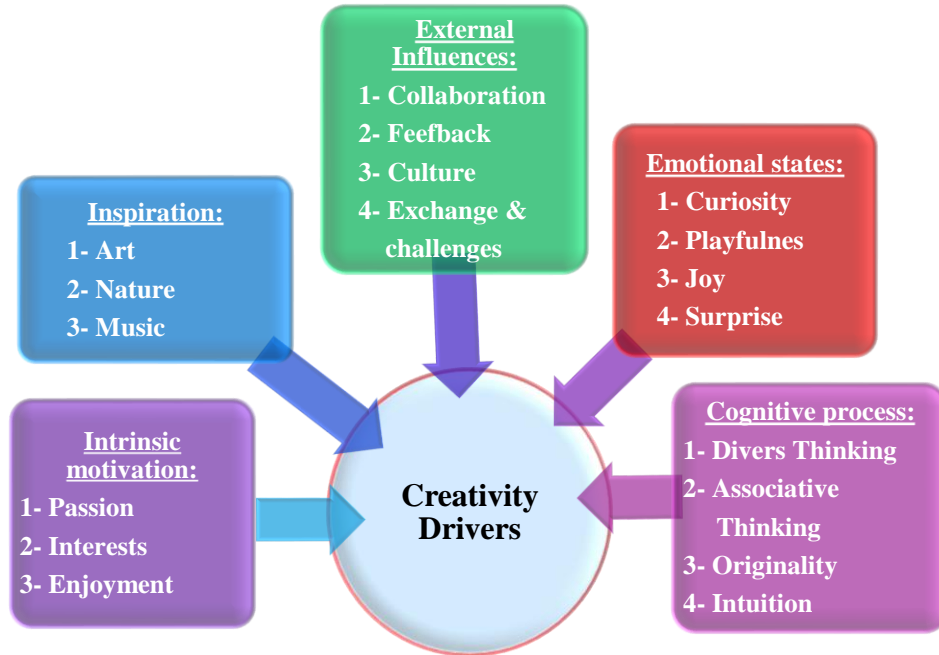


Figure-1(a): Drivers of Creativity (own figure some data derived from (Mommel & Dengel, 2007; X. Zhao, Wang, & Hong, 2022))

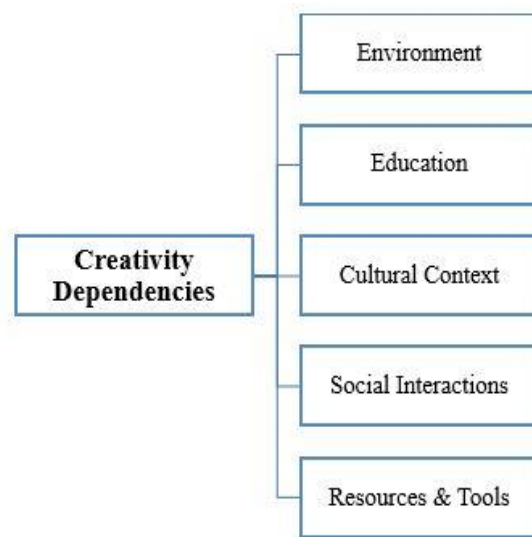


Figure-1(b): Creativity dependencies (own figure some data derived from (Badalov, 2023))

Creativity drivers and dependencies e.g. triggers, behaviors, elements, environments, etc. set the stage for individuals' creativity shown in Figure-1(a, b). While persuasive technologies (Faryad, Batoool, Asif, & Yasin, 2021), the digital elements or strategic designs that influence change in human behaviors, can lift up creativity by promoting creativity drivers e.g. motivation through behavioral change (Wang et al., 2023). Persuasive model of B.J Fogg explains the relationships of persuasion, motivation and trigger (Fogg, 2009, 2019), all resulting from persuasive techniques e.g. gamification. Thus, gamification is a behavior-changing art.

Gamification being a digitized strategic approach causes students to learn, conceive and explore novel ideas more fastly, so, has a pervasive power to influence their vision (AlSaad & Durugbo, 2021; Hamari et al., 2023; Ji, Che Me, & Kamarudin, 2023; Lieder, Chen, Prentice, Amo, & Tošić, 2024; Watini & Setyowati, 2023). The gamified digital approach can lift creativity by renovating learning into an interactive and engaging practice that encourages students to think out of the box. By integrating game elements like contests, rewards, and challenges stimulates interest and investigation in educational atmosphere. Hence, gamification as a persuasive technology nurtures a playful atmosphere where learners feel motivated to discover new ideas and develop innovative solutions. (Lieder et al., 2024). A well-known study (Bakhanova, 2022), has elaborated a gamification model in a participatory context for the educational domain to boost the creativity level of students and their engagement in educational activities. Many other context-oriented models of gamification are available to enlighten the way of effective learning with its persuasion power.

LITERATURE REVIEW

In the late century, researchers believed that creativity was a belief system instead of a characteristic or power of interaction. A set of hardly interrogated values that discuss the change in cultural or socio-economic behaviors, liberty of thought, portray time to bring together and promote philosophical ideas are termed creativity (Ryhammar & Brolin, 1999). Creative minds are often considered as arrogant, spontaneous, presumptuous, serious and disagreeable, they prefer to use their sustaining energy to harvest new thoughts instead of building connections (Aljughaiman & MOWRER-REYNOLDS, 2005). In many studies (Carroll, Latulipe, Fung, & Terry, 2009; Mathisen & Einarsen, 2004; Morris, 2006; Mumford & Simonton, 1997; Ruppert, 2010), creativity categorized as a feature concerned with helpful items and processes. On the other hand, imagination is thought of as a part of creativity, a mental cycle that not only changes one's environmental interactions but the interpretation comprehension also (Cropley, 2015). Creativity is a sort of curiosity that guards advancements in every sort of life. Creative thoughts enlighten the world with its fantastic colors. Curiosity transformed into inventing new things, taking care of issues, thinking of new solutions for problems and many more (Morais

& Azevedo, 2011).

Yet producing innovative thoughts is tedious (Cromptley, 2015; Lau & Li, 1996; Morais & Azevedo, 2011; Mumford & Simonton, 1997). A savvy fix to one issue frequently produces different issues or causes surprising adverse consequences (Bristol & Viskontas, 2006). Creativity is connected with rule-bowing, regulation-breaking, social distress, hostility, bunch struggle, and deceptive nature (Beghetto & Plucker, 2006). No test, no skill, and no software can teach you how to be creative (Beghetto & Plucker, 2006). Being creative means overcoming obstacles that have been in your way for a while and farsighted things from different angles (Kaufman & Baer, 2006). Creativity is the skill of envisioning a painting on a blank canvas or hearing a song that has never been written. Its freshness and capacity to materialize dreams are its essential qualities (Kaufman & Baer, 2006). Currently, our schools are facing a creativity crisis (Beghetto & Plucker, 2006; Fautley & Savage, 2007; Morris, 2006; Mumford & Simonton, 1997). It will significantly impact all organizations, mainly those involved in marketing, in near about ten years.

The measure to encourage creativity is to shift the way we think about creativity in traditional educational institutes from a collection of downstream skills (such as music, theatre, and the visual arts) to an approach that can be used in all facets of a student's life (including, but not limited to the arts) (Beghetto & Plucker, 2006; Bristol & Viskontas, 2006; Fautley & Savage, 2007; Kaufman & Baer, 2002; Morris, 2006; Mumford & Simonton, 1997; Sawyer & Henriksen, 2024). While outperforming your rivals is critical, outthinking them is even more crucial. Actually, creativity cannot be considered a gift (Bristol & Viskontas, 2006). Finding out the best way to realize one's creativity is a prerequisite, it begins by examining what "creativity" stands for in today's classrooms (Badalov, 2023; Beghetto & Plucker, 2006; Carroll et al., 2009; Cheung, Tse, & Tsang, 2003; Cromptley, 2015; Fautley & Savage, 2007; Le et al., 2022; Molinari, Megliola, & Marsh, 2014; Morais & Azevedo, 2011; Ruppert, 2010; X. Zhao et al., 2022).

We should provide students with a variety of alternatives relatively early on, a menu of things they might fall in love with. It could be painting, drawing, writing, computer science, or any number of other interests (Beghetto & Plucker, 2006; Carroll et al., 2009; Cheung et al., 2003; Cromptley, 2015; Fautley & Savage, 2007; Ruppert, 2010; Shaheen, 2010). Literacy and creativity should be equated. The pursuit of knowledge and the innovation of the world are made possible by creativity; those who think creatively transform the world (Faryad et al., 2021). Even though it cannot be taught, creativity may be fostered in a supportive setting (Araújo, 2024; Elbaly & Elfeky, 2023; Faryad et al., 2021; Khalil et al., 2023; Simplicio, 2000). You need to give creativity a chance (Fautley & Savage, 2007). Since the end of the 1990s, imagination

has revived curiosity in education and the larger communal. When it comes to education, the government policy that was in effect from the late 1980s forward contrasts sharply with the growing emphasis and value placed on fostering creativity. One of the guiding principles and arguments for this resurgence of interest in nurturing creativity is that the empowerment of individuals and society as a whole is promoted by the expansion of artistic abilities, particularly at the communal and pecuniary levels (Cheung et al., 2003; Lau & Li, 1996; Mathisen & Einarsen, 2004; Mumford & Simonton, 1997; Ryhammar & Brolin, 1999; Simplicio, 2000). In the framework of teaching creativity, this essay looks at latent social, conservational, cultural, and virtuous restrictions on vision (De Dreu et al., 2023; Kaufman & Baer, 2006; Molinari et al., 2014; Simplicio, 2000).

Factors hinder Creativity/Factors promoting low creativity

There are several reasons why creativity died off in traditional classrooms (Aljughaiman & MOWRER-REYNOLDS, 2005; Le et al., 2022). Among the issues and causes, here are the major causes and examples of how rigid education approaches killed creativity.

Creative subjects are elective

Among the subjects that don't receive the proper attention are art, music, woodworking, building, and construction. Students are prevented from pursuing disciplines that are in line with their strengths and abilities since they are designated as electives and are not even encouraged to take them (Ruppert, 2010).

Marks awarding strategies

In schools, idealistic presentations are discouraged, which implies that teachers are only permitted to grade assignments that contain factual information (Moreno-Guerrero, Aznar-Díaz, Cáceres-Reche, & Alonso-García, 2020). This is a system that stifles innovation since it forbids students from expanding upon or redesigning the information they have acquired over time (Chaulagain, 2024).

Students should uphold their beliefs.

Students are examined to adapt the idea they don't narrate to, rather than being invigorated to inaugurate their chronicle and craft somewhat that would fuel their desire (Khan & Traub, 1980; Lesser, 1994). The lesson plans being used are not appropriate for the evolving world situations, which prevents pupils from making connections (Chaulagain, 2024; Stacey, 2023).

Schools don't reward creativity

By labeling people as hyper and having active imaginations, the educational system excludes those who think outside the box (Chaulagain, 2024; Khan & Traub, 1980;

Stacey, 2023). Because thinking beyond the box is not encouraged (Carroll et al., 2009), students' creativity is stifled from an early age (Cropley, 2015; Le et al., 2022; Morais & Azevedo, 2011).

Discouraging personal opinions

Freedom of thought is discouraged at schools because pupils are expected to consume without question (Stacey, 2023; Y. Zhao & Watterston, 2021). When the ability to think freely is restricted, students are more likely to become knowledgeable consumers rather than revolutionaries who carry out their original ideas (Carroll et al., 2009; Elbyaly & Elfeky, 2023; Kaufman & Baer, 2002).

School governance behavior

Although codes of conduct are necessary (X. Zhao et al., 2022), schools penalize students for breaking them, which means that students often lack the freedom to make judgments that are the result of critical and creative thought (Chaulagain, 2024; Stacey, 2023). The stringent rules merely prevent kids from developing their creative potential (Gokuladas & Baby Sam, 2022).

Routine system

A routine system cannot support creativity as an aspect. The idea behind schools is that there is routine work these are organized structures that stifle the growth of creativity (Chaulagain, 2024; Le et al., 2022). Getting out of the ordinary is what spurs innovation and progress (Carroll et al., 2009).

“All fits in one size” Environments

An individualized approach to creativity is required, where each learner is given access to solutions and a supportive environment (Kaufman & Baer, 2006). Only when each learner is provided with a setting where they can channel their passion and thought can creativity be fostered (Kennedy, 2005). Every student's circumstances are unique, yet because of schools' "All fits in one size" philosophy, don't let the creativity to flourish (Adeoye-Olatunde & Olenik, 2021; Le et al., 2022; Molinari et al., 2014).

Rigid curricula

The educational system is not designed to maximize pupils' talents (Nasir, 2021; Patston, Kaufman, Cropley, & Marrone, 2021; Sleeter & Zavala, 2020). Instead, it aims to implant pre-selected information into the students' minds. This tendency of the curriculum is what stifles talent expression and limits innovation (Chaulagain, 2024; Y. Zhao & Watterston, 2021).

Diverse thinking is discouraged

School system doesn't support multiple imaginations of a single picture instead innovation is assumed to be incorrect. This approach slaughters creativity in learners by eliminating any imaginative outlet that a student might have considered (Chaulagain, 2024; Le et al., 2022; Stacey, 2023).

Uniformity hampers creativity

Success is measured by tests Schools force all apprentices through the same flap, with one standard evaluation method for all students, although everyone has different abilities (Pacheco, 2021). Slow learners and even their abilities are deemed at no merit, making them lepers (Akhmedov et al., 2024; Kennedy, 2005; X. Zhao et al., 2022).

Success assessment methods

The measure of success is whether or not a student passes a test in school. As a result, students solitary fight to evoke the practicalities for the exam and not subsequently (Al Abdullatif, Al-dokhny, & Drwish, 2022; Carroll et al., 2009; Gokuladas & Baby Sam, 2022; Le et al., 2022). Creativity would have a chance to thrive if achievement was grounded on imaginative presentations and deliberations (Chaulagain, 2024; Stacey, 2023).

Curiosity seen as obstacle

Students with vigorous thoughts and interests are condemned in school and viewed as obstructions to the universal implementation of teaching space familiarity (Ruppert, 2010; Stacey, 2023). It is teemed that lecture theater knowledge is "flawless," whereas creativity has flaws, and this is imprint that students are given. Students are unable to generate original ideas because they are perceived to have flaws and this flaw prevents creativity from flourishing (Carroll et al., 2009; Le et al., 2022).

Creative teaching methods needed

Our traditional teaching practices do not nurture effective learning, leaving learners less inclined to think creatively. Time is the greatest foe of creativity. Because they are perceived to have flaws, they are unable to generate original ideas, and it is this flaw that prevents creativity from flourishing (Chaulagain, 2024). A study (Chaulagain, 2024; Stacey, 2023) claimed that our traditional teaching methodologies are destroying creativity, they need revolution.

Creative expressions: Home vs. School dynamics

According to a recent study (Lassig, 2020), differences in student creative expression there is a difference between students' creative articulation at home and school. Learn which types of students are affected by this gap and how to help them (Hutchison, Paatsch, & Cloonan, 2020).

Artistic courses discouraged

Schools should provide more arts-related classes and encourage students to register for classes they find engaging (Taggart, Fukuda, & Lillard, 2018) and ensure that students enroll in courses that they are interested in, such as art or music (Benedek, Bruckdorfer, & Jauk, 2020). According to (Conradty, Sotiriou, & Bogner, 2020; Simplicio, 2000), the task of parents and teachers is to teach students how to "productively daydream." Students should be encouraged to imagine something new and mistakes are considered as water bubbles. We have lost sight of the true meaning of learning somewhere along the way in our battle and pursuit of meaningless papers, diplomas, and money (Conradty et al., 2020).

Opportunity to unleash creativity

Creativity is concerned with students making their own decisions, generally, it requires some structure. (Carroll et al., 2009; Mumford & Simonton, 1997; Y. Zhao & Watterston, 2021)The study's main finding is that students are more creative outside of school than they are inside. The first to give the best chance of grasping their imaginative latent, institutes must be responsible for a rich and diverse curriculum with self-styled artistic subjects of arts and entertainment (Cheung et al., 2003; Cremin, 2022; Simplicio, 2000).

Schools need innovation

Today's institutes do not supporting the creative abilities of students, and many people agree. We need to incorporate creative activities in schools (Ndulue et al., 2022; Stacey, 2023; Y. Zhao & Watterston, 2021) to make our institutes attractive and creative places. If we don't, we're not supporting our students to use their critical thinking and creative potential and this is terrible. Our traditional educational institutes don't let a student realize their creativity (Chaulagain, 2024; Stacey, 2023).

Gamification as a Persuasive Art: Changing behaviors to promote creativity

Gamification in education reveals the magical transformations of the traditional learning environment into an engaging and influencing platform (AlSaad & Durugbo, 2021) that not only changes the level of motivation but creativity also. Passive behaviors of students turn to energetic thrills empower them to invent something new (Krath & Von Korflesch, 2021), think broadly beyond the limits and enlighten the world with its creative potentials. That's what gaming elements can input into a traditional learning environment, working as a triggering spark to handle the behaviors and motivational factors (Bakhanova, 2022; Farooq, Hamid, Alvi, & Omer, 2022; Khaldi et al., 2023).

A well-known study (Bakhanova, 2022), as elaborated a gamification model in a participatory context for the educational domain to boost the creativity level of

students and their engagement in educational activities. Many others deployed game-based elements into a learning atmosphere where these components expressively influence motivation and student behavior (Bakhanova, 2022; Bakhanova, Garcia, Raffe, & Voinov, 2023). Students' engagement in such activities improves collaboration and connections between ideas, things, objects and persons using points, levels, rewards and many others. This approach boosts up intrinsic motivation of students, a key to engagement and creativity for effective learning (AlSaad & Durugbo, 2021; Khaldi et al., 2023; Krath & Von Korflesch, 2021; Lieder et al., 2024; Watini & Setyowati, 2023).

Gamification as a persuasive art can impact students' effective learning by changing their degree of engagement, frequency of creative outputs, etc. The persuasion power of gamification (Faryad et al., 2021; Ji et al., 2023; Krath & Von Korflesch, 2021; Ndulue et al., 2022; Oyeboode & Orji, 2023; Wang et al., 2023) is derived from its ability to transform traditional routine tasks into enjoyable adventures, expressing a sense of achievement and encouraging them to indulge in such activities more frequently. When gamified objects are deployed into a traditional classroom, students' engagement tends to increase, expressed by their involvement in class activities, higher level of collaboration with peers and a sense of success (Barbosa & de Ávila Rodrigues, 2020).

A higher level of engagement tends to a higher frequency of creative feedback, projects and presentations. Thus, students' spark goes beyond the boundaries, they think out of the tailored ways and invent new solutions, ideas, etc. Feedback from both teachers and students strengthens the fact that gamification has a persuasion power and can boost up the level of creativity in a gamified classroom (Behnamnia, Kamsin, Ismail, & Hayati, 2020; Dahalan, Alias, & Shaharom, 2024; Farooq et al., 2022; Lieder et al., 2024; Ndulue et al., 2022; Shpakova, Dörfler, & MacBryde, 2020; Tumpa, Ahmad, Naeni, & Kujala, 2024; Watini & Setyowati, 2023). Students report a higher level of interest in gamified learning atmospheres while greater collaboration and connections are observed in such learning environments. These observations and opinions underscore the role of gamification as a persuasive art promoting effective learning behaviors.

Research Queries

Grounded on the prior work done, root causes of low creativity skills need to be highlighted to understand more keenly why students in traditional educational institutes have less creativity skills and how to enhance their creativity by influencing their behaviors (Lieder et al., 2024) using gamification tactics in education (AlSaad & Durugbo, 2021). Thus, this study seeks to respond to the subsequent queries:

1. Which fundamental factors inhibit creativity in students and impede effective

learning?

2. Does gamification as a persuasive art enhance creativity among students by changing their behaviors?

RESEARCH OBJECTIVES

1. Ascertain the significant factors causing low creativity among students.
2. Examine how gamification can boost student creativity by changing their behaviors.
3. Evaluate the influence of gamification on student engagement, creative outputs, and feedback from educators and students.

RESEARCH METHODOLOGY

Research Type

This research utilized a dual-method framework deploying both surveys and semi-structured interviews as research tools. Surveys are globally recognized for their scalability, effectiveness and efficiency, allowing a researcher to collect data from a large pool of diverse respondents. They are effective for both types of research approaches i.e. qualitative and quantitative. On the other hand, the most flexible tool known as a semi-structured interview (Adeoye-Olatunde & Olenik, 2021; Husband, 2020; Magaldi & Berler, 2020), creates an avenue for collecting domain specific data from experts. Facts collected by using such kinds of interviews are discovering new themes and provide unexpected insights with more consistent results in a short time. Hence, both research tools are utilized to gather opinion-based data from experts and professionals in the educational domain. A survey questionnaire is used in this case study to determine the factors behind the low level of creativity in traditional educational institutes and a semi-structured interview is leveraged to inspect the effects of gamification as a persuasive art on effective learning of students. The combo of both tools provides a comprehensive view of research topic and a deeper understanding of the issues at hand.

Research instrument (Questionnaire and Semi-structured Interviews)

After critically analyzing prior work by researchers, a questionnaire comprised of 22 questions is prepared and duly verified by the supervision committee. Key fragments of questions are adopted and prepared according to the situation ruling out in our traditional educational institutes (Al Abdullatif et al., 2022; Hänninen et al., 2020; Le et al., 2022; Lieder et al., 2024; Mathisen & Einarsen, 2004; Memmel & Dengel, 2007; Molinari et al., 2014; Morais & Azevedo, 2011; Morris, 2006; Mumford & Simonton, 1997; Ruppert, 2010). The questionnaire is based on the four validated constructs to measure all survey items (Questionnaire in appendix). Creating a semi-structured interview involved designing questions to offer more flexibility and structure (Adeoye-Olatunde & Olenik, 2021; Husband, 2020; Magaldi & Berler,

2020). Thus, interviews are proposed to gather solicit opinions, insights and feedback from experts about the effect of gamification as a persuasive art, changing students' behaviors and promoting effective learning and creativity in educational institutes. Some of the starter questions in semi-structured interviews were derived from the previous work.

Distribution of Questionnaire

After the preparation of the questionnaire, researcher met with each participants in person and asked them to read the questionnaire carefully before providing their opinion. Questionnaire distributed among total of 100 participants include professional educators (Teachers and Master Trainers) and administrators (institute heads) during the training workshop.

Conducting semi-structure interviews:

To conduct the semi-structured interviews, we selected a diverse group of 25 experts from educational institutes, including senior subject teachers, master trainers, administrators, and educational researchers. We prepared by familiarizing ourselves with the participants' expertise, creating a checklist of key points, arranging a distraction-free interview room, and securing consent and confidentiality agreements. Each participant was interviewed separately using a top-down approach, starting with general questions and moving to specifics, with careful listening and noting of their responses.

Data collection and analysis

Using Questionnaire

To collect data, a physical survey was carried out during a parent and teacher training workshop at a recognized institute QUAED of Pakistan. The collected data were organized in tabular form and analyzed statistically using MS-Excel 2016. The data analysis involved the use of percentage formulas and graphical representations.

Using Semi-structured interviews

Data collection

At QUAED Institute in Pakistan, 25 educational professionals, including master trainers, subject specialists, administrators, and researchers with over five years of experience, were interviewed over one week. Conducted in 30-minute sessions using a flexible semi-structured format with five core questions, the interviews explored the impact of gamification on students' behavior, creativity, and learning outcomes. Confidentiality was ensured by anonymizing details, and comprehensive responses were recorded and transcribed for analysis.

Data Analysis

The interview data was analyzed using a thematic examination schema, which involved familiarizing with the data, coding the transcripts, developing broader themes, and interpreting the relationships between variables. This process was validated through discussions and the findings were reported in a structured format, providing rich insights into the effectiveness of gamification in promoting student engagement, creativity, and positive behavior in the educational context at QUAED.

DATA ANALYSIS AND RESULTS

Survey Results (Causes of low creativity skills in students)

The results, based on 100 responses, show a balanced gender distribution with 64% male and 36% female participants. The majority (54%) are aged 25-27, 33% are 28-31, and 13% are 22-24, indicating a bias towards younger individuals.

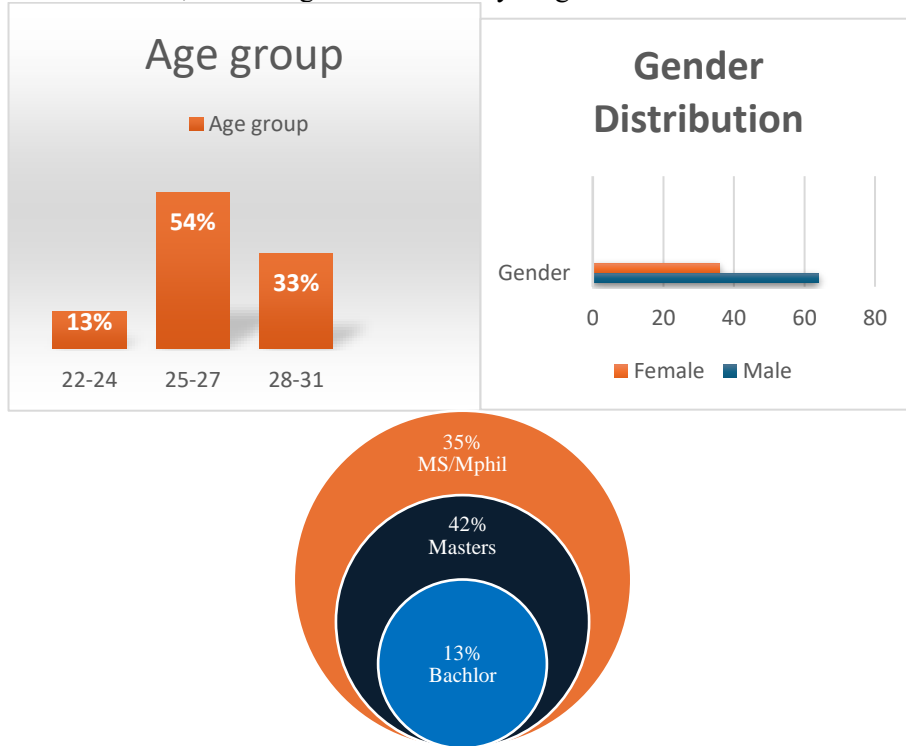


Figure-2: (Summary of participants' Educational Background, Gender distribution and age group.)

Figure-2 shows the educational background and age of the responders. Out of 100 responders, 35% people having MS as highest qualification, 42% are Masters and 13% responders are Bachelors.

Table 1: Time-Based Factors Affecting Creativity

Survey Question	Strongly Disagree	Strongly Agree	Key Insight
Q1: Time constraints & student management	26%	74%	Time constraints and ineffective student management are seen as barriers to creativity.
Q2 & Q3: Time constraints for teachers	9%	91%	Time constraints prevent teachers from exploring multiple student responses, hindering creativity.

The survey results in Table.1 show that a significant majority of respondents believe time constraints and ineffective student management hinder creativity, as these factors prevent exploration of curiosity and multiple solutions.

Table 2: Behavioral Factors Affecting Creativity

Survey Question	Strongly Disagreed	Strongly Agreed	Key Insight
Q4: Influence on creative subjects	41%	59%	Many respondents believe students lack an environment that encourages choosing creative subjects.
Q5: Focus on degrees over learning	43%	57%	Majority fear prioritizing credentials over actual learning diminishes creativity.
Q6: Teaching imagination and questioning	42%	58%	Traditional institutions' lack of focus on critical thinking and questioning is seen as reducing creativity.
Q7: Parental authority vs. student autonomy	47%	53%	Slight majority believe that parental control negatively impacts creativity.
Q8: Authoritative behavior of parents/teachers	40%	60%	Restrictive behaviors from parents and teachers are perceived to lower students' creative abilities.

The results in Table. 2 indicate that a significant proportion of respondents believe that various behavioral factors, such as lack of influence towards creative subjects, focus on degrees over learning, insufficient emphasis on imagination and questioning, and authoritative behavior by parents and teachers, contribute to reduced creativity among students.

Table 3: Curricula-Based Factors Affecting Creativity

Survey Question	Strongly Disagreed	Strongly Agreed	Key Insight
Q9: School curricula promoting creativity	11%	89%	Standardized curricula are perceived as inhibiting creativity due to their rigid policy content.
Q10: Inflexible structure of traditional institutes	31%	69%	The strict routines of traditional institutes are seen as stifling creativity and limiting students' ability to innovate.
Q11: Poor infrastructure and policies	28%	72%	Participants believe that inadequate infrastructure and policy constraints hinder students' creative development.
Q12: Lack of subject diversity	26%	74%	Institutes' failure to offer subjects meeting diverse modern needs is associated with lower levels of student creativity.
Q13: Limited opportunities for creativity	32%	68%	Participants agree that students' limited opportunities to explore their creative potentials contribute to reduced creativity.

The findings in Table. 3 highlight various aspects contributing to reduced creativity among students.

These include concerns regarding standardized curricula, the inflexible structure of traditional institutes, poor infrastructure and policies, lack of subject diversity, and limited opportunities for students to tap into their creative potentials.

Table 4: Environmental Factors Affecting Creativity

Survey Query	Strongly Disagreed	Strongly Agreed	Key Insight
--------------	--------------------	-----------------	-------------

Q14: Institutional support for creative subjects	30%	70%	Lack of supportive settings in institutes is seen as a demotivating factor for selecting creative subjects, impacting creativity negatively.
Q15: Traditional schools and individual creativity	17%	83%	"One-size-fits-all" mentality in traditional schools is believed to stifle individual expression and critical thinking, favoring conformity over creativity.
Q16: Restrictive environments in conventional institutes	19%	81%	Conventional institutes are perceived as providing restricted environments that inhibit individualized thinking, stifling creativity and critical thinking.
Q17: Early recognition of creativity	22%	78%	Lack of early recognition and reward for creativity in institutes is thought to contribute to lower levels of creativity among students.
Q18: Inappropriate behavior in traditional institutes	40%	60%	Inappropriate behavior and deprived environments in old-fashioned institutes are believed to hinder creative thinking in students.

Responses' summary in Table. 4 reveals that a majority of participants agree that institutional settings play a central role in motivating students to select creative subjects, and traditional educational approaches hinder individual expression and critical thinking.

Additionally, there is strong consensus that conventional institutes restrict creative and critical thinking and fail to recognize and reward creativity early on, resulting in diminished creative abilities.

Table 5: Teaching Practices and Assessment Based Factors

Survey Query	Strongly Disagreed	Strongly Agreed	Key Insight
--------------	--------------------	-----------------	-------------

Q19: Standardized Testing vs. Creativity	41%	59%	Many participants feel that standardized testing hampers creativity, hindering the assessment of true talent and potential.
Q20: Uniform Assessment Criteria	45%	55%	Majority agree that uniform assessment criteria limit individual capabilities, thereby stifling creativity.
Q21: Institutional Constraints	25%	75%	A significant portion believes that institutional rules restrain independent thinking, leading to decreased creativity.
Q22: Impact of current Teaching Approaches	31%	69%	The majority strongly agree that current teaching methods impede creativity and advocate for their revision to foster it.

These results underscore the widespread concern among respondents regarding the impact of standardized testing, uniform assessment criteria, institutional constraints, and teaching approaches on nurturing student creativity. The summary of all survey results in the form of a bubble graph is given beneath.

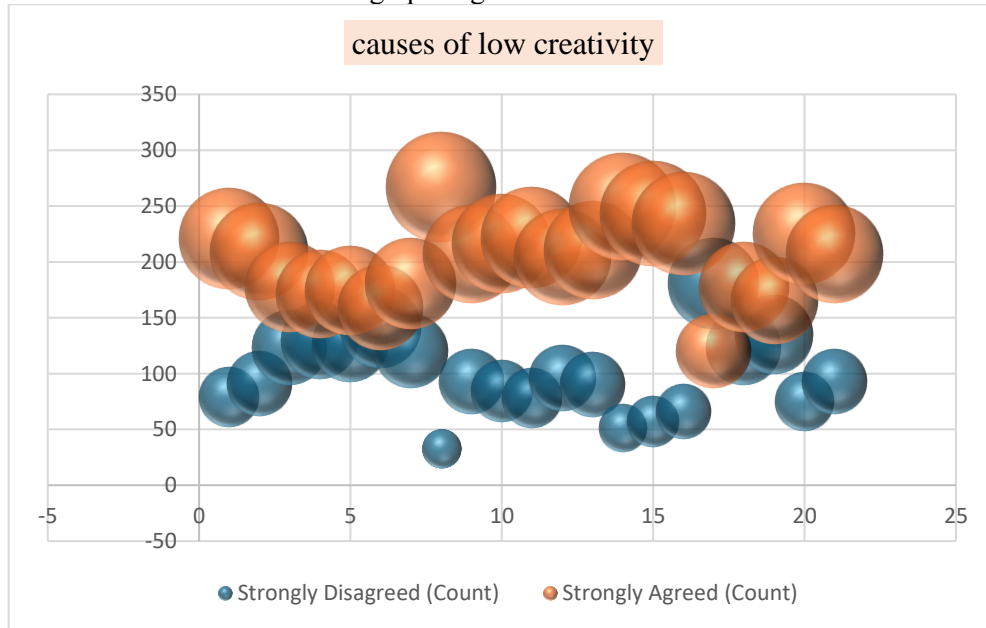


Figure 3: Summary of survey results in a Bubble graph

Semi-structured Interview Results (Gamification as a persuasive art, changing behaviors to promote effective learning)

Table 6: Participants' Background and Expertise

	Educators (SSTs)	Master Trainers (MTs)	Administrative (Institute Heads)	Researchers of the domain
Age group	35-43	45-55	38-55	25-45
Years of Experience	28-35	10-15	25-35	5-8
Expertise in educational domain	Pedagogical skills, ICT integration, communication skills, subject-matter knowledge, curricula development, problem-solving and decision making skills, cultural diversity, team work and collaboration, content mastery, pedagogy and instructional design, technology integration, effective teaching practices, leadership skills	team work and collaboration, Mentoring, communication and interpersonal skills, Adult learning and andragogy, content mastery, pedagogy and instructional design, technology integration, effective teaching practices, psychological behavioral models, leadership skills	Leadership and policy implementation, communication and interpersonal skills, educational infrastructure design and implementation, problem-solving and decision making skills, strategic planning and public relationship management, legal and ethical understandings, Technology integration	Subject theories knowledge, experience with effective educational approaches, project management, subject-matter expertise, key knowledge of latest educational challenges and trends, publication and presentation proficiency
Female respondents	5	2	3	1
Male respondents	4	4	2	4

Out of 25 Total respondents	9	6	5	5
--	---	---	---	---

Table.6 provides the detailed background and expertise of the interview participants. Respondents’ opinions are summarized, all the key points were noted down and by applying thematic schema we have found there is a linear correlation between gamification, positive behavior, motivation and creativity of students. Gamification can promote intrinsic motivation (M), which is the driving component of engagement and creativity. Hereby, gamification (G), intrinsic motivation (M) and positive behavioral outcomes (B) have direct relationships. Let’s dive into a mathematical illustration of this relationship.

$$\boxed{M=a \cdot G} \longrightarrow (1)$$

Where, “a”= proportionality constant reflecting the impact of gamification on intrinsic motivation, “G= gamified elements” and “M= Intrinsic motivation”. Equation (1) describes that with the impact of gamification, there is a direct increase in intrinsic motivation, which causes a series of behaviors to trigger interconnected with deeper engagement for instance critical thinking, curiosity and discovering new ideas. The outcome is a positive change in student behavior, promotes effective learning and creativity.

Another strong relationship between intrinsic motivation and positive behavior can be written as:

$$\boxed{B=k \cdot M} \longrightarrow (2)$$

Where, “B= Positive behavior”, “M= Intrinsic motivation” and “k=constant representing the strength of the relationship between behavior and motivation”. By combining these two equations, we came across the results showing that:

$$B=k \cdot (a \cdot G) \qquad \text{Ⓛ} \quad M=a \cdot G$$

$$\rightarrow B= (k \cdot a) \cdot G$$

$$\boxed{B=ka \cdot G} \longrightarrow (3)$$

Thus, the combined linear relationship shows that the influencing behavior strength depends on the combined constants “k” & “a”, representing the strength of persuasion through gamification and the corresponding change in motivation, which ultimately leads to positive behavioral outcomes in an effective learning environment. The case study reports the initial findings, future work can extend and verify the results at a large scale. The external validity of this case study still needs to be verified.

DISCUSSION

This study is designed to look into the root causes of low creativity skills in traditional institutions, as well as the effect of gamification as a persuasive art on students' intellectual skills. The samples for this case study were collected from several traditional institutes in Pakistan, which may not be sufficient to represent the entire educational system in the country. Additionally, we used the questionnaire and interviews as research tools (with confirmed validity and reliability), to gather data, but this approach might cause bias in the findings. However, this case study recommends both quantitative and qualitative approaches to more critically examine the factors hindering creativity and the effect of gamification on students from all institutions in Pakistan. Our research indicates the causes of low creativity in students and the effects of gamification as a persuasive art in promoting creativity and effective learning of students by changing their behaviors. Moreover, the results can also help institutions bring up the creativity skills of their students.

In conclusion, our research has offered a deep dive into the causes of overdue students' low creativity and discovered how gamification could potentially reform educational settings. The results clearly indicate the dire need for educational reforms to address rigid and orthodox teaching practices, socio-economic restraints, and an absence of freedom to discover new ideas; certain reasons that constantly hamper creativity in the educational framework. By using interviews and surveys, a mixed-method framework, we have acknowledged the significant obstacles to creativity and identified a strong linear correlation relationship between gamification, intrinsic motivation, and positive behavioral outcomes. Our results recommend that gamification can serve as a crucial catalyst in cultivating creativity among students by influencing their behaviors by providing a more engaging, collaborative, and motivational learning experience.

The survey results, derived from 300 participants, highlight broad consensus on challenges such as obstructive educational structures, uniform assessments, and the lack of guidance for creative endeavors. In most of the queries, over 70% of participants agreed that contemporary educational settings stifle creativity owing to inflexible routines, constant assessment criteria and inadequate opportunities for self-determination. Furthermore, expert opinions from interviews indicate that there exists a direct relationship between gamification and increased intrinsic motivation, which subsequently triggers positive behavior and promotes creativity. Through a mathematical model that solidifies the key outcomes of interviews by demonstrating a linear association between gamification, positive behavioral outcomes and intrinsic motivation. The proportionality constants (k and a) used in our mathematical schema demonstrate that the intensity of motivation and behavioral change are directly influenced by the manifestation of gamified elements in educational settings. This relationship emphasizes the persuasive power of gamification that not only enhances

student engagement in learning activities but also boosts their diverse thinking, greater sense of autonomy and creativity.

These insights recommend that educational institutions must integrate gamified elements into their teaching practices to encourage creativity and improve learning outcomes. Future research could delve deeper into the specific gamified elements that are most effective across various educational contexts and assess the sustained effects of gamification on students' creativity and academic accomplishments.

RECOMMENDATIONS

This study is designed to look into the root causes of low creativity skills in traditional institutions, as well as the effect of gamification as a persuasive art on students' intellectual skills. However, this case study recommends both quantitative and qualitative approaches to more critically examine the factors hindering creativity and the effects of gamification on students from all institutions in Pakistan. Our research indicates the causes of low creativity in students and the effects of gamification as a persuasive art in promoting creativity and effective learning of students by changing their behaviors. The case study reports the initial findings, future work can extend and verify the results at a large scale. The external validity of this case study still needs to be verified.

REFERENCES

- Adeoye-Olatunde, O. A., & Olenik, N. L. (2021). Research and scholarly methods: Semi-structured interviews. *Journal of the American college of clinical pharmacy*, 4(10), 1358-1367.
- Akhmedov, B., Makhmudova, D., & Akhmedjonov, D. (2024). Using the Socrates method in improving the quality of education in pedagogical universities. *Sciental Journal of Education Humanities and Social Sciences*, 2(1), 16-24.
- Al Abdullatif, A., Al-dokhny, A., & Drwish, A. (2022). Critical factors influencing pre-service teachers' use of the Internet of Things (IoT) in classrooms. *International Journal of Interactive Mobile Technologies*, 16(4), 85.
- Aljughaiman, A., & MOWRER-REYNOLDS, E. (2005). Teachers' conceptions of creativity and creative students. *The journal of creative behavior*, 39(1), 17-34.
- AlSaad, F. M., & Durugbo, C. M. (2021). Gamification-as-innovation: a review. *International Journal of Innovation and Technology Management*, 18(05), 2130002.
- Araújo, I. (2024). *Creativity as a gamification booster*. Paper presented at the International Conference on Lifelong Education and Leadership for All (ICLEL 2023).
- Badalov, K. (2023). DEVELOPING THE CREATIVITY OF A PRIMARY CLASS TEACHER. *Open Access Repository*, 4(02), 141-148.
- Bakhanova, E. (2022). *Gamification of Participatory Modeling: towards creating a more engaging process for stakeholders*. University of Technology Sydney (Australia),
-

- Bakhanova, E., Garcia, J. A., Raffaele, W. L., & Voinov, A. (2023). Gamification Framework for Participatory Modeling: A Proposal. *Group Decision and Negotiation*, 32(5), 1167-1182.
- Barbosa, M. W., & de Ávila Rodrigues, C. (2020). Project Portfolio Management teaching: Contributions of a gamified approach. *The International Journal of Management Education*, 18(2), 100388.
- Beghetto, R. A., & Plucker, J. A. (2006). The Relationship Among Schooling, Learning, and Creativity: "All Roads Lead to Creativity" or "You Can't Get There from Here"?
- Behnamnia, N., Kamsin, A., Ismail, M. A. B., & Hayati, A. (2020). The effective components of creativity in digital game-based learning among young children: A case study. *Children and Youth Services Review*, 116, 105227.
- Benedek, M., Bruckdorfer, R., & Jauk, E. (2020). Motives for creativity: Exploring the what and why of everyday creativity. *The journal of creative behavior*, 54(3), 610-625.
- Bristol, A., & Viskontas, I. (2006). Dynamic processes within associative memory stores. *Creativity and reason in cognitive development*, 60-80.
- Carroll, E. A., Latulipe, C., Fung, R., & Terry, M. (2009). *Creativity factor evaluation: towards a standardized survey metric for creativity support*. Paper presented at the Proceedings of the seventh ACM conference on Creativity and cognition.
- Chaulagain, F. P. (2024). The Need for an Education Revolution: Examining Alternatives to Traditional Schooling.
- Cheung, W. M., Tse, S. K., & Tsang, H. W. (2003). Teaching creative writing skills to primary school children in Hong Kong: Discordance between the views and practices of language teachers. *The journal of creative behavior*, 37(2), 77-98.
- Conradty, C., Sotiriou, S. A., & Bogner, F. X. (2020). How creativity in STEAM modules intervenes with self-efficacy and motivation. *Education Sciences*, 10(3), 70.
- Cremin, T. (2022). Teaching english creatively. In *Teaching English Creatively* (pp. 1-11): Routledge.
- Cropley, A. (2015). *Creativity in education and learning: A guide for teachers and educators*: Routledge.
- Dahalan, F., Alias, N., & Shaharom, M. S. N. (2024). Gamification and game based learning for vocational education and training: A systematic literature review. *Education and Information Technologies*, 29(2), 1279-1317.
- De Dreu, C., Nijstad, B. A., & Baas, M. (2023). Human Creativity: Functions, Mechanisms and Social Conditioning.
- Elbyaly, M. Y. H., & Elfeky, A. I. M. (2023). The Efficiency of Instructional Gaming Programs In Stimulating Creative Thinking. *European Chemical Bulletin*, 12, 6613-6621.
- Farooq, M. S., Hamid, A., Alvi, A., & Omer, U. (2022). Blended learning models, curricula, and gamification in project management education. *IEEE Access*, 10, 60341-60361.
- Faryad, S., Batool, H., Asif, M., & Yasin, A. (2021). Impact of internet of things (IoT) as persuasive technology. *IJ Information Technology and Computer Science*, 6(2021), 16-28.
- Fautley, M., & Savage, J. (2007). Creativity in secondary education. *Creativity in Secondary Education*, 1-144.
- Fogg, B. J. (2009). *A behavior model for persuasive design*. Paper presented at the Proceedings of the 4th international Conference on Persuasive Technology.

- Fogg, B. J. (2019). Fogg behavior model. *Behav. Des. Lab., Stanford Univ., Stanford, CA, USA, Tech. Rep.*
- Gokuladas, V., & Baby Sam, S. (2022). Student Satisfaction In Secondary Education: An Empirical Study Of Indian Expatriate Students. *Journal of Research in International Education, 21*(1), 73-83.
- Hamari, J., Xi, N., Legaki, Z., & Morschheuser, B. (2023). *Gamification*. Paper presented at the Hawaii International Conference on System Sciences.
- Hänninen, L. I., Byrge, C., Gómez, P. N., Tang, C., Brøndum, K., D'Ingli, S., & Xerxen, S. P. (2020). Testing the effects of digital gamified creativity training. *Journal of Creativity and Business Innovation, 6*, 5-17.
- Husband, G. (2020). Ethical data collection and recognizing the impact of semi-structured interviews on research respondents. *Education Sciences, 10*(8), 206.
- Hutchison, K., Paatsch, L., & Cloonan, A. (2020). Reshaping home–school connections in the digital age: Challenges for teachers and parents. *E-learning and Digital Media, 17*(2), 167-182.
- Ji, K., Che Me, R., & Kamarudin, K. M. (2023). A review of persuasive technology and design to healthy lifestyle. *International Journal of Art and Design (IJAD), 7*(2), 103-115.
- Kaufman, J. C., & Baer, J. (2002). Could Steven Spielberg manage the Yankees?: Creative thinking in different domains. *Korean Journal of Thinking and Problem Solving, 12*(2), 5-14.
- Kaufman, J. C., & Baer, J. (2006). *Creativity and reason in cognitive development*: Cambridge University Press.
- Kennedy, M. M. (2005). *Inside teaching: How classroom life undermines reform*: Harvard University Press.
- Khalidi, A., Bouzidi, R., & Nader, F. (2023). Gamification of e-learning in higher education: a systematic literature review. *Smart Learning Environments, 10*(1), 10.
- Khalil, R. Y., Tairab, H., Qablan, A., Alarabi, K., & Mansour, Y. (2023). STEM-Based Curriculum and Creative Thinking in High School Students. *Education Sciences, 13*(12), 1195.
- Khan, S. B., & Traub, R. E. (1980). Teachers' attitudes in open and traditional schools. *Canadian Journal of Education/Revue canadienne de l'éducation, 5-14*.
- Krath, J., & Von Korfflesch, H. F. (2021). Designing gamification and persuasive systems: A systematic literature review. *GamiFIN, 100-109*.
- Lampropoulos, G. (2024). Virtual reality and gamification in education: a systematic review. *Educational technology research and development, 1-95*.
- Lassig, C. (2020). A typology of student creativity: creative personal expression, boundary pushing and task achievement. *Thinking Skills and Creativity, 36*, 100654.
- Lau, S., & Li, W.-L. (1996). Peer status and perceived creativity: Are popular children viewed by peers and teachers as creative. *Creativity Research Journal, 9*(4), 347-352.
- Le, D. M., Hang Nguyen, P. T., Thao Pham, G., Anh Phan, T. N., Quynh Le, T. P., & Bao Bui, K. H. (2022). Factors affecting the creativity of high school students.
- Lesser, M. A. (1994). *Teachers' implicit theories of creativity*: Fordham University.
- Lieder, F., Chen, P.-Z., Prentice, M., Amo, V., & Tošić, M. (2024). Gamification of Behavior Change: Mathematical Principle and Proof-of-Concept Study. *JMIR Serious Games*,

- 12(1), e43078.
- Magaldi, D., & Berler, M. (2020). Semi-structured interviews. *Encyclopedia of personality and individual differences*, 4825-4830.
- Mathisen, G. E., & Einarsen, S. (2004). A review of instruments assessing creative and innovative environments within organizations. *Creativity Research Journal*, 16(1), 119-140.
- Memmel, M., & Dengel, A. (2007). *Sharing contextualized attention metadata to support personalized information retrieval*. Paper presented at the Int'l Workshop on Contextualized Attention Metadata: Personalized Access to Digital Resources.
- Molinari, F., Megliola, M., & Marsh, J. (2014). *Enhancing creativity and innovation in workplaces: A living lab approach*. Paper presented at the eChallenges e-2014 Conference Proceedings.
- Morais, M. F., & Azevedo, I. (2011). What is a creative teacher and what is a creative pupil? Perceptions of teachers. *Procedia-Social and Behavioral Sciences*, 12, 330-339.
- Moreno-Guerrero, A.-J., Aznar-Díaz, I., Cáceres-Reche, P., & Alonso-García, S. (2020). E-learning in the teaching of mathematics: An educational experience in adult high school. *Mathematics*, 8(5), 840.
- Morris, W. (2006). Creativity its place in education, New Zealand. In: OECD (2018). *The future of education and skills: Education*.
- Mumford, M. D., & Simonton, D. K. (1997). Creativity in the workplace: People, problems, and structures. *The journal of creative behavior*, 31(1), 1-6.
- Nasir, M. (2021). Curriculum development and accreditation standards in the traditional islamic schools in Indonesia. *Journal of Curriculum Studies Research*, 3(2), 37-56.
- Ndulue, C., Oyebode, O., Iyer, R. S., Ganesh, A., Ahmed, S. I., & Orji, R. (2022). Personality-targeted persuasive gamified systems: exploring the impact of application domain on the effectiveness of behaviour change strategies. *User Modeling and User-Adapted Interaction*, 32(1), 165-214.
- Oyebode, O., & Orji, R. (2023). Persuasive strategy implementation choices and their effectiveness: towards personalised persuasive systems. *Behaviour & Information Technology*, 42(13), 2176-2209.
- Pacheco, J. A. (2021). The “new normal” in education. *Prospects*, 51(1), 3-14.
- Patston, T. J., Kaufman, J. C., Cropley, A. J., & Marrone, R. (2021). What is creativity in education? A qualitative study of international curricula. *Journal of Advanced Academics*, 32(2), 207-230.
- Ruppert, S. S. (2010). Creativity, Innovation and Arts Learning: Preparing All Students for Success in a Global Economy. *Arts education partnership (NJI)*.
- Ryhammar, L., & Brodin, C. (1999). Creativity research: Historical considerations and main lines of development. *Scandinavian journal of educational research*, 43(3), 259-273.
- Sawyer, R. K., & Henriksen, D. (2024). *Explaining creativity: The science of human innovation*: Oxford university press.
- Shaheen, R. (2010). Creativity and education. *Creative education*, 1(03), 166.
- Shpakova, A., Dörfler, V., & MacBryde, J. (2020). Gamifying the process of innovating. *Innovation*, 22(4), 488-502.
- Simplicio, J. S. (2000). Teaching classroom educators how to be more effective and creative. *Education*, 120(4).

-
- Sleeter, C. E., & Zavala, M. (2020). *Transformative ethnic studies in schools: Curriculum, pedagogy, and research*: Teachers College Press.
- Stacey, M. (2023). Tradition and change. In *Studies in British Society* (pp. 7-31): Routledge.
- Taggart, J., Fukuda, E., & Lillard, A. S. (2018). Children's preference for real activities: Even stronger in the Montessori Children's House. *Journal of Montessori Research*, 4(2), 1-9.
- Tumpa, R. J., Ahmad, T., Naeni, L. M., & Kujala, J. (2024). Computer-based Games in Project Management Education: A Review. *Project Leadership and Society*, 100130.
- Wang, R., Bush-Evans, R., Arden-Close, E., Bolat, E., McAlaney, J., Hodge, S., . . . Phalp, K. (2023). Transparency in persuasive technology, immersive technology, and online marketing: Facilitating users' informed decision making and practical implications. *Computers in Human Behavior*, 139, 107545.
- Watini, S., & Setyowati, W. (2023). Using Gamification To Increase E-Learning Engagement. *International Transactions on Education Technology*, 1(2), 84-94.
- Zhao, X., Wang, C., & Hong, J. (2022). Evaluating the individual, situational, and technological drivers for creative ideas generation in virtual communities: A systematic literature review. *Frontiers in Psychology*, 13, 978856.
- Zhao, Y., & Watterston, J. (2021). The changes we need: Education post COVID-19. *Journal of Educational Change*, 22(1), 3-12.