

# Best Practices in Activating E-Learning Environments to Enhance Creative Thinking Skills among High School Students: Insights from Diverse Educational Contexts

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*Abstract: This study investigates high school teachers' perceptions of best practices for activating e-learning environments to nurture students' creative thinking skills. The sample consisted of 60 teachers purposefully selected from diverse educational contexts, including American, British, Asian, and local schools. Data were collected using a semi-structured interview instrument and analyzed through a grounded theory approach. Findings indicate that teachers believe e-learning environments play a significant role in enhancing students' creative thinking by fostering emotional engagement and seamlessly integrating technology. This creates dynamic learning settings that encourage exploration and the development of critical skills. Teachers highlighted the importance of emotional support in instructional settings to boost student engagement and enthusiasm. Additionally, they emphasized promoting self-directed learning to help students take ownership of their education and teamwork to enhance social skills. The results also underscore the value of assessments as teaching aids to*

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*help students recognize their strengths and areas for improvement, prioritizing learning over mere evaluation. Practical implications of this study suggest the need for training programs and curriculum enhancements that equip teachers with strategies to develop engaging e-learning environments. By incorporating inquiry-driven learning and emphasizing creative problem-solving, this study contributes to improved educational quality, fostering student innovation and equipping them with essential skills for the future.*

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**Keywords:** Best practices; e-learning; learning environments; creativity and innovation; diverse educational contexts.

## INTRODUCTION

The paced progress of technology is changing the landscape of education and e learning is now seen as a vital element, for overhauling the educational framework worldwide. This transformation goes beyond the adoption of technological tools, it involves a redefinition of the responsibilities held by educators and learners (Nguyen & Nguyen, 2022; Pham, 2022; Rahmat, 2018). Teachers are shifting from being information providers to encouraging creative thinking, among students. Meanwhile students are actively participating in their learning journey by exploring and questioning (Arriba & Vidagañ, 2020; Brem & Puente-Díaz, 2020). Technology has evolved from an aid, to becoming an element of the learning experience. It now supports e-learning platforms offering a wide range of educational materials (Richardson & Mishra, 2018; Rosar et al., 2018; Rosar & Weidlich, 2022).

As students increasingly rely on technology, educational institutions must adapt. Traditional knowledge-sharing through textbooks is no longer sufficient to equip students for the challenges they will face in their careers and personal lives (Richardson & Mishra, 2018; Samoylenko et al., 2022; Nasution et al., 2021). What is needed now is engaging learning environments tailored to students' interests and designed to spark their thinking skills. Technological tools such as interactive platforms create a new educational experience centered on self-directed knowledge construction rather than rote memorization (Rusch, 2023; Tan et al., 2019; Weidlich & Bastiaens, 2019).

Cognitive psychologists, such as Piaget, highlight the importance of transitioning from traditional teaching methods to constructive, inquiry-based practices. This transition is based on several key assumptions: learning is a social process shaped by interactions within e-learning environments that foster the exchange of ideas; constructive education requires students to actively explore knowledge; learning involves both social and individual interactions; and teachers play a critical role in supporting students' inquiries and discoveries (AlAli & Al-

Barakat, 2022; Chan, 2023; Eden et al., 2024). This support includes designing educational activities that foster critical and creative thinking through technological tools, such as educational videos and simulations (Al-Barakat et al., 2023; Fava, 2017; Gabriel et al., 2022; Gallegos-Rejas et al., 2023).

E-learning environments play a crucial role in modeling the effectiveness of teaching and learning process. These environments, encompassing material, social, and psychological elements, contribute to creating a comprehensive educational experience that enhances the achievement of educational goals (Al-Hassan et al., 2012; Fan & Cai, 2022; Ovbiagbonhia et al., 2019). Consequently, educational institutions strive to provide integrated environments that enhance efficiency, from academic resources to management and educational facilities (Adams, 2017; Al-Eisawi & Al-Ay, 2019). To achieve this, institutions must continuously improve and adapt to modern changes, particularly in e-learning settings (AlAli & Al-Barakat, 2023).

In interactive e-learning environments, students collaborate with teachers in stimulating settings that foster innovation and creativity (Burns, 2024; Calavia et al., 2021; Graciano et al., 2023). Human elements, such as educators and administrators, are critical in shaping these electronic educational landscapes, guiding students in developing cognitive, emotional, and social skills (Grimus, 2020; Han et al., 2018; Kettler et al., 2018). Meanwhile, non-human factors, such as facilities and equipment, create conducive learning atmospheres, while social interactions among students from diverse backgrounds cultivate a positive classroom culture that nurtures creativity and innovation (Seechaliao, 2017; Singh & Alwaqaa, 2023).

Fostering creativity and innovation has become a global educational priority, with institutions striving to enhance creative thinking through supportive learning environments equipped with digital technologies such as smart boards and e-learning systems (Al-Barakat et al., 2023; Nguyen & Nguyen, 2022; Pham, 2022; Rahmat, 2018). These environments, which provide access to a wealth of educational resources, allow students to explore new concepts critically, collaborate, and share ideas, enhancing active learning processes. By integrating tools like interactive platforms and educational games, e-learning fosters creative thinking and equips students with problem-solving skills (Nguyen & Nguyen, 2022; Samoylenko et al., 2022).

To effectively harness the potential of e-learning environments, it is essential to provide settings that encourage higher-order thinking skills (AlAli et al., 2024; Khasawneh et al., 2023). Torrance's and Guilford's theories of creativity highlight the importance of supporting students' ability to generate and apply new ideas through structured and innovative learning experiences (Khasawneh et al., 2022; Sohrabi & Khajehazad, 2015; Zamani et al., 2022). Cognitive theories further assert that creative thinking arises from students' interactions with knowledge and

their ability to connect new information with past experiences, fostering innovation (Khasawneh et al., 2023; Kollöffel & Brok, 2019).

In conclusion, the e-learning environment is fundamental for enhancing students' creative thinking and innovation, offering emotional support and purposeful social interactions. Educational institutions must prioritize creating learning environments that leverage technological tools and human resources to foster creativity. Therefore, continuous efforts to improve learning environments are essential for achieving optimal educational outcomes and preparing students for the challenges of the future (Al-Barakat et al., 2023; Fan & Cai, 2022; Ovbiagbonhia et al., 2019).

### **Statement of the Study**

Despite notable technological advancements, significant gaps remain in creating e-learning environments that foster creativity and innovation. Observations by the researchers in UAE schools identified challenges within current educational settings, including a reliance on traditional curricula that do not adequately promote creative thinking. Addressing these gaps is essential to developing interactive educational environments that enhance students' creativity and problem-solving capabilities.

This study aims to analyze secondary school teachers' perceptions of effective teaching practices in e-learning, providing insights into improving electronic educational environments to stimulate creativity and prepare students for present and future challenges. The central research question guiding this study is: What are secondary school teachers' perceptions of the best teaching practices that foster e-learning environments conducive to creative thinking?

### **Importance of the Study**

This study is particularly relevant in the context of the accelerating shift to e-learning and the integration of technology as a means to enhance students' creative thinking. E-learning offers unique opportunities to reshape educational environments, promoting students' innovation capabilities. Empowering students with the necessary skills for success in a knowledge-driven society is a primary goal of this research.

Additionally, the study highlights e-learning's role in developing creative thinking skills through interactive environments rich in practical experiences. It emphasizes teachers' critical role in designing educational settings that align with students' needs and societal expectations. By providing actionable recommendations for developing electronic educational environments, the study contributes to achieving educational objectives at both individual and societal

levels, preparing a generation capable of innovation and active engagement in the knowledge economy.

Furthermore, this study is the first to explore secondary school teachers' perceptions across diverse educational contexts (American, European, Asian, and local). It aims to expand research horizons in this vital area, enriching educational experiences and equipping a generation to meet future challenges.

### **Study Design**

The research project used a qualitative approach to investigate high school teachers' perspectives of e-learning platforms that can improve creative thinking skills among students. This approach was selected because it allows for an exploration of participants' viewpoints and experiences necessary, for studying the impact of e learning, on creative thinking development. By employing this approach, researchers collected detailed data that quantitative techniques might overlook, leading to a profound comprehension of the topic.

### **Sample of the study**

The research sample included 60 high school teachers from Sharjah, United Arab Emirates, and Al Jubail, Saudi Arabia. These regions were purposefully selected due to the diverse educational environments, which included teachers from American, British, Asian, and local Arab schools. The researchers selected the purposive sampling method because the teachers and school principals were willing to participate, and cooperate in providing access, to the sample population.

The participants, in the study were evenly split between teachers, from Saudi Arabia and the UAE. 30 From each country making up half of the group. Out of all the participants surveyed; 43 were female teachers (71.7%); while 17 were male teachers (38.3%). In terms of expertise; 23 teachers specialized in sciences (38.3%), 19 taught English (31.7%), and 18 focused on social studies (30%). The distribution was carefully planned to include a representation of both genders and subjects, in order to enhance the validity and reliability of the study.

### **Study Instrument (Semi-structured interview)**

In order to reach the goals of the research project effectively and gain an understanding of the subject matter at hand. Formal interviews were conducted as the primary means of data collection, for this study. This method was selected due to its adaptability and versatility which allowed participants to share insights about their experiences and viewpoints, on e-learning environments and how they

contribute to nurturing innovative thinking. The interview schedule was developed through a comprehensive review of educational literature and relevant studies. The initial version included five questions and was reviewed by a panel of 14 experts in language education, and instructional design and technology for feedback on clarity and relevance. Based on their input, two questions were removed, and two others were revised, resulting in a final schedule with three core questions:

1. Do you believe that e-learning environments contribute to the development of students' creative thinking skills?
2. What are the necessary requirements for using e-learning environments to enhance creative thinking?
3. In your opinion, how do e-learning environments contribute to fostering creative thinking in students?

The questions, during the interview aimed to get accuracy answers not just "yes or no". Follow up questions or probing such as "Why do you believe that?" were used to understand the rationale, behind the participants' perspectives better. The study gathered insightful data by following this formal structure semi-structured, which underscored both the opportunities and challenges of utilizing e-learning for nurturing students' creative thinking skills.

### **Reliability of the Interview Schedule**

To assess the reliability of the semi-structured interview schedule, five pilot interviews were conducted with participants outside the study sample. Each interview was repeated twice, with a 15-day interval between sessions. The data obtained from these pilot interviews were analyzed by two independent analysts using Cohen's Kappa coefficient to measure the agreement between their analyses, resulting in a coefficient of 0.95. This indicates a high level of consistency and reliability of the instrument over time.

### **Data Collection Procedures**

Data were collected through semi-structured interviews following these steps:

1. Participants, for the research were chosen randomly. Then reached out to understand the goals of the study and the interviews significance, in improving understanding. They were assured of data confidentiality and research use before agreeing to take part in the research.
2. All participants were asked for permission before recording the interviews to ensure their consent was obtained in advance.

3. Arranging interview schedules involved finding times according to the participants availability and preferences, with each interview lasting between 45 to 55 minutes. The initial researcher conducted interviews with individuals in the UAE while the second researcher engaged with participants in Saudi Arabia. All interviews took place in person at sites selected by the participants; 60 individuals opted to conduct their interviews at their workplaces. To promote transparency and trust, between interviewers and participants confidentiality measures were implemented to safeguard the collected data..

4. Establishing a connection before commencing the interviews was crucial for fostering an environment of trust and comfort, between the interviewers and participants in order to encourage candid conversations. This included ensuring a safe and stimulating atmosphere for dialogue. To promote comfort, participants were identified by numbers rather than names, encouraging them to express their views freely without fear, thus fostering an open and unrestricted environment.

5. Participants were given the opportunity to provide detailed insights without constraints. Each interview was recorded to ensure accurate documentation of the data. The interview questions were carefully posed, and participants' expressions of their opinions were clarified through rephrasing some questions. This approach aimed to ensure the accuracy of the data collected and a better understanding of individuals' views and experiences.

6. About a week after the interviews, the audio recordings were transcribed. Participants were then asked to review and sign the written transcripts to confirm their accuracy. All participants agreed to this process and signed their transcripts. These measures aimed to ensure the documentation and credibility of the data obtained from the interviews.

### **Data Analysis**

The researchers employed grounded theory methodology for analyzing the study data, which is a widely recognized approach in qualitative research analysis. This methodology allowed concepts to emerge directly from the data, leading to the identification of key and subcategories through the following steps:

1. Preliminary reading: After transcribing the recorded interviews, a thorough and critical reading of the texts was conducted to develop an initial understanding. The focus was on identifying recurring themes and patterns in participants' statements, which emerged as key ideas.

2. Inductive analysis: Inductive analysis was utilized, deriving categories directly from the data itself. In this study, there was no pre-existing theoretical framework guiding the analysis; instead, categories emerged based on the frequency or significance of topics within the interviews.

3. Coding: During the critical reading and inductive analysis, the texts were divided into smaller units (words, phrases, and sentences), and codes were assigned to represent their content.

4. Developing categories (Themes): Following the coding process, similar codes were grouped into main categories representing central ideas or themes.

5. Writing a descriptive summary: The summary provided a focused account of the qualitative analysis results, offering a concise and comprehensive description of the key ideas or patterns that emerged.

### **Demographic Details and Variations among Teacher Groups**

To improve the reliability of the study on best practices in activating e-learning environments to nurture creative thinking skills among high school students, it is essential to provide more detailed information about the sample's demographics. Analyses showed that female teachers were more inclined to use e-learning strategies in teaching language and social studies, whereas male teachers tended to apply these strategies more frequently in science and mathematics disciplines. This gender and subject distribution may significantly influence how teachers respond to the use of e-learning environments, necessitating further examination of the differences in their educational experiences and teaching practices.

Moreover, the variations in responses among teacher groups offer valuable insights into how creative thinking skills can be enhanced. For instance, English and social studies teachers emphasized the importance of student engagement in e-learning environments to promote critical and creative thinking, while science and mathematics teachers highlighted the use of e-learning tools to deepen understanding and stimulate innovation. By analyzing these differences, effective recommendations can be developed to enhance the effectiveness of e-learning in cultivating creative thinking skills, providing a comprehensive understanding of the demographic and subject-specific influences on learning practices.

### **Results of the Study**

The study aimed to uncover best educational practices for creating supportive and stimulating e-learning environments that foster creative thinking among students from the perspective of secondary school teachers in diverse educational contexts. To address this question, data were collected through semi-structured interviews, which were analyzed according to qualitative research methodology using the grounded theory approach. The results of the inductive analysis revealed a set of main and sub-themes indicative of the best educational practices for creating encouraging e-learning environments that stimulate creative



thinking. These themes included the role of secondary school teachers in preparing electronic environments that enhance students' creative thinking, which can be summarized in Table 1.

Table 1: Frequencies and Percentages of Qualitative Analysis Results by Analytical Categories

No.	Categories (Themes)	Frequency	Percentage
1	Enhancing the emotional aspect of students	55	91.7%
2	Promoting the concept of self-directed learning among students	57	95.00%
3	Promoting the concept of collaborative learning among students	49	81.66%
4	Promoting the concept of assessment as a learning tool	51	85.00%
5	Promoting the concept of active learning environments	58	96.70%
6	Promoting the concept of inquiry-based environments	51	85.00%

The following presents these results for each theme separately:

*Results of the First Theme: Enhancing the emotional aspect of students*

The study results indicated that 55 participants, representing (91.7%), emphasized the importance of providing emotional support in creating environments that encourage students to think creatively. In this context, participants expressed the significance of e-learning environments that contribute to supporting the emotional aspect of students, which motivates them to engage in creative thinking. Many teachers articulated this through various statements, including:

"Emotional support helps students feel safe and free to express their ideas creatively without fear of failure or criticism."

"When a student feels psychological and emotional support, it motivates them to participate more and encourages them to present innovative ideas because they know their contributions are valued and respected."

"Students need an environment that makes them feel important and that their ideas deserve attention. This type of support creates a safe space for developing creative thinking skills."

"If a student feels emotionally supported, they are more willing to explore new ideas and take risks in presenting innovative perspectives, which enhances their ability to think in different ways."

"Positive communication with students and fostering healthy relationships between teacher and student contribute to motivating students to participate and express their ideas freely, enriching the environment for creative thinking."

"Emotional support is not limited to individual relationships; it should extend to the classroom environment as a whole. When students feel supported by their peers, it enhances their capabilities for innovation and collaboration in their projects."

The data analysis and the cited quotations clearly show that emotional support plays a crucial role in motivating and developing students' creative thinking skills. The study demonstrated that 91.7% of teachers acknowledged the importance of this support in creating a learning environment that enables students to freely express their ideas and experiences, without fear of failure or negative criticism. The data analysis reveals that emotional support transcends merely being a means to enhance students' psychological comfort; it is considered an essential element in empowering them to take intellectual risks and move away from conventional thinking. When students feel safe and appreciated, they are more likely to present new and unconventional ideas, reflecting the significant role teachers play in providing an environment conducive to innovation.

Moreover, the data analysis suggests that teachers who are committed to providing psychological and emotional support directly contribute to motivating their students to engage actively and creatively. This support encourages students to interact positively with the educational content, which reflects their ability to develop innovative solutions and think critically and flexibly.

In addition, emotionally supportive electronic environments contribute to enhancing students' self-confidence and capabilities, which are fundamental conditions for the growth of creative thinking. Students who feel their ideas are valuable and worthy of attention exhibit a higher level of boldness in presenting ideas and stepping outside traditional patterns.

From a reflective perspective on the above quotations, it becomes evident to the reader that emotional support helps create an environment in which students feel safe and free, facilitating their ability to express and experiment with their ideas without fear of failure or criticism. The importance of this dynamic cannot be overstated because safe spaces play a role, in fostering creativity and inspiring students to delve into concepts and create original solutions. When students have the opportunity to think freely and articulate their thoughts without constraints they often propose ideas that mirror their viewpoints.

Moreover the emphasis, on the importance of emotional encouragement, in nurturing students' self-esteem is underscored. The quotations illustrate how students who receive psychological support feel appreciated and respected, which drives them to participate more in classroom activities. This sense of appreciation enhances their capabilities for critical thinking and innovation, as they can present their ideas without the anxiety of negative criticism. The quotes also highlight how vital it is to have connections, between educators and learners in order to cultivate a culture of teamwork and ingenuity in settings. Thusly offering emotional backing isn't an extra aspect of teaching – it is a key component that helps create a favorable educational atmosphere conducive, to fostering innovation and nurturing students' ability to think creatively.

Overall, these quotations underscore the necessity of integrating emotional support as part of educational strategies aimed at enhancing creative thinking.

Teachers should recognize that their role extends beyond delivering academic content; the contemporary role of teachers is to provide supportive environments that nurture the emotional aspect to help students grow and develop as innovative thinkers.

*Results of the Second Theme: Promoting the concept of self-directed learning among students*

The results of the interview analysis revealed that 57 teachers, representing 95%, indicated that e-learning environments should provide students with opportunities for self-learning and be inclusive, allowing them to develop their educational skills in ways that align with their individual interests and abilities. The teachers emphasized that e-learning environments serve as an effective means for achieving independent and sustainable learning, as they allow students complete control over their time and pace, enabling them to manage the learning process according to their individual needs. One teacher explained:

"Self-learning in e-learning environments helps students interact with content according to their personal needs, as they can review study materials at their convenience, providing them with flexibility in learning and the ability to develop skills independently."

She added that this flexibility in E-learning environments enhances everyone's capacity to benefit from the educational experience, regardless of their academic backgrounds or circumstances. Another teacher highlighted the importance of E-learning environments in developing students' critical thinking and interactive engagement, stating:

"These environments provide students the opportunity to work on their projects and conduct independent research, encouraging them to delve deeper into topics individually."

She clarified that this approach fosters independence and offers all students the chance for active participation in the learning process without complete reliance on the teacher. Additionally, one teacher noted that e-learning environments allow students of all academic levels to access diverse educational resources, mentioning:

"These environments equip students with the necessary tools to organize their own learning processes, including scheduling lessons and managing homework, enhancing their ability to take responsibility and develop organizational skills."

He emphasized that this environment provides everyone equal opportunities to access educational content, contributing to the principle of educational equity.

One teacher praised the impact of e-learning environments in enhancing students' research and self-exploration skills, explaining:

"These environments enable students to seek information from multiple sources and develop innovative solutions to the challenges they face, increasing their capacity for innovation and thinking outside the box."

He added that everyone benefits from these environments, whether they are students seeking to broaden their horizons or those needing to strengthen their foundational skills.

On another note, some teachers confirmed that e-learning environments particularly support students with special needs, as they allow them to access educational content in ways that suit their individual requirements. One teacher explained,

"Using assistive tools such as readable texts or text-to-speech in e-learning environments makes learning accessible to everyone, including students with disabilities."

One teacher added that e-learning environments provide students the opportunity to receive immediate feedback on their academic progress, enhancing everyone's ability to continuously improve their performance. He stated:

"Instant assessments and interactive quizzes enable students to understand their strengths and weaknesses and work on improving them without having to wait for final evaluations."

In this context, a teacher pointed out that E-learning environments help achieve the principle of inclusivity in education, allowing students from various social and economic backgrounds to access the same educational resources without geographic or physical barriers. He said,

"E-learning environments break traditional barriers that may hinder some students from accessing quality education, ensuring everyone has an equal opportunity for academic success."

To sum up the discussion; Online learning environments are essential, for enabling self-directed learning opportunities and empowering students to learn and grow based on their strengths and requirements. Additionally; these environments facilitate an journey that caters to all learners needs by fostering an equitable and inclusive educational setting.

*Results of the Third Theme: Promoting the concept of collaborative learning among students*

The data analysis results showed that 49 individuals, equivalent to 81.66%, affirmed the importance of focusing on collaborative learning in electronic learning environments. Participants explained that using electronic learning models, such as project-based learning, collaborative learning, and group discussions, contributes to enhancing students' creative thinking skills. They confirmed that these models provide an interactive environment that encourages communication and the exchange of ideas, thereby fostering students' learning skills.

In this context, many respondents expressed as follow:

"When we apply the project-based learning approach, we witness significant interaction among students. They engage in planning and implementing projects, which deepens their understanding of the academic topics. This experience is not just theoretical learning; it is an opportunity for them to apply what they have learned in a tangible context, encouraging them to think in new and innovative ways."

"In collaborative learning, we encourage students to work together in small groups. This interaction enables them to exchange ideas and experiences, leading to the development of innovative solutions to the problems they encounter. I notice that students become more creative when they feel comfortable expressing their opinions and sharing their ideas with others."

"Using group discussions in e-learning environments enhances the building of a strong learning community. When students talk about their ideas and receive feedback from their peers, it contributes to improving their critical thinking skills. They learn how to ask questions and examine ideas more deeply, making them more open to learning."

"When we focus on collaborative learning, we significantly contribute to enhancing students' creative thinking. Their interaction with one another allows them to view concepts from multiple perspectives, improving their academic performance. They do not only learn from the teacher but also learn from each other, creating a richer educational atmosphere."

"Electronic learning allows us to provide an interactive educational experience, where students can communicate through online platforms, sharing resources and ideas. Through collaborative learning, they can address problems collectively, enhancing their critical and creative thinking in tackling challenges."

"Using collaborative learning styles helps students feel confident in expressing their opinions. The supportive environment we create, where they can share their ideas without fear of criticism, encourages them to think freely. This experience results in new and innovative ideas that enhance their learning and prepare them to face future challenges."

These quotes illustrate how collaborative learning enhances students' creative thinking skills, and teachers emphasize the importance of electronic learning strategies that rely on cooperation and interaction. It is evident from the above quotes that collaborative learning in e-learning environments is an effective tool for enhancing students' creative thinking skills. Teachers' experiences show that these educational models not only enhance academic understanding but also contribute to the development of communication and collaboration skills. Utilizing project based learning leads to a student engagement, with material since it prompts students to delve into ideas thoroughly and put them into practice effectively by exploring practical applications collaboratively in groups and sharing responsibilities to create a final project.

Regarding collaborative learning, the sharing of ideas among students contributes to the development of critical thinking skills. The quotes indicate that discussions that arise during collaboration stimulate students to explore diverse perspectives, broadening their thinking horizons.

The data analysis results indicate that exposure to different viewpoints enhances students' ability to challenge conventional ideas and encourages them to think more creatively. Group discussions also contribute to building a learning community that supports the free expression of opinions, enhancing students' self-confidence. In this nurturing setting fosters a feeling of psychological security, among students. Here they believe that their thoughts matter and are taken into account. This encourages their thinking and results, in educational achievements.

Furthermore, working together helps students enhance their communication skills by learning to listen to others and give feedback while discussing concepts, with their peers. These abilities are crucial for thriving since teamwork and effective communication are key to success. With that said, emphasizing learning within e-learning educational settings not only boosts academic achievement but also fosters essential skills, like critical thinking, teamwork and creativity. Equipping students, with these skills is crucial, for preparing them to tackle challenges and fostering their creativity and active participation in society.

From what was mentioned on the matter; it's clear that incorporating cooperative learning methods into the educational journey can bring about a beneficial effect, on the entire learning process. By enhancing communication and collaboration, the learning experience becomes rich and inspiring, contributing to preparing students to face the challenges of academic and professional life.

*Results of the Fourth Theme: Promoting the concept of assessment as a learning tool*

The analysis of the interviews revealed a significant importance in promoting the concept of "assessment for learning" as a fundamental tool for supporting and developing students' creative thinking skills in electronic learning

environments. This is further supported by 85% of responses, which emphasized the necessity of creating e-learning environments that focus on using assessment as an educational tool, rather than limiting its role to measuring academic achievement. Participants stressed that assessment should shift to a means of enhancing students' creative thinking, which supports their overall development and enhances their engagement with academic materials in innovative ways. In this context, several sub-categories emerged to emphasize teachers' perceptions of the role of assessment for learning in electronic learning environments, and the results of the analysis revealed the following:

1. Assessment as a tool for creative thinking: Analysis indicated that 85% of participants acknowledged the importance of assessment as a key factor in encouraging students to move beyond traditional thinking and adopt creative problem-solving methods. Specifically, a significant number of teachers noted that assessment activities based on creative thinking strategies provide students with the opportunity to develop innovative solutions and move away from stereotypical answers. One participant mentioned,

"I think assessments shouldn't just test how well you remember facts. They should inspire students to think and share perspectives. For instance, I like to present students with challenges and have them suggest ideas, such as creating eco-friendly products or developing technological solutions for community problems".

2. Assessment as an ongoing process: A percentage of the study sample indicated that assessment should be integrated as part of the continuous educational process, serving as a tool for monitoring students' skill development and motivating them to think creatively in electronic learning environments. One teacher noted that they rely on continuous formative assessment, stating,

"I regularly monitor students through short learning tasks and creative assignments that help me understand their skill development and identify their future needs. For instance, I provide e-learning environments by using platforms like "Google Classroom" to deliver diverse activities that assess creative thinking, such as asking students to develop projects related to innovative solutions for environmental challenges."

3. Utilizing inventive assessment methods: The findings of the research show that 85% of the individuals surveyed feel that fostering Creative thinking necessitates establishing learning environments that facilitate the utilization of inventive assessment methods. In this regard teachers underscored the significance of furnishing interactive settings that boost students' interaction with course material and foster analytical thinking skills. As an illustration one educator pointed out that they:

“Educators are enthusiastic, about incorporating learning platforms like Kahoot and Quizizz to inspire students to think outside the box by prompting them to come up with solutions, in various activities. These tools spark students’. Motivate them to get involved in their learning journey by participating in educational tasks rather than simply absorbing information passively. Also, in play are these aids that boost student engagement by fostering collaboration and enabling the exchange of ideas and viewpoints in interactive environment. This fosters a deeper grasp of concepts and bolsters students’ self-assurance and capacity for thinking. As a result of this approach to education that embraces learning spaces supporting the integration of cutting edge assessment methods – a move towards nurturing creative thought and honing’s skills crucial for navigating challenges, in the modern era – students are better equipped to tackle future hurdles.”

From the interviews it became clear that diversifying assessment tools and strategies is crucial, for meeting the needs of students, within e learning settings.. Many teachers indicated that adopting various methods such as brainstorming, open discussions, and self-assessment enhances students' opportunities to think creatively. One participant explained,

"When students assess themselves through self-evaluation techniques. Recommend ways to enhance their performance creatively. This helps in improving their skills."

4. Encouraging Collaboration through Evaluation: The findings from the data analysis showed that 71.66 percent of respondents agreed that e learning settings should promote evaluation focused on group activities. Implying that assessment should extend beyond assignments to encompass collaborative tasks that foster student interaction and idea sharing. One participant stated,

"I prioritize offering group projects where students work together to solve real-world problems, which promotes collaborative and creative thinking. For example, we organized group projects in our school where students were asked to develop innovative ideas to improve the school environment or enhance community service."

5. Developing Practical Life Skills: 47 responses (78.33%) indicated that assessment in e-learning environments encourages students to practice creative thinking by presenting real-world problems that prepare them to face life's challenges. This is one of the main advantages of using creative assessment, as it helps students develop skills that can be applied in real life. One participant explained,



"By providing assignments related to solving real problems, such as resource management or developing environmental projects, I can enhance students' practical and creative thinking skills."

Based on the interviews reviewed as a whole it appears crucial to emphasize the importance of integrating "assessment, for learning" into e-learning settings to foster thinking within educational settings urgently. Teachers should shift from viewing assessment as a method to gauge performance to utilizing it as a tool, for fostering creative thinking skills. Through the establishment of interactive learning environments and varied assessment approaches educators can help students cultivate creative thinking skills that will benefit them academically and professionally alike.

*Results of the Fifth Theme: Promoting the concept of active learning environments*

Data analysis revealed that 96.7%, from the respondents indicated that e-learning environments that enhance students' creative thinking skills are active environments based on student-centered learning rather than teacher-centered learning. This clearly demonstrates how these environments provide students with greater opportunities to explore and develop their ideas independently. The participants in the study emphasized the importance of providing active e-learning environments that activate the role of the student as a central agent in the learning process. In this context, the following quotes reflect the participants' views and enhance the understanding of how these environments impact the enhancement of creative thinking:

"By using active electronic learning environments, I notice that students become more independent in their thinking, as their creative abilities emerge when given the opportunity to explore concepts in innovative ways, rather than relying solely on direct instructions from the teacher. Active environments help students diversify their ideas."

"Last week, I assigned my students research projects on 'climate change,' and they used various online sources to gather information, which allowed them to explore the topic independently."

"In traditional environments, students often rely on teacher guidance at every step, but in active electronic environments, they are given greater opportunities for independence. Here, students can explore concepts in ways that suit their learning styles, enhancing their critical and creative thinking. Through online discussion forums, students can present their ideas and discuss their perspectives, which enhances their ability to generate diverse ideas while being aware of their community's issues."

"In an active electronic environment, students collaborate effectively, as they have opportunities to create new solutions to problems beyond traditional templates that limit and restrict their thinking. Students can use interactive educational games to solve puzzles and make strategic decisions about various scientific issues, enhancing their deep understanding of concepts."

"In student-centered electronic learning environments, I see students take the initiative in directing their learning process. This type of environment encourages students to express their ideas and find creative ways to solve academic challenges, thereby enhancing their creative thinking skills."

"The student's interaction with the content becomes deeper. The student does not merely receive information but tries to apply it in new ways, which promotes the development of creative thinking skills that help them excel. Students in my class managed to produce content such as videos and podcasts on various scientific topics, which enhanced their ability to express their ideas innovatively. In these electronic environments, students can practice their role in the learning process by building knowledge creatively."

The results of the data analysis highlight the significance of active e-learning environments in enhancing students' creative thinking. By emphasizing student independence and effective interaction, it becomes evident that these environments provide opportunities for students to explore concepts in innovative ways, moving away from the traditional model that relies on teacher guidance. The quotes demonstrate how the focus on student-centered learning contributes to enhancing creative thinking, granting students greater freedom to take initiative and direct their learning process. This independence is not only key to developing creative thinking skills but also enables students to apply their knowledge in unconventional ways, enhancing their ability to solve problems innovatively. Furthermore, it appears that these environments encourage students to express their ideas and seek new solutions, contributing to a deeper understanding of concepts. Overall, the analysis shows that active electronic learning fosters the role of the student as an active and influential participant in the educational process, reflecting the importance of adopting interactive teaching methods that support creative thinking.

#### *Results of the Sixth Theme: Promoting the concept of inquiry-based environments*

The results of the semi-structured interview analysis indicated that 85.00% of the study participants strongly affirmed the necessity of providing electronic inquiry-based environments, considering that they play a vital role in developing and enhancing students' creative thinking skills. Participants indicated that inquiry-based environments are not merely educational tools but serve as beacons for innovation and effective interaction between students and knowledge. These results reflect the importance of educational experiences that rely on inquiry as an

effective means to stimulate curiosity and promote a deep understanding of academic content.

In this context, many participants expressed their views on the importance of these environments. Some of them stated:

"Providing electronic inquiry-based environments significantly contributes to enhancing students' creative thinking skills, as they grant them the freedom to explore ideas and apply them practically."

"Inquiry-based environments allow students to explore ideas more deeply and develop their critical thinking skills, helping them analyze problems and find innovative solutions."

"We need to integrate technology into education through inquiry-based environments to enhance students' innovation capabilities."

The analysis of data, as reflected in the quotes above, confirm the vital importance of electronic inquiry-based environments in stimulating students to ask questions and develop new ideas. By engaging in inquiry-based activities, students acquire skills that enable them to analyze complex problems and reach innovative solutions, adequately preparing them for academic and professional life. These quotes also indicate a shift toward technology-based education, where electronic inquiry-based environments help capture students' interest and increase their level of participation. Integrating technology into education facilitates access to diverse sources of information and enables the use of interactive tools, thereby enhancing the learning experience and creating a dynamic educational environment.

## Discussion

The results of the study revealed that emotional support in online learning environments is crucial for enhancing students' creative thinking. Such support fosters a psychologically safe atmosphere where students feel free to express their ideas without fear of failure or criticism, enabling them to explore new concepts and adopt innovative thinking. This finding is supported by Cohen and McCabe (2009), who noted the positive impact of teacher emotional support on students' creative skills. Additionally, fostering positive relationships between teachers and students is essential, as students are more motivated to engage when their ideas are valued. Zins and Weissberg (2004) found that positive classroom relationships enhance motivation and collaboration, allowing students to devise innovative solutions to challenges.

Moreover, emotionally supportive online environments boost students' self-confidence and belief in their abilities, encouraging risk-taking and reinforcing the value of their contributions. Participants also highlighted the importance of self-directed learning opportunities, noting that flexibility in managing their time

enhances independence and helps them address real-life issues. This findings are in line with what was mentioned by educationalists ((Alshammari & Thomran, 2023; Fraihat et al., 2022; Irshid et al., 2023; Fan & Cai, 2022; Ovbiagbonhia, Kollöffel, & Brok, 2019; Qahl & Sohaib, 2023; Richardson & Mishra, 2018; Seechaliao, 2017; Singh & Alwaqaa, 2023), who emphasized that diverse learning resources promote educational equity by allowing students of varying academic levels to access tailored content.

The study also underscores the need for online environments that support students with special needs through assistive technologies, aligning with the UAE's commitment to equitable and inclusive education as part of the UN's sustainable development goals. Overall, the findings affirm that online learning environments play a vital role in fostering self-directed learning and enhancing student autonomy, contributing to an educational experience that meets diverse needs. Educational institutions should prioritize the development of these environments to promote self-directed learning and improve academic outcomes.

Additionally, the findings indicate that collaborative learning is a key element in enhancing creative thinking. Engaging students in cooperative activities with peers fosters deeper exploration and analysis of ideas, developing critical thinking skills. This integration of collaborative strategies enhances social interaction, motivating active engagement and leading to improved academic performance. Previous studies (Arriba & Vidagañ, 2020; Brem & Puente-Díaz, 2020; Burns, 2024; Calavia, Blanco, & Casas, 2021; Chan, 2023; Eden, Chisom, & Adeniyi, 2024; Fava, 2017; Gabriel et al., 2022; Gallegos-Rejas et al., 2023; Graciano et al., 2023; Grimus, 2020) support this notion, suggesting that participation in collaborative activities enhances critical thinking and problem-solving abilities.

The results also promote the view of assessment as a central learning tool rather than a mere measure of performance. This aligns with a global trend toward interactive and sustainable education and reflects a growing recognition of formative assessment as a means to foster deep learning (Han et al., 2018; Kettler et al., 2018; López, Vázquez-Vílchez, & Salmerón-Vílchez, 2024; Mayer, 2017; Rosar & Weidlich, 2022; Rusch, 2023). Additionally, effective implementation of cooperative learning-based assessments requires enhancing teachers' assessment skills, as highlighted by the Ministry of Education in its reports on educational quality.

Overall, the study stresses the need for online environments that actively enhance creative thinking through a student-centered approach, allowing students the freedom to explore ideas independently. This shift from traditional teaching approaches toward active learning promotes interaction and autonomy, as confirmed by many researchers (Millican, 2022; Moosavi & Bush, 2021; Richardson & Mishra, 2018; Rosar et al., 2018), who found that promoting student independence improves critical and creative thinking skills.

Active learning environments further enhance creative thinking through interaction with educational content. Participation in discussion forums and research projects enables students to express their ideas freely, fostering critical thinking and new idea generation. For example, Al-Barakat et al. (2023) confirmed that interactive educational games effectively enhance understanding of scientific concepts and improve problem-solving strategies. The findings also highlight the necessity of providing online exploratory environments to stimulate curiosity and deepen understanding, aligning with constructivist theories that emphasize inquiry's role in enhancing creative thinking and motivation (Adams, 2017; Arriba & Vidagañ, 2020; Fava, 2017; Riley, 2017; Tomyuk, 2020; Tan et al., 2019; Weidlich & Bastiaens, 2019).

At the end of the day, we can say that adopting online investigative environments are essential for meeting students' needs and fostering their skills. This approach prepares students for future challenges and contributes to the development of educational institutions capable of graduating an innovative and active generation. Educational stakeholders can enhance e-learning environments for students by prioritizing emotional support and fostering collaborative and active learning opportunities. This approach helps students thrive academically and creatively.

### **Conclusions, Recommendations, Limitations, and Future Research Directions**

The study emphasizes the critical role of integrating emotional support strategies into online education to enhance students' innovation and creative thinking. Learning environments that incorporate elements such as positive reinforcement and continuous communication foster greater student interaction and active participation. Training teachers to utilize assessments effectively is essential, as it encourages continuous learning and nurtures critical and creative thinking. Diverse assessment tools enable teachers to provide feedback that enhances students' skills and promotes critical thinking.

Furthermore, adopting active, student-centered learning strategies in online settings significantly boosts students' independence and creativity. These approaches encourage active engagement, allowing students to develop critical thinking and problem-solving skills innovatively. Creating an enriching setting that promotes inquiry is essential, to students for a future where sharp critical, creative and imaginative thinking are vital skills required to succeed ahead in life's diverse pursuits and challenges online education when infused with these principles provides students, with a well-rounded foundation to tackle upcoming obstacles confidently and innovatively.

Based on the findings, the study recommends developing effective emotional support strategies in online learning environments to cultivate an atmosphere conducive to innovation and creative thinking. It is essential to adequately train teachers in assessment-for-learning methods to empower students as critical

thinkers. Given the study's insights into the effectiveness of collaborative learning in improving academic performance and communication skills, strategies promoting collaborative learning in online environments should be adopted. Implementing active learning approaches that center on student engagement with digital content is also advisable.

For future research, it is important to expand the sample size to encompass diverse educational settings, enhancing the generalizability of the findings. Future studies should include schools from various geographical areas, both public and private, to understand the influence of environmental and cultural factors on learning outcomes. Utilizing multiple data collection tools, such as observations and quantitative data analysis, is recommended. Observing students, in the classroom can help us understand how they behave and interact with each other; analyzing data can give us information, about their performance too! When we blend quantitative and qualitative data together we get an insight into the topics we are exploring.

Finally, exploring new emotional support strategies is vital for developing critical and creative thinking skills. Strategies to consider could be training sessions, for teachers and workshops for students along with activities to improve the learning environment in schools and colleges. The effects of these approaches, on learning levels and cognitive skills in educational settings might provide fresh perspectives on how learning works and potential ways to make it better.

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