

Predicting Creative Thinking among Iraqi Students at the University of Mazandaran Based on the Attitudes of University of Mazandaran Professors toward the Use of Educational Technology in the Teaching Method

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Abstract

Background and Objective: The expansion of educational technologies in higher education has increasingly highlighted the role of professors in accepting and purposefully employing these technologies. This issue is of greater importance in multicultural university environments in which students with different cultural and educational backgrounds study. The present study was conducted with the aim of predicting the creative thinking of Iraqi students based on the attitudes of University of Mazandaran professors toward the use of educational technology in teaching. **Method:** In terms of purpose, this research was applied, and in terms of method, it was descriptive of the correlational type. The research population included professors of the University of Mazandaran and Iraqi students studying at this university, from among whom 120 individuals were selected by convenience sampling. Data were collected using the Yavuz Educational Technology Questionnaire (2005) and the Welch Creative Thinking Questionnaire (2002). After examining the statistical assumptions, including normality of data distribution, absence of multivariate outliers, and absence of multicollinearity, the data were analyzed using Pearson's correlation coefficient and multiple regression in SPSS software. **Findings:** The results showed that the regression model was significant ($F(5,114)=44.853, p<0.001$), and the components of attitudes toward the use of educational technology collectively explained 66.3% of the variance in the creative thinking of Iraqi students. Among the examined components, the benefits of using technology in education ($\beta=0.188$), prerequisites for using technology in education ($\beta=0.190$), and effectiveness of technological equipment in education ($\beta=0.231$) had positive and significant contributions to predicting creative thinking; in contrast, the ineffectiveness of technology in education ($\beta=-0.226$) had a negative and significant contribution. The component of perceptions about the use of technology in education did not have a significant contribution to the model ($p=0.058$).

Conclusion: The findings show that professors' attitudes toward the use of educational technology, particularly the perception of the benefits of technology, the availability of prerequisites for use, and the effectiveness of equipment, are related to the creative thinking of Iraqi students. Accordingly, the effective use of technology in higher education requires simultaneous attention to professors' attitudes, technical and skill readiness, and the quality of educational equipment. In multicultural university environments, strengthening these components can provide students with greater opportunities for active learning, interaction, problem solving, and the generation of new ideas.

Keywords: Educational technology, professors' attitudes, creative thinking, Iraqi students.

Introduction

The rapid transformation of digital technologies has fundamentally changed the nature of teaching and learning processes in higher education (Islam et al., 2024). The expansion of communication tools, digital learning environments, learning management systems, online educational resources, and interactive technologies has moved university education away from a one-way knowledge-transmission model toward environments in which students can actively access information, collaborate with others, produce and recreate educational content, and participate in the problem-solving process (Farias-Gaytan et al., 2024). Under these conditions, educational technology is no longer merely a tool for faster transmission of course content; rather, it is considered part of the learning infrastructure that can influence the manner of professor–student interaction, the organization of learning activities, and students' opportunities for experience, exploration, and the generation of new ideas (Hakimi et al., 2024). From this perspective, the fundamental issue in contemporary higher education is not merely the extent of access to technology, but how technology is used educationally and how it is integrated into the teaching process. In this regard, the role of the professor in determining the effectiveness of educational technology is of particular importance. The existence of digital equipment and platforms alone does not guarantee transformation in the learning process; rather, the professor's attitude toward technology, the extent of its acceptance, and the professor's ability to use digital tools purposefully and educationally can determine whether technology becomes a tool for reproducing traditional methods or provides a platform for active, participatory, and problem-based learning. Professors who accept technology as a meaningful part of the teaching process can use multimedia resources, interactive environments, simulation, participatory activities, and online learning resources to create diverse learning situations—situations that transform the student from a passive recipient of information into an active participant in the learning process (Culduz et al., 2024). Therefore, the professor's attitude toward the use of educational technology can be regarded as one of the important factors determining how technology is educationally utilized and its capacity to create richer learning experiences.

The importance of this issue becomes more evident when the aim of higher education is not merely the transmission of existing knowledge, but also the development of students' ability to confront new problems, generate different ideas, and provide innovative solutions (Al-Mahasneh, 2018). Within such a framework, creative thinking is one of the fundamental competencies expected of university students. Creative thinking refers to an individual's ability to generate, elaborate, and evaluate ideas that are valuable in terms of novelty and relevance to the problem and that can be used in a manner different from conventional patterns for confronting problems (Hernández Jaime et al., 2018). This type of thinking is not limited merely to generating unusual ideas, but includes the ability to view problems from different angles, establish relationships among information, redefine problems, and search for new and practical solutions (Khuana et al., 2017). Therefore, developing creative thinking at the university can prepare students to confront scientific and professional problems more flexibly and to participate more effectively in complex and changing environments.

From an educational perspective, digital technology can provide suitable conditions for the growth of creative thinking by creating interactive learning environments and providing opportunities for searching, experimentation, feedback, and collaboration. Unlike educational environments based entirely on lectures, technology can place students in situations in which they are required to compare information from different sources, judge its credibility, share their ideas with others, test different solutions, and examine the consequences of their choices. Such processes are aligned with the fundamental components of creative thinking, including cognitive flexibility, idea generation, and reconsideration of existing solutions (Shahbazi Chegni et al., 1403). Research evidence has also shown that the purposeful use of educational technology can increase students' participation, interaction in the learning process, and opportunities for innovation and problem solving (Alshuaybat, 2025). Therefore, the relationship between educational technology and creative thinking cannot be reduced merely to the presence of digital tools; this relationship largely depends on the quality of instructional

design and the manner in which the professor uses technology. This issue becomes more important in multicultural higher-education environments. Contemporary universities host students with different cultural, linguistic, and educational backgrounds, and this diversity can increase the necessity of using flexible and student-centered teaching methods. International students may differ from domestic students in modes of classroom participation, interaction with professors, access to educational resources, and previous learning experiences. Under such conditions, educational technology can create greater opportunities for students to engage in learning activities by providing flexible access to resources, enabling interaction beyond the time and place of the classroom, and creating diverse modes of participation. However, the effectiveness of such capacities depends on the extent to which professors accept technology in order to respond to students' diverse needs and employ it meaningfully in designing their teaching process (Heng & Lu, 2026). In this context, Iraqi students studying at the University of Mazandaran constitute a noteworthy group for examining this issue, because their educational experience in an Iranian university environment may be affected by cultural, educational, and linguistic differences. On the other hand, examining the role of educational technology in such an environment can go beyond measuring the effectiveness of a particular tool or platform and help identify how professors' attitudes, technology-based teaching practices, and students' cognitive outcomes are related. Despite the increase in studies on digital education and its outcomes, a considerable proportion of existing research has focused on domestic students or on technology users' attitudes, and empirical evidence regarding the role of professors' attitudes toward the use of educational technology in shaping the creative thinking of international students, particularly Iraqi students in Iranian universities, is limited (Wilczewski & Alon, 2023). This research gap highlights the importance of examining this issue in a real and multicultural university context. On the other hand, simultaneously examining professors' attitudes toward the use of educational technology and students' creative thinking can help clarify whether professors' acceptance and educational use of technology are accompanied by the creation of greater opportunities for exploratory learning, problem solving, and the generation of new ideas among students. Such an approach is particularly important because, if attention is focused solely on technological infrastructure, the role of the human and educational factor in utilizing technology may be overlooked. In contrast, focusing on the professor's attitude and educational behavior can show how technology, in interaction with the teaching method, the design of learning activities, and student participation, becomes a potential factor for strengthening creative thinking (Bereczki & Kárpáti, 2021). Accordingly, the problem of the present research is not merely to examine the extent of technology use at the university, but to examine professors' attitudes toward the use of educational technology in the teaching process and to explain its role in the creative thinking of Iraqi students at the University of Mazandaran. Studying this relationship can provide evidence for a better understanding of the capacity of educational technology in multicultural higher education and can assist universities in designing professors' professional-development programs, educational policymaking, and strengthening technology-based teaching practices. Therefore, the present study was conducted with the aim of examining the attitudes of University of Mazandaran professors toward the use of educational technology in the teaching method and its role in the creative thinking of Iraqi students at the University of Mazandaran.

Method

In terms of purpose, the present research is applied, and in terms of the method of data collection and analysis, it is descriptive-correlational. The aim of the research is to examine the attitudes of University of Mazandaran faculty members toward the use of educational technology in the teaching process and to examine its relationship with the creative thinking of Iraqi students. In this research, Iraqi students evaluated the attitudes and technological performance of professors with whom they had attended classes. In this design, without applying an intervention or manipulating the variables, the researcher measures the variables under study under the natural conditions of the university environment and examines the relationships among them. Correlational designs are appropriate for examining the strength and direction of relationships among variables under natural conditions and can provide a basis for identifying patterns of association between predictor and outcome variables (Cohen et al., 2022). In the present study, attitude toward the use of educational technology in teaching was considered the predictor variable, and the creative thinking of Iraqi students was considered the outcome variable. The choice of a correlational design is consistent with the aim of the research because the study seeks to examine the relationship among variables in the real environment of higher education and does not intend, by creating an educational intervention, to attribute changes in students' creative thinking to educational technology. The research population included faculty members of the University of Mazandaran and Iraqi students studying at this university in the 1403–1404 academic year. The professor population included University of Mazandaran faculty

members who were responsible for teaching university courses during the academic year under study. The student population also included Iraqi students studying at different levels of the University of Mazandaran during the same academic year. Based on official information received from the relevant units of the University of Mazandaran, the number of university faculty members in the 1403–1404 academic year was 850. To increase the precision of defining the research population, in the student section only individuals who held Iraqi nationality, were active students of the University of Mazandaran at the time of conducting the research, and met the study inclusion criteria were entered into the study. Sampling in the present study was conducted on a convenience and voluntary basis. After coordination with the relevant university units and provision of the necessary explanations regarding the aim of the research, the questionnaires were provided to eligible individuals. Participation in the research was completely voluntary, and respondents, after being informed of the aim of the study and the manner in which the information would be used, declared their consent to participate in the research. Because the present research is among multivariate correlational studies and relationships among variables are analyzed through statistical tests such as regression, the sample size was determined based on the formula of Tabachnick et al. (2013), which is presented as follows:

$$N > 50 + 8m$$

Variables of the formula:

(N): Number of required samples

(m): Number of predictor (independent) variables in the research model. The constant value 50 ensures the minimum adequacy of the sample for the stability of the statistical model, and the coefficient 8 is added for each independent variable in order to increase the accuracy of estimating the statistical coefficients. Therefore, considering five predictor variables:

$$N > 50 + 8(5) = 90$$

Consequently, the minimum sample size would be 91 individuals. However, in order to compensate for the possibility of incomplete questionnaires and the reduction in statistical power resulting from deletion of data, a sample size of 120 individuals was considered. Finally, the data collected through the standardized questionnaires were analyzed. The resulting data were first examined using descriptive statistical methods (mean, standard deviation, skewness, and kurtosis), and then, in order to test the research hypotheses, inferential statistical methods including Pearson's correlation coefficient and multiple regression were used. All analyses were performed using SPSS statistical software, and the significance level of the tests was considered to be 0.05.

Research Instruments

Yavuz Educational Technology Questionnaire (2005): This questionnaire was designed by Yavuz in 2005 and includes 50 items containing favorable and unfavorable statements concerning attitudes toward modern technologies and their use in the teaching–learning process. Its dimensions are: use of technology in education, perceptions regarding the use of technology in education, ineffectiveness of technology in education, prerequisites for the use of technology in education, and effectiveness of technological equipment in education. Respondents rate their answer to each item on a five-point Likert scale from 1 = completely disagree to 5 = completely agree; therefore, the range of scores on this scale varies from 50 to 250. In Iran, the questionnaire was validated by Moshtaqi Largani et al. (1387), with an overall reliability of 0.80. In the study by Saeidi et al. (1395), reliability coefficients ranging from 0.74 to 0.82 were also calculated. Creative Thinking Questionnaire: The Welch Creative Thinking Questionnaire (2010) consists of 20 items and is used to assess an individual's creative-thinking skill. The questionnaire is scored on a five-point Likert scale in which the options “never,” “rarely,” “sometimes,” “often,” and “always” receive scores of 1, 2, 3, 4, and 5, respectively. To obtain the total questionnaire score, the scores of all items are summed. In the Welch study (2010), the validity of the questionnaire was reported as satisfactory, and its reliability was also reported by Welch (2002) through a Cronbach's alpha coefficient of 0.93. In domestic studies, the reliability of the instrument was also reported by Eyni et al. (1399) as a Cronbach's alpha above 0.83.

Findings

In the present study, of the total 120 participants, 46 (38.33%) were women and 74 (61.67%) were men; therefore, in the gender composition of the sample, the number of men was greater than the number of women. In order to examine the assumptions required for conducting multiple regression analysis, the distribution status of the research variables was examined in the first stage. For this purpose, skewness and kurtosis indices were calculated. The results showed that the skewness and kurtosis values of the variables under study were within the ± 2 range; therefore, the distributions of the variables did not show a substantial deviation from normality, and the

assumption of normality of the data distribution was satisfied at an acceptable level. Next, in order to examine the presence of multivariate outliers, the Mahalanobis distance index was used. This index shows the distance of each observation from the center of the multivariate distribution based on the set of variables under examination. Given that five components of professors' attitudes toward the use of educational technology in teaching were entered into the regression model as predictor variables, the degrees of freedom were considered to be 5. The critical chi-square value at the significance level of 0.001 and with 5 degrees of freedom was 20.515. Examination of the Mahalanobis distance values showed that none of the observations exceeded the stated critical value; therefore, no evidence of multivariate outliers was observed in the dataset, and this regression assumption was satisfied. In addition, before conducting the regression analysis, the existence of a linear relationship between the predictor variables and the criterion variable was examined, and the results showed that the necessary conditions for examining linear relationships among the variables were present. Overall, the results of the preliminary analyses showed that the research data were in an acceptable condition with respect to approximate normality of distribution, absence of multivariate outliers, and the necessary conditions for examining linear relationships. Accordingly, it was possible to use multiple regression analysis to examine the ability to predict the creative thinking of Iraqi students based on the components of University of Mazandaran professors' attitudes toward the use of educational technology in teaching. Multiple regression analysis was used to examine the ability to predict the creative thinking of Iraqi students based on the attitudes of University of Mazandaran professors toward the use of educational technology in teaching. In this analysis, the five components of attitudes toward the use of educational technology—benefits of using technology in education, perceptions regarding the use of technology in education, ineffectiveness of technology in education, prerequisites for using technology in education, and effectiveness of technological equipment in education—were entered into the model as predictor variables, and the creative thinking of Iraqi students was entered as the criterion variable.

Table 1. Summary of the Regression Model

R	R ²	Adjusted R	Standard Error	Durbin–Watson
0.814	0.663	0.648	24.1	2.034

According to Table (1), which presents the summary of the regression model, it can be concluded that the components of University of Mazandaran professors' attitudes toward the use of educational technology in the teaching method, taken together, predict 66.3% of the creative thinking of Iraqi students at the University of Mazandaran. To examine the significance of the regression model, the statistical method of analysis of variance was used.

Table 2. Analysis of Variance for Examining the Significance of the Regression Model

Model	Sum of Squares	df	Mean Square	F Value	Significance Level
Regression	13125.666	5	26243.133	44.853	0.001
Residual	66700.034	114	585.088		
Total	197915.700	119			

Table (2) shows the results of the analysis of variance for examining the significance of the regression model. The results confirm the significance of the overall model with 99% confidence ($P \leq 0.01$), with $F(5, 114)=44.853$.

After examining the summary of the regression model and the significance of the model, the standardized and unstandardized regression coefficients of the model variables are examined.

Table 3. Standardized and Unstandardized Regression Coefficients

Variable	B (Unstandardized)	Standard Deviation	β	Significance	Tolerance	VIF
Benefits of using technology in education	0.779	0.341	0.188	0.024	0.438	2.284
Perceptions regarding the use of technology in education	0.557	0.290	0.151	0.058	0.480	2.083

Ineffectiveness of technology in education	-0.958	0.341	-0.226	0.006	0.457	2.186
Prerequisites for using technology in education	0.917	0.373	0.190	0.015	0.493	2.029
Effectiveness of technological equipment in education	1.242	0.458	0.231	0.008	0.408	2.449

As the results of Table (3), concerning the regression coefficients, show, the components of the benefits of using technology in education ($\beta=0.188$), prerequisites for using technology in education ($\beta=0.190$), and effectiveness of technological equipment in education ($\beta=0.231$) among students, with 95% confidence, have a significant contribution ($P \leq 0.05$) to predicting the creative thinking of Iraqi students at the University of Mazandaran. Among these three predictors, the component of effectiveness of technological equipment in education, with the largest standardized beta coefficient, was the strongest positive predictor of creative thinking in the model. Also, ineffectiveness of technology in education ($\beta=-0.226$): this finding shows that an increase in the attitude that technology is ineffective in education was associated with a decrease in the creative thinking of Iraqi students; in other words, this component had an inverse relationship with creative thinking. The assumption of multicollinearity was also examined in the rows related to VIF and Tolerance, and consequently no linear multicollinearity among the independent variables was found (Tolerance values of 0.01 or less and VIF values greater than 10 indicate multicollinearity).

Discussion

The findings of the present study showed that, among the components of University of Mazandaran professors' attitudes toward the use of educational technology in teaching, the benefits of using technology in education, prerequisites for using technology in education, and effectiveness of technological equipment in education had positive and significant contributions to predicting the creative thinking of Iraqi students; in contrast, the ineffectiveness of technology in education showed a negative and significant contribution to predicting creative thinking. Overall, these findings indicate that the relationship between professors' attitudes toward educational technology and students' creative thinking is not limited merely to the existence of technology in the university environment, but is also related to how the educational value of technology is perceived, the availability of conditions for its use, and the efficiency of the equipment. These results are consistent with the findings of Bakhsha'i (1403), Fattahi et al. (1402), Katouli-Nejad et al. (1402), Azizi et al. (1401), Zaremohzzabieh et al. (2025), and Jalolov (2024), who emphasized the relationship of educational technology with active-learning processes and components related to creative thinking. Professors' perception of the benefits of educational technology may be related to the type of use made of technology in the teaching process. When technology is considered not merely as a tool for transmitting course content, but as a means for information searching, interaction, content production, problem solving, and student participation, greater opportunities are created for students to engage in diverse cognitive activities. Under these conditions, students can encounter different resources and viewpoints, compare and combine information, and offer different solutions to educational problems—processes that are theoretically closely related to creative thinking. In the same regard, Loveless (2007) emphasized the capacity of digital technologies to create open and interactive learning environments and to provide opportunities for experience and creative learning. The present finding is also consistent with the study of Romero et al. (2015). In examining creative learning based on digital technologies, they showed that the educational use of digital tools, particularly in project-based activities and student content production, is associated with greater opportunities for active participation and the development of creative skills. In higher-education environments, such activities move the student from being merely a recipient of information toward being a participant in the process of knowledge production. Therefore, it may be considered probable that a positive professor attitude toward the benefits of technology, by providing the context for more diverse use of technological tools, is associated with learning experiences related to students' creative thinking. The finding of the present study is also consistent with the results of Henriksen et al. (2016). These researchers emphasized the

importance of purposeful integration of technology into the educational process and showed that the value of technology for creativity depends on how it is integrated with problem-solving processes, the combination of knowledge, and the generation of new ideas. From this perspective, technology alone does not determine creative thinking; rather, the manner of educational use of technology is fundamentally important. Therefore, the present finding can be regarded as an indication of the importance of professors' attitudes toward the educational functions of technology and the relationship of this attitude with students' creative-learning opportunities. On the other hand, ineffectiveness of technology in education had a negative and significant relationship with creative thinking. This result may indicate that an attitude toward technology as a tool lacking educational value or efficiency is associated with a lower level of students' creative thinking. A negative attitude toward the usefulness of technology may be accompanied by more limited use of technological tools in educational activities; consequently, students will have fewer opportunities to participate in activities such as searching digital resources, producing multimedia content, online interaction, collaborative learning, and technology-based problem solving. This explanation is consistent with studies related to technology acceptance, including the study by Teo et al. (2011), which emphasized the role of perceived usefulness and users' attitudes in the acceptance and use of educational technology. Professors' attitudes are an important component in transforming technology from a technical tool into an educational tool. If a professor considers technology useful, efficient, and relevant to educational objectives, the likelihood that its capacities will be used in designing learning activities will be greater; in contrast, perceiving technology as a low-impact or unnecessary tool may be accompanied by more limited use of it. However, given the correlational nature of the present research, this explanation should be considered a possible mechanism, and a causal relationship between professors' attitudes and students' creative thinking cannot be concluded on the basis of the present findings. Overall, the consistency of the present findings with previous studies shows that the relationship between educational technology and creative thinking is probably more evident when technology is situated within meaningful, interactive, and exploratory learning activities. Therefore, the importance of educational technology cannot be evaluated solely on the basis of the extent of access to equipment or the number of digital tools available at the university; rather, the type of professors' attitudes, the manner of educational use of technology, and the extent of its connection with students' cognitive activities must also be considered. According to the constructivist approach, learning is an active process in which the learner constructs and reconstructs knowledge through interaction with the environment, information, and others. From this perspective, educational technology becomes pedagogically important when it is used to create opportunities for searching, interaction, content production, collaboration, and problem solving (Jonassen, 2000). Therefore, the positive finding related to the benefits of using technology in education can be explained by the view that professors' greater perception of the educational benefits of technology is associated with providing a context for the use of technology in active and student-centered activities—activities that can provide students with greater opportunities to examine different viewpoints, test solutions, and generate new ideas. Mayer's multimedia learning theory also provides another framework for interpreting these findings. According to this theory, purposeful presentation of information through verbal and visual channels can assist in the organization and processing of information (Mayer, 2014). In higher-education environments, the appropriate use of text, images, audio, video, and other multimedia formats can expose students to more diverse ways of representing information. This diversity may provide greater opportunity to connect new information with prior knowledge, compare concepts, and reconstruct them. When professors and students have sufficient skill to use technology and the technical infrastructure functions appropriately, a portion of the cognitive resources that might otherwise be spent dealing with technical problems and learning how to use the tool remains available for processing educational content. Under such conditions, greater capacity will be available for activities such as problem solving, combining information, evaluating different solutions, and generating ideas (Sweller, 2011). Accordingly, appropriate technological prerequisites can be regarded as one of the conditions that make deeper cognitive use of technology possible in the educational environment. On the other hand, the availability of infrastructure and technological skills can also expand the range of educational and social interactions. Digital learning environments enable online discussions, group work, resource sharing, receiving peer feedback, and collaboration in producing educational products. This is consistent with views concerning the social nature of creativity that emphasize the role of interaction and collaboration in the formation and development of new ideas (Sawyer & Henriksen, 2024). Therefore, the positive relationship between technological prerequisites and creative thinking can, to some extent, be explained through the provision of greater opportunities for interaction, collaboration, and exchange of viewpoints. According to this theory, satisfaction of the basic psychological needs

of autonomy, competence, and relatedness is associated with the formation of autonomous motivation and positive learning outcomes (Deci & Ryan, 2000). Some educational applications of technology can increase the possibility of choosing resources, the method of performing an assignment, the manner of presenting a product, and the type of participation in learning activities. However, realization of such a capacity depends on the quality of instructional design and the degree of readiness of the professor and student. Therefore, it may be considered probable that the existence of appropriate technological prerequisites provides the context for using capabilities that are related to autonomy, a sense of competence, and educational interaction and are thereby associated with creative thinking. Overall, the research findings show that educational technology cannot be regarded as an independent and automatic factor for enhancing creative thinking. The value of technology in this regard depends on professors' attitudes toward its benefits, the availability of technical and skill prerequisites, and the efficiency of the equipment. When these conditions are placed alongside appropriate instructional design, technology can create greater opportunities for active learning, interaction, searching, problem solving, and encountering diverse resources; in contrast, an attitude based on the ineffectiveness of technology may be associated with more limited use of its educational capacities. Therefore, the pattern obtained in the present research supports the importance of the quality and manner of integrating technology into the teaching process more than the mere existence of technology in the university environment. This point is of greater importance in the multicultural environment of the University of Mazandaran and in relation to Iraqi students, because designing diverse, flexible, and interactive learning opportunities can enable more active participation by students with different educational and cultural backgrounds.

Conclusion

The present study was conducted with the aim of predicting the creative thinking of Iraqi students based on the attitudes of University of Mazandaran professors toward the use of educational technology in teaching. The findings showed that professors' attitudes toward educational technology, overall, have a considerable ability to predict the creative thinking of Iraqi students; therefore, this highlights the importance of professors' attitudes and perceptions alongside educational and environmental factors related to the use of technology. From an educational perspective, the research findings emphasize the importance of the human factor in the utilization of technology. On the other hand, technology by itself does not guarantee creative learning; rather, its educational value largely depends on how it is integrated into the teaching process, the type of activities designed by the professor, and the opportunities provided to students for participation, searching, interaction, problem solving, and idea generation. Therefore, investment in the university's technological infrastructure can be associated with desirable cognitive outcomes when it is pursued simultaneously with empowering professors to use technology educationally and creatively. The focus of the research on Iraqi students at the University of Mazandaran means that generalization of the results to other groups of international students, universities, and cultural contexts should be made with caution. Alongside the development of digital infrastructure, universities can develop programs to empower professors in technology-based instructional design, active learning, and problem-solving and creative activities. Such an approach can transform educational technology from a tool that merely transmits content into part of an interactive, exploratory learning environment that supports creative thinking.

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