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The Effect of Digital Platforms and Artificial Intelligence on the Development of Engagement Skills in Learning and Digital Trust among University Students

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ABSTRACT

The current study sought to develop engagement skills in learning and digital trust among university students by designing an interactive e-learning environment based on integrating the edX digital platform with some artificial intelligence applications. It was achieved by a random sample of undergraduate students at the College of Education, King Khalid University, was selected and divided into two groups: The first empirical group numbered (28) students and used the edX platform with some AI applications, and the other empirical group numbered (29) students who used Blackboard platform. A scale of engagement in learning was prepared, and a scale of digital trust and a t-test were used to analyze the study's findings. The study found a statistical significance between integrating the edX digital platform with some AI applications and the Blackboard platform in developing engagement skills in learning in favor of the edX digital platform. The calculated T-value for both groups was 7.923, statistically significant at $p < 0.05$. The T-value for integrating the edX digital platform with some AI and the Blackboard platform applications in developing digital trust skills in both groups was 1.368, which was insignificant at $p < 0.05$.

INTRODUCTION

Online learning allows teachers to efficiently deliver interactive educational content to students through platforms and applications, enabling future reference and recording of this interactive learning experience (Sabljić *et al.*, 2021). It contributes to creating and designing an interactive learning environment that meets the needs of each learner. Due to the significant development in the field of the Internet, the idea of widespread Massive Open Online Courses (MOOCs) appeared (Sabljić *et al.*, 2021). George Siemens is the first to coin the term "MOOCs" among students through the course "Connectivism and Connective Knowledge" at the University of Manitoba (McAuley *et al.*, 2010). These courses were based on the philosophy of the Open University and technological platforms. However, the MOOC did not officially start until 2012. When Stanford University launched the first MOOCs in the "Introduction to Artificial Intelligence" course, it attracted more than (160000) subscribers from all over the world (Khamis, 2020).

Arab initiatives have emerged to launch open educational courses, the most famous of which were the Rwaq and Edraak platforms (Sallam, 2017). However, these Arab initiatives differed from their foreign counterparts in that universities did not launch them but rather were initiatives of individuals or institutions (Adham & Lundqvist, 2015). E-learning platforms (MOOCs) are defined as a set of educational services available via the Internet that integrate social networks and e-learning management systems (Encarnacion *et al.*, 2021). They provide teachers, learners, parents, and educational participants with information, interactive tools, and resources to support and enhance educational content for learners through a comprehensive

web-based system (Kiryakova-Dineva *et al.*, 2017). In this aspect, Faris *et al.* (2019) focused on designing a digital learning platform based on participatory stories. They recommended the need to provide digital platforms to deliver undergraduate courses to encourage students to learn and participate in educational communities across the web (Faris *et al.*, 2019). (Holotescu *et al.*, 2017) Focused on employing highly polarized open e-learning systems (MOOCs) among university students. The study concluded that the students were able to produce new software that contributed to the design of smart cities for their countries. There are AI applications that are used in the field of education, including tracking and extracting educational data to track student behavior, as well as provide support to students at risk of dropping out of their studies (Pedro *et al.*, 2019). AI applications can delve deeper to learn more about the real difficulty facing the learner and can identify the basic steps that the student missed and then help them learn the correct way (González-Calatayud *et al.*, 2021).

In this aspect, Ondáš *et al.* (2019) concluded that Chatbots are among the modern applications of AI that can be used to provide educational content to students through a set of interactive questions, texts, images, videos and comments (Ondáš *et al.*, 2019). The study recommended integrating these applications into teacher preparation programs to keep pace with the ever-changing labor market requirements.

Werang and Leba (2022) indicated that there was a need to achieve student engagement in studying the courses offered through digital platforms (Werang & Leba, 2022). These courses must be based and designed on interaction to ensure the effective participation of students and their

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engagement and non-dropout. Engagement was one of the important aspects that reduced students' attrition while studying (Canty *et al.*, 2020). The rate of student attrition in courses taught remotely increases by (10-20%) than teaching courses in traditional classes (Angelino *et al.*, 2007). Therefore, those who teach courses via digital platforms must pay attention to choosing content and designing activities that ensure the effective engagement of students.

The global reliance on interactive digital learning platforms in education has led to a major change in the teaching and learning processes (Decuyper *et al.*, 2021). AI and its various applications have become one of the methods that can help in monitoring students' online activities and their access. AI applications help students with comprehension and assist in understanding major concepts and are linked with the development of skills (Shiohira, 2021).

The current research aimed to develop engagement skills in learning and digital trust among students of the College of Education, King Khalid University, through integration between the global edX platform and some AI applications. This study suggested university education officials pay attention to the use of digital platforms in university education. It further encouraged students to self-learn, exchange ideas, and integrate into learning through digital platform environments.

Research Problem

Ritter *et al.* (2018) confirmed that educational programs offered by universities did not help students to engage and integrate them (Ritter *et al.*, 2018). The reason for this was that the educational software template was similar to the educational book template in terms of showing chapters, lessons, and activities to students. The study suggested designing digital content that helps students to participate effectively through behavioral interaction, promotes positive emotional responses, and encourages them to respond positively. Non-engaged students learn less and are often described as "unmotivated". Many students in virtual learning sessions turn off the microphones and cameras to divert their attention to something else (Castelli & Sarvary, 2021). As a result, there is a gap and a decrease in the academic achievement of students.

Tiryakioğlu and Erzurum (2011) indicated that most students were more interested in the social connections they make through web-based tools and platforms (Tiryakioğlu & Erzurum, 2011). Although students used these tools daily, educational institutions were still slow to adopt these digital tools and platforms that may help them integrate into the learning process (Rodríguez-Abitia & Bribiesca-Correa, 2021). Mutambik *et al.* (2022) indicated that there are some fears and lack of confidence among some users about placing their information and files with the companies providing digital platforms when the service is subjected to a hacking process (Mutambik *et al.*, 2022). Many users have weak confidence in the services of digital platforms.

Based on the preceding, the problem of the current study was identified as "poor engagement skills and digital trust among university students". Therefore, the current research sought solutions for this weakness through the integration between the global edX platform and AI applications to develop their digital engagement and confidence skills. Research Questions

The current research attempts to answer the following two questions:

A. What is the effect of integration between the digital edX platform and AI applications in developing the skills of engagement in learning among students at the College of Education, King Khalid University?

B. What is the effect of the integration between the digital edX platform and AI applications in developing digital trust skills among students at the College of Education, King Khalid University?

Research Hypotheses

The current research attempts to verify the validity of the following hypotheses:

H1: There was no statistically significant difference at the level (0.05) between the mean scores of the first empirical group (which used the edX platform) and the other empirical group that used the Blackboard platform in the post-application of the engagement scale in learning.

H2: There was no statistically significant difference at the level (0.05) between the mean scores of the first empirical group (which used the edX platform) and the other empirical group that used the Blackboard platform in the post-application of the digital trust scale.

METHODOLOGY

This study employed a quasi-experimental approach, and it was based on two groups following their pre and post-application performance measures.

Research Procedures

To know the effect of integrating the edX platform with AI applications on developing engagement skills in learning and digital trust among students of the College of Education, King Khalid University, the following was conducted:

First: Selection of the Research Sample

The research sample was selected from the "Bachelor's" students at the College of Education, King Khalid University, randomly. It consisted of two groups: the first empirical group, consisting of (29) students, was trained through the edX platform through the free account (<https://www.edunext.co>). The second empirical group, a division of (28) students, was trained using the learning management system (Blackboard) available at the university. To ensure the equality of the two groups, the research tools were applied beforehand, and the findings were as shown in Table (1).

Table 1: Findings of the t-test in the scale of inclusion in learning and the digital trust scale in the pre-application

Tool	Group	Mean	SD	Degree of freedom	Calculated T value	Significance level	Significance
Learning Engagement scale	1 st empirical group	42.90	3.33	55	1.749	0.848	Not significant
	2 nd empirical group	41.36	3.31				
Digital trust scale	1 st empirical group	45.10	3.06		1.564	0.438	Not significant
	2 nd empirical group	43.89	2.77				

Table (1) shows the calculated (T) value, (1.749), (1.564) in the learning engagement scale and the digital trust scale. These were non-functional, at the level of significance (0.05), the significance of both sides and the degree of freedom (55). The non-functionality Indicated equivalence of the two groups as there were no statistically significant differences between the two groups in the pre-application of the scale of engagement in learning and the scale of digital trust.

Second: Preparing Research Materials

Designing a learning environment based on the integration of edX platform and AI applications: To design a learning environment based on the engagement of the digital edX platform with AI applications, some previous studies were reviewed. The study of (Spatioti *et al.*, 2022), (Stapa & Mohammad, 2019) and the general model of ADDIE design was used as follows:

Analysis

At this stage, the following procedures were taken:

- Determining the general objectives of the learning environment based on the engagement of the digital edX platform with AI applications, where the general objective of this environment is to develop engagement skills in learning (the use of computers in education) among the students of the research sample.

Determining the Characteristics of Learners

Seventh-level undergraduate students at the College of Education, King Khalid University, studying the course “Using Computers in Education 424 TRB-2” in the first semester of the academic year (2021 AD). Learners belong to the same environment with similar circumstances, and their skills in using computers and Internet networks are almost identical. The number of students in the first empirical group was (29) students, and the number of students in the second empirical group was (28) students.

Educational Material

The training content has been identified in the form of (5) training units.

Design

The design stage included defining procedural goals for the existing learning environment, integrating the edX platform with AI applications, setting the conception of the content, learning strategy, and evaluation methods, as follows:

A- The procedural objectives of the learning environment based on the integration of the edX platform with AI applications:

First Topic: Digital Platforms

After completing this content, the student should be able to:

- Discuss the nature of digital platforms.
- Explain the characteristics of technological innovations.
- Review the most important emerging technologies.
- Discuss the role of emerging technologies in the development of education.

The Second Topic: Designing Interactive Digital Content

After completing this content, the student should be able to:

- Know the digital content.
- Define the elements of digital content.
- Employ digital content authoring tools.
- Design digital content according to the Sharable Content Object Reference Model (SCORM) standards.

The Third Topic: Designing Educational Websites

After completing this content, the student should be able to:

- Know what the educational site is.
- Define web design specifications.
- Know the Drupal system for web design.
- Design an educational website.

The Fourth Topic: Digital Walls

After completing this content, the student should be able to:

- Know about digital walls.
- Explain the importance of digital walls in education.
- Design a digital wall.
- Able to publish the digital wall.

The Fifth Topic: Words Cloud

After completing this content, the student should be able to:

- Discuss what the word cloud is.
- Conclude the importance of the word cloud in education.
- Design a word cloud in his field of specialization.
- Employ the word cloud in the opinion poll.

The Chatbot application was designed through the ChatFuel platform. This platform does not require programming experience, and automated chat is easily designed without any programming experience. The Otter Voice Notes application has also been integrated through the website (<https://otter.ai/>) with the edX digital platform.

B- The learning environment content:

The content of the learning environment edX platform with AI applications included the following five topics:

1. Emerging platforms and technologies.
2. Digital content design.
3. Designing educational websites.
4. Digital walls.
5. Word clouds.

The learning strategy and activities used in the edX platform and AI applications:

In light of the procedural objectives and the content of the learning environment, the learning strategy proceeded using the edX platform by entering the platform, starting to study the content and reviewing the objectives. The digital content was read by interacting

with the Otter application and the Chatbots application, as well as between the students and the teacher. The students completed the required project and presented it to the teacher in order to obtain feedback. As for the learning strategy through the learning management system “Blackboard” was concerned, it was done through students entering the platform, reviewing the objectives, and studying the content. Then, interacting with each other and between the students and the teacher. The students completed the required project and then got the feedback. Figures 1 and 2 show the Flowchart of the learning strategy through the edX electronic platform and the Flowchart of the learning management system “Blackboard” strategy, respectively.

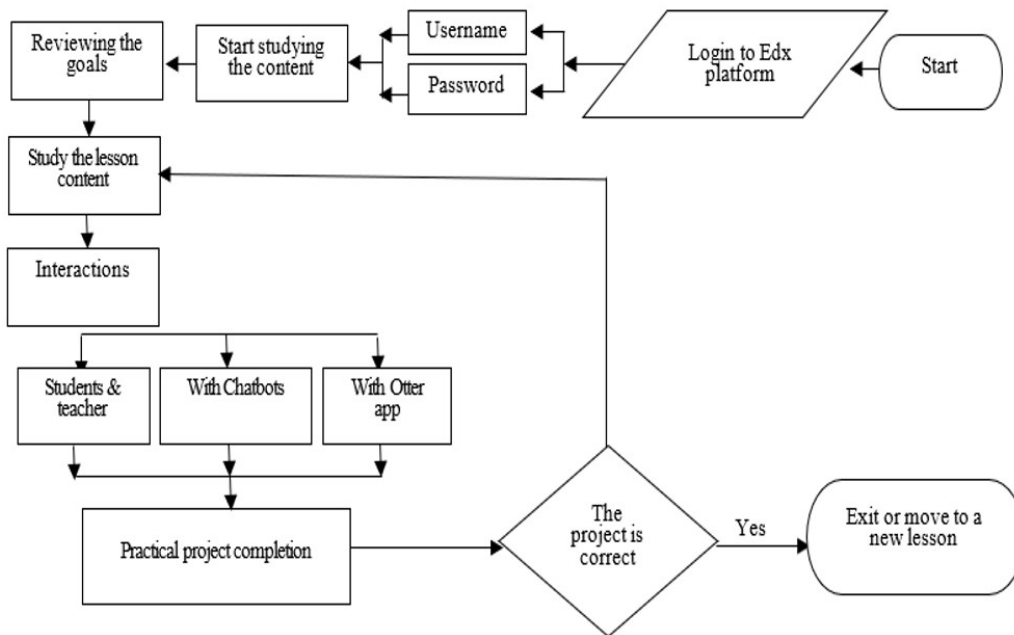


Figure 1: Shows a flowchart of the learning strategy through the edX electronic platform

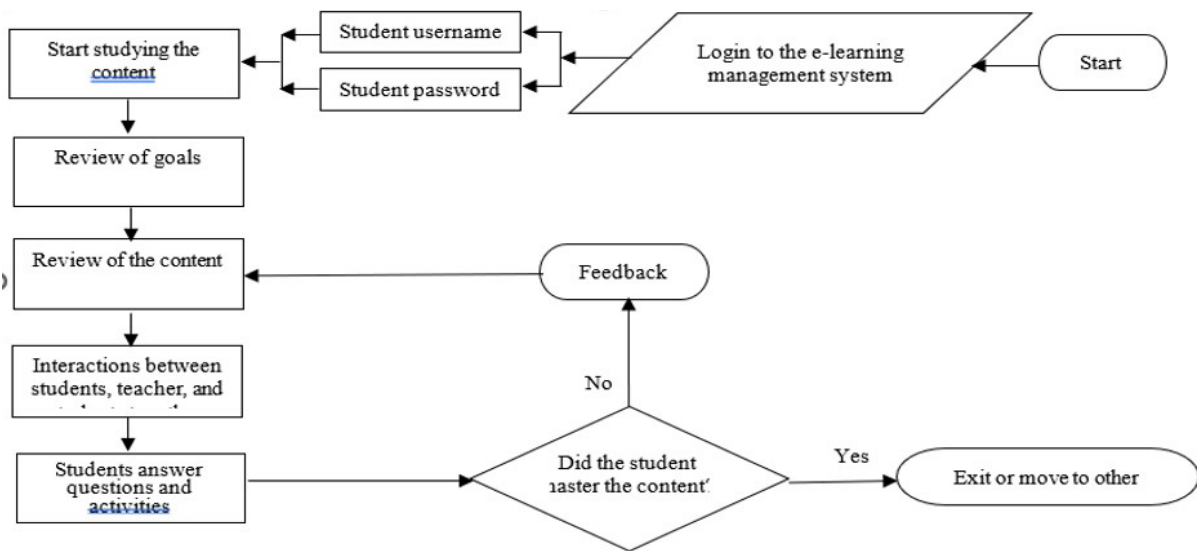


Figure 2: Shows a flowchart of the learning management system’s “Blackboard” strategy

Assessment Methods

The assessment methods varied to include the tribal calendar at the beginning of each topic to determine the previous learning. Formative assessments were included to guide students and provide feedback. The final assessment, which took place after completing the study of all training content designed according to the engagement of the digital edX platform with AI applications.

Development

At this stage, the researchers used some programs and applications, the most important of which were the following:

- Blackboard system
- Video Scribe software
- <https://www.edX.org> platform
- <https://answer.garden.ch> website
- Articulate Storyline Program
- <https://ar.padlet.com>
- Chatbot application
- Otter Voice Notes application

Implementation

At this stage, the digital content was published on the EdX platform, the trial version, and was available to (50) users. It also explained how to enter the platform and the tasks to be performed.

Evaluation

The content of the edX digital platform with AI applications was distributed among a group of experts in the fields of curricula and “educational technologies”. In addition, the measurement tools were employed after thoroughly studying all the training content of the students of the research sample.

Third: Preparing Performance Measures

The Scale of Engagement in Learning

The scale of engagement skills in learning was prepared according to the following steps:

Determining the Purpose of the Scale

The objective of the scale was to measure engagement skills in learning the “Using Computer in Education” course with its three dimensions, which were the cognitive dimension, the behavioral dimension, and the emotional dimension, using the digital edX platform integrated with AI applications for “Bachelor’s” students at the College of Education at King Khalid University.

Paragraphs of the Scale

The scale consisted of three dimensions: the cognitive dimension and the number of its phrases (11), the behavioral dimension and the number of its phrases (9), and the emotional dimension and the number of its phrases (11). Thus, the number of scale phrases became (31) phrases.

Adjusting the Scale through

Presenting the initial image of the scale to a group of arbitrators: After completing the formulation of the scale’s vocabulary, it was presented to a group of experts in the field of curricula, educational techniques, and psychology. Their opinions explained the appropriateness of the scale for the purpose for which it was set. The deletion of some phrases of the second dimension of the scale and the reformulation of some phrases from the linguistic point of view after analysis.

Exploratory Application of the Scale

After knowing the opinions of the arbitrators, the scale was applied to Digital Ally through the website <https://cutt.us/Jf7m7> on an exploratory sample of (22) undergraduate students at the College of Education, King Khalid University to identify the appropriateness of phrases from a linguistic and scientific point of view. Their responses illustrated the appropriateness of the scale statements without any linguistic or scientific ambiguity.

Internal Consistency of the Scale (statistical validity)

The correlation coefficient matrix (Pearson) was found between the dimensions of the scale and the total score, according to Table 2.

Table 2: Shows the dimensions of the scale and the total score

Item	Cognitive	Behavioral	Emotional
Cognitive	1		
Behavioral	0.64	1	
Emotional	0.37	0.50	1
The scale as a whole	*0.89	*0.80	*0.68

Table 2 shows that the correlation coefficient of the first, second, and third dimensions with the scale as a whole were equal to (0.89), (0.80), and (0.68) respectively. All of these were significant and statistically acceptable values. This indicated that the dimensions of the scale were the same thing as the scale as a whole, which showed the validity and dimensionality of the scale.

Calculating the Average Time of the Scale

The scale time was calculated by finding the average of all students’ times, each according to his speed, and it was approximately equal to (30) minutes.

Calculating the reliability of the scale

After presenting the scale to a group of arbitrators and its exploratory testing on (22) students using (Cronbach’s alpha) equation, it was found that it was approximately equal to (0.83), which was an appropriate reliability coefficient.

The Final Version of the Scale

After formulating the scale and adjusting it statistically, the scale became valid for the final application.

Digital Trust Building Scale

The digital trust building scale was prepared according to the following steps:

University with the skills of building digital trust in dealing with digital platforms. The dimensions of the scale were accessibility, ease of use, information quality, website format and design, and information security.

Determining the Purpose of the Scale

The objective of the scale was to provide the Bachelor’s degree at the College of Education at King Khalid

Paragraphs of the Scale

The scale contained dimensions, as shown in Table 3.

Table 3: Shows the total number of dimensions and number of phrases for each dimension

S	The Dimension	No. of phrases
1	Easy access to the platform	5
2	Easy use of the platform	8
3	Quality of information on the platform	9
4	Form and design of the platform	6
5	Information security in the platforms	10
Total	5	38

Setting the Scale by Presenting the Initial Image of the Scale to a Group of Arbitrators

After completing the formulation of the scale’s vocabulary, it was presented to a group of specialists in the field of curricula, teaching methods, educational techniques, and psychology. The scale’s appropriateness was emphasized, with certain phrases removed and linguistic wording modified for its intended purpose.

cutt.us/3UIMb on an exploratory sample of (22) undergraduate students at the College of Education, King Khalid University, to identify the appropriateness of phrases from a linguistic and scientific point of view. Their responses illustrated the appropriateness of the scale statements without any linguistic or scientific ambiguity.

Exploratory Application of the Scale

After knowing the opinions of the arbitrators, the scale was applied to Digital Ally through the website <https://>

Internal Consistency of the Scale (Statistical Validity)

Spearman correlation coefficient matrix was found between the dimensions of the scale and the total score according to Table 4:

Table 4: Shows the Spearman correlation coefficient matrix

Dimension	Ease of access	Ease of use	Information quality	Platform and design	Information security
Ease of access	1.00				
Ease of use	0.61	1.00			
Information quality	0.57	0.73	1.00		
Platform form and design	0.34	0.67	0.59	1.00	
Information security	0.54	0.49	0.61	0.54	1.00
The entire scale	*0.70	*0.65	*0.80	0.54	0.84

Table 4 revealed significant correlation coefficients for five dimensions of scale, with coefficients of 0.70, 0.65, 0.80, 0.54, and 0.84, respectively, indicating acceptable and statistically acceptable values. This indicates that the dimensions of the scale were the same thing as the scale, which indicated the validity and dimensionality of the scale.

(Alpha Cronbach) equation, it was found that it was approximately equal to (0.86), which was an appropriate reliability coefficient.

Calculating the Average Time of the Scale

The time of the scale was calculated by calculating (75%) of the student’s responses, and it was approximately equal to (50) minutes.

The Final Version of the Scale

After formulating the scale and adjusting it statistically, the scale became valid for the final application (Appendix 3).

Calculating the Reliability of the Scale

After presenting the scale to a group of arbitrators and experimenting with it on (22) students using the

Fifth: Pre-application of Measurement Tools

The tools of the scale of engagement in learning and the scale of digital trust were applied to the two research groups in the first semester (2021 AD).

Sixth: Implementation of the Research Experiment

After clarifying the purpose of the experiment, the

research experiment was carried out at the College of Education during the first semester (2021 AD), and the first empirical group had 29 students. As for the second empirical group, it numbered (28 students), and the experiment lasted about (6) weeks.

Seventh: Post-application of Measurement Tools

After the completion of the research experiment, the measurement tools represented in The Scale of Engagement in Learning and the Scale of Digital Trust in the course “Using Computers in Education” a post-application to the research sample, correcting and monitoring it.

RESULT AND DISCUSSIONS

Research Findings and its Interpretations

After monitoring the scores of the students in the post-application in each of the scales of engagement in learning and the scale of digital trust in the course “Using Computers in Education”, the research questions were answered as follows:

The Answer to the First Question

“What is the effect of the integration between the digital edX platform and AI applications in developing the skills of engagement in learning among the College of Education’s students at King Khalid University?”

To answer this question, formulate the following hypothesis:

There was no statistically significant difference at the level (0.05) between the mean scores of the first empirical group (which used the edX platform) and the other empirical group that used the Blackboard platform in the post-application of the engagement scale in learning. To test the validity of this hypothesis, the statistical treatment was carried out using the t-test for two independent samples to compare the scores of applying the scale of engagement in learning for the first experimental or other empirical groups. Table 5 shows the findings of applying the t-test to indicate the differences between the mean scores of the first empirical group and the other empirical group in the scale of engagement in learning the course “Using Computers in Education”.

Table 5: The T value and its statistical significance between the mean scores of the students of the first and the other empirical groups in the engagement scale

Group	Tool	N	M	A	Degree of freedom	T Value	Significance
1 st Group	Education engagement scale	29	52.69	4.91	55	*7.923	Significant
2 nd Group		28	43.41	4.13	55	*7.923	Significant

Table (5) shows that the calculated (T) value was (7.923), which was a function of the level (0.05), the significance of both sides and the degree of freedom (55), which indicated the existence of statistical significant differences between the first empirical group and the other empirical group in the post application of the engagement scale in learning the course “Using computers in education”. Thus, the first hypothesis of the research was rejected, as there was a statistically significant difference at the level of (0.05) between the mean scores of the first empirical group (which used the edX platform with some artificial intelligence applications) and the other empirical group that used Blackboard platform, in the post application of the engagement scale in learning, in favor of the first empirical group.

The researchers believe that the previous finding could be due to the following:

- The user interface characterized the edX digital platform, including buttons, ease of access, drop-down lists, outgoing and incoming message boxes, and others. All of this contributed to attracting students and integrating them into learning the content of the computer use course in education.
- Availability of an application of AI in the edX platform, which was the Chatbots, as this application helped in assessing the level of students after they studied the content of the lesson and then assisted them in the difficult and incomprehensible parts. As a result, the application helped students to get engaged in the learning process by asking questions and getting answers instantly.

- The design, quality, and modernity of the digital content of the “Using Computers in Education” course, including the implementation of practical projects by students, helped the students’ engagement in the learning process.

- Integration of Otter Voice Notes App into the edX platform, which was an AI application that helped students record information and share it with others, whether by converting sounds into written texts or only audio recordings.

- The basic philosophy of the edX platform was based on self-learning through the learner’s search for information and the participation of others to exchange information. Then, each student from the research sample was interested in developing their abilities and searching for new things in the field of technology. This environment helped to increase the engagement of the College of Education’s students in the learning process.

- The integration of the edX platform with the Chatbots application represented a personalized learning environment for each learner. Through this application, each learner was able to obtain his needs according to the pre-made answers. In addition, this environment is not linked to a specific place or time, and therefore, all students were primarily involved in the learning process.

- As a result of the students’ familiarization in the current era with the means of instant communication platforms, integration of the edX platform with the Chatbots application provides this feature for instant communication and immediate feedback, as mobile

applications have now become an essential part of every student's life.

- Integration of the edX platform with the Chatbots application helped students to keep up with their trends and tendencies in real-time by using the internet to browse, get knowledge, and instant help, thus helping to engage students in the learning process.

The Answer to the Second Question

“What is the effect of integration between the digital edX platform and AI applications in developing digital trust skills among students at the College of Education, King Khalid University?”

To answer this question, formulate the following

hypothesis:

There was no statistically significant difference at the level (0.05) between the mean scores of the first empirical group (which used the edX platform) and the second empirical group (which used the “Blackboard” platform) in the post-application of the digital trust scale. To test the validity of this hypothesis, the statistical treatment was carried out using the (t) test for two independent samples to compare the application scores of the digital trust scale for the first experimental and the other empirical groups. Table 6 shows the results of the t-test to indicate the differences between the mean scores of the first empirical group and the second empirical group in the digital trust scale.

Table 6: The T value of and its statistical significance between the mean scores of the students of the first and second empirical groups in the digital trust scale

Group	Tool	N	M	A	Degree of freedom	T Value	Significance
1 st Group	Digital trust scale	29	66.52	7.05	55	1.368	Insignificant
2 nd Group		28	64.04	6.68	55	1.368	Insignificant

Table 6 shows the calculated T-value (1.368), which was non-functional at the level of (0.05), and the significance of both sides, with a degree of freedom (55). The t-value was insignificant, suggesting that there were no statistically significant differences between the first empirical group and the second empirical group in the post-application of the digital trust scale in the “Use of Computers in Education” course. Thus, the second hypothesis of the research hypotheses was accepted, as there was no statistically significant difference at the level (0.05) between the mean scores of the first empirical group (which used the edX platform) and the second empirical group that used Blackboard platform, in the post-application of the scale digital trust.

The researchers believed that the previous finding could be due to the following:

- EdX platform included applications for AI, and the “Blackboard” platform includes an easily and securely accessible link.
- EdX and Blackboard platforms provided tools for the user to verify his identity before starting to enter the platform and study the educational content.
- The user in both edX and Blackboard platforms

can securely have registered his data on the platform by sending a confirmation message via his mobile phone. Then the student deals with confidence and security with the content of the platform.

- The user in both edX and Blackboard platforms could easily and securely share the content of any platform, where each platform provides content protection tools, when a file had an extension (exe), for example, it was not shared with any other user.

- In case the user lost or forgot the password, edX and Blackboard provided accurate password recovery tools through the user's mobile number or by sending a message to the platform manager to verify the identity of the student. Therefore, all students on the edX and Blackboard platforms felt safe and confident in dealing with any of these platforms.

Scientific and Practical Significance

Through Tables 5 and 6, the researchers explained the practical or applied importance of the research findings by finding the effect size of the independent variable on the dependent variables.

Table 7: Shows the scientific and applied significance of the research findings

Independent variable	Dependent variable	Cohen's (d)	η ²	Effect size
edX integration with AI Apps	Education Engagement	2.13	0.53	Big
	Digital trust	0.29	0.03	Small

Table (7) shows the size of the effect of the engagement of the digital edX platform with AI applications in the development of engagement skills in learning the course “Using Computers in Education” among students of the College of Education, King Khalid University (0.53), which was a large percentage. The rest was due to a variety of other factors, including specialization, student

experience, student environment, peers, and other factors. The size of the effect of using the edX digital platform with AI applications on the development of digital trust skills was (0.03), which is a small size.

Table 7 suggested that the integration of edX integration with AI Apps had a significant impact on education management as it showed a bigger effect size as compared

to digital trust, which had a slight influence and had an effect size smaller.

Discussing the Research Findings

The current research aimed to develop engagement skills and digital trust in the course “Using Computers in Education” among students at the College of Education, King Khalid University, by designing a learning environment based on the engagement of the digital platform (edX) with some AI applications. The findings of the study in consistent with previous research.

First

What is the effect of the integration between the digital edX platform and AI applications on the development of engagement skills in learning among students at the College of Education, King Khalid University?

The findings showed that the ability of the students of the first empirical group that used the edX platform was higher and statistically significant than the ability of the students of the second group that used the “Blackboard” platform to develop engagement skills in learning. This means that the students of the first empirical group benefited from the edX platform and AI applications better than the students who trained through the “Blackboard” platform (Mohammed, 2023). This was due to the employment of AI applications within the edX platform and giving the student the ability to share information with others. Moreover, the user interface of the edX platform facilitated the engagement of students in the learning process anywhere and at any time. These findings were consistent with the findings of the study of (Kim *et al.*, 2019) and the study of (Chen *et al.*, 2020).

Second

What is the effect of the integration between the digital edX platform and AI applications in developing digital trust skills among students at the College of Education, King Khalid University?

The findings showed that the ability of the students of the first empirical group that used the edX platform was almost equal to the ability of the students of the second group that used the “Blackboard” platform in digital trust skills. This means that the students of the first empirical group benefited from the edX platform and AI applications almost to the same extent as the students who trained through the “Blackboard” platform. This may be because both edX and Blackboard platforms each provide a secure system for entering the platform, as well as the ability to verify the user’s identity when changing the password. EdX and Blackboard platforms also provided safe handling without fear on mobile phones, as well as through them, the learner can share files safely without fear. (Salvador *et al.*, 2021) Also looked into security measures and issues when using Blackboard and edX. All of this led to the equal role of edX and Blackboard platforms in developing digital trust skills among students of the College of Education, King Khalid University.

Similar results were shared by (Zdravkova, 2019) and (Ivanova *et al.*, 2016).

Research Recommendations

Based on the current research findings, the following can be recommended:

- Train university students on digital engagement skills through global e-learning platforms such as edX and Coursera.
- Develop skills of university faculty members on ways to employ AI applications in the field of education.
- Need to pay attention to the engagement of AI applications in interactive digital platforms.

Conclusion

This research was conducted in an effort to improve students’ digital and learning engagement abilities. The results of this research has supported that the integration of edX in Artificial Intelligence enhance students learning, and digital experience. Furthermore, the results also highlight the significance of interactive digital environments in promoting engagement on cognitive, behavioral, and affective levels. Ongoing investigation and improvement of these methods may provide significant knowledge for future teaching approaches.

Deceleration

Availability of Data and Materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

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