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Interactive communication and academic achievement as indicators of the quality of the e-learning program

Shoeb Saleh[1] & **Khaled Ahmed Abdel-Al Ibrahim**[2*]

[1]The National Research Center for Giftedness and Creativity, King Faisal University, Saudi Arabia.

[2]Department of Educational Psychology, College of Education, Prince Sattam bin Abdulaziz University, Al-Kharj, Saudi Arabia

*Correspondence: ka.ibrahim@psau.edu.sa

ABSTRACT

Considering the worldwide digital transformation witnessed by the education sector, especially after the consequences of the Covid-19 pandemic, this study aimed to investigate the effectiveness of an e-learning program based on the Moodle platform in developing interactive communication and increasing the level of academic achievement, as these two variables are key indicators of the quality of e-educational programs. The program was administrated to a sample of students of the Methods of Teaching Legality Sciences course, where a quasi-experimental methodology was followed that compares an experimental group that received education through the electronic program, and a control group followed the traditional method of learning. The results of this study showed the effectiveness of the suggested electronic program, based on the Moodle system, in developing interactive communication in e-learning and increasing the level of academic achievement among students. One of the main achievements provided by this study is to emphasize that electronic interaction does not have an extra value, but it is an essential element of high-quality educational design, experimental data have proven that programs that were characterized by a high degree of interaction (whether the learner's interaction with the teacher, his colleagues or the content) clearly contributed to improving academic learning outcomes, and enhancing the sense of belonging and presence within the learning environment. This study provides a practical framework for measuring the effectiveness of electronic programs by tracking the dynamics of interaction within the Learning environment, analyzing the relationship between communication patterns (student-teacher, student-content, student-student) and actual educational outcomes. It also contributes to suggesting an evaluative model based on evidence-based educational practices, which can be adopted by higher education institutions to ensure the quality of design and implementation of their electronic courses.

KEYWORDS: E-learning, interactive communication, academic achievement, quality of e-learning, digital learning environments, learning management system (Moodle)

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Introduction

The use of modern electronic media and technologies in education is no longer an entertainment option but it has become an imperative necessity imposed by the rapid digital transformations happening in the information age. Technological developments have contributed to setting new educational patterns, most notably e-learning, which allowed the delivery of programs and courses totally or in partially through flexible electronic environments (Miller, 1996). This transformation was accompanied by a fundamental change in the roles of both the teacher and the learner, as both parties must equip themselves with new skills that keep pace with the challenges of the times and the speed of change in learning tools and skills.

E-learning has emerged as a comprehensive concept associated with many sustained concepts such as e-learning, digital teacher, e-learner, virtual school, book and e-course, all of which revolve around employing digital media to enhance teaching and learning. Accordingly, the effective use of these systems and their success in achieving their goals requires the need to start from the needs of learners and develop interactive learning environments, in which different parties educate about the effectiveness of the system and its effect upon individual and institutional performance (Al-Azab, 2003).

The technological revolution has imposed a new and factual insight into education, especially at the university level, where e-learning has become an essential option in the delivery of study programs. However, the success of this transformation does not depend solely on the availability of infrastructure but requires an accurate evaluation of the quality of the programs offered, based on clear pedagogical indicators. Amongst the most prominent indicators are interactive communication and academic achievement.

Interactive communication is considered central to e-learning environments, enabling the exchange of ideas and information between teachers and learners, promoting common understanding and active participation. Moore (1989) identified three main modes of interaction in e-learning: learner interaction with content, learner-teacher interaction, and learners' interaction with each other. Recent studies confirm the positive relationship between higher levels of interaction and learner satisfaction and increased motivation (Bolliger & Martindale, 2004; Martin et al., 2018). Anderson (2003) points out that interaction is not just an exchange of information, but a key element in designing active learning experiences.

On the other hand, academic achievement is one of the most important outcomes of any educational program, because it reflects the extent to which learners' cognitive and skill objectives have been achieved. Numerous research has shown that online programs designed according to effective pedagogical principles, which provide interactive and supportive environments, contribute to raising the level of academic achievement (Means et al., 2010; Bernard et al., 2004). Poor performance of academic achievement and Low engagement, even with quality content, may lead to poor learning outcomes.

The integration between interactive communication and academic achievement is considered an effective scientific approach to evaluating the quality of e-learning programs. These two indicators, when studied together, provide a comprehensive vision of the effectiveness of the program from both the pedagogical and technical aspects. The literature has shown that any defect in one of these dimensions may affect the quality of learning and require a review of program design or implementation.

The importance of this subject has increased with the sudden shifts imposed by global crises, such as the COVID-19 pandemic, which has prompted educational institutions to adopt distance education as an alternative solution. Despite the achievements, the rapid expansion revealed gaps in the quality of programs, regarding poor interaction and the absence of accurate tools to evaluate educational outcomes.

Multiple studies have shown that many higher education institutions focus on formal and technical aspects of evaluating their online programs, ignoring the essential elements associated with the actual learning experience. Here, the importance of interactive communication and academic achievement emerges as factual indicators that reflect the quality of design and implementation from an in-depth pedagogical perspective (Hrastinski, 2009; Bernard et al., 2009).From the previously mentioned above the analysis of the relationship between these two indicators should be given a due attention in research that contributes to developing an accurate scientific understanding of the nature of digital educational environments, and helps in developing more comprehensive and realistic evaluation models, in a way that enhances the effectiveness of e-learning programs in achieving their goals, and accordingly, this study contributes to bridging this gap, by analyzing the level of interaction in the e-learning environment, and relating it to the results of students' academic achievement,

which contributes to providing realistic and scientific indicators that can be adopted it to evaluate programs and improve e-learning practices.

Objectives

This study aims to achieve the following:

1. Stating the relationship between interactive communication and academic achievement in distance learning environments.
2. Identifying the effectiveness of interactive communication as an indicator of the quality of e-learning programs.
3. Measuring the effect of interaction quality on learners' academic achievement within an electronic environment.
4. Suggesting a preliminary evaluation model through which interactive communication and academic achievement can be adopted as basic indicators in evaluating the quality of electronic programs.

Theoretical Framework

Education is a broader and more comprehensive process that requires the teacher to relate what he teaches his students with practical application, and it requires interaction between all elements of the learning environment. Interaction is one of the important concepts in the education environment in general and e-learning in particular. Many studies that have defined the concept of interaction have focused on several aspects such as "active learning", "two-way communication", and "distance reciprocal learning". The current study defines the concept of interactive communication in the e-learning environment as: that reciprocal act, or the joint effect that occurs within the suggested electronic program between the learner and teacher, teacher and learner, learner and learner, learner and content, learner and e-learning environment, which could help activate the teaching and learning process.

The quality of e-learning refers to the extent to which educational programs achieve their set goals efficiently and effectively, while responding to the needs of learners, and providing a rich learning experience, which contributes to achieving clear and measurable learning outcomes. Several studies have confirmed that the quality of e-learning is not only related to the quality of the content or platform, but includes other more complex factors, including: interaction, academic support, achievement, and instructional design (Al-Fraihat et al., 2020).The International Society for Technology in Education (ISTE) holds upon the point that the quality of e-learning depends on the integration of multiple elements, including: accessibility, teacher support, interaction, assessment, and academic achievement (ISTE Standards, 2021).

Interactive communication refers to the exchange of information, ideas and knowledge between the learner and the teacher, between the learners themselves, or between the learner and the content, which enhances the understanding of the content and the construction of common meaning. Moore (1989) presented a famous classification of the forms of interaction in distance education, represented in: learner-content interaction, learner-instructor interaction, learner-instructor interaction, learner interaction with peers (Learner-Learner Interaction). Studies confirm that interaction at its three levels is the cornerstone of the digital educational process, and it is an influential factor in the learner's motivation, level of engagement, and general satisfaction with the educational experience (Anderson, 2003; Hrastinski, 2009).

Bolliger & Martindale (2004) observed that effective interaction in an online environment is positively associated with student satisfaction and enhances their learning experience. Martin, Wang & Sadaf (2018) also showed that increased interaction leads to improved academic belonging and learner retention in online programs, Garrison et al. (2000) added through "the Community of Inquiry model" that good interaction contributes to building "social presence, knowledge and education," which are essential components of a successful online learning experience.

Academic achievement refers to the amount of knowledge, skills, and attitudes acquired by a learner as a result of participating in a structured learning process and it is often measured through tests and assessment activities. Achievement is one of the most important learning outcomes, and a key indicator of the efficiency and effectiveness of educational programs (Means et al., 2010), and the literature indicates that the quality of the electronic program is reflected in the learner's performance and level of achievement. Bernard et al. (2004)

Learners in online environments that provide opportunities for interaction and feedback achieve results that are equal or sometimes superior to their peers in traditional education, as Swan (2001) pointed out that e-course design that integrates interaction, academic support, and clarification of learning objectives leads to better achievement outcomes.

Research indicates a positive correlation between the level of interaction within the e-learning environment and the level of academic achievement of learners. Effective interaction enhances students' understanding of content, increases their active engagement, and contributes to building a meaningful learning environment, all of which lead to improved academic outcomes (Martin et al., 2018; Bernard et al., 2009), and the study of Alqurashi (2019) concluded that interaction is the most powerful predictive variable of academic achievement in electronic environments, more than student satisfaction or technical support, and researchers agree that interaction and achievement together represent essential indicators by which the effectiveness of e-educational programs can be measured. Interaction reflects the quality of ongoing educational processes, while achievement reflects the outcome of those processes. Therefore, the integration of the two indicators into a comprehensive assessment model provides a Realistic vision about the effectiveness of the program, and guides development and decision-making processes (Eom & Ashill, 2016).

Interactive communication in the electronic educational environment refers to the dynamic and continuous interaction between the components of the educational process, and is affected by several main factors, most notably: e-course design: which includes clarity of educational objectives, content organization, and diversity of activities, which is one of the factors affecting the stimulation of interaction between learners, content and teachers (Sun et al., 2008), the use of interactive tools and techniques: Such as forums, discussion rooms, synchronous and asynchronous video, collaborative activities, and message boards, which are tools that enable building a stimulating interactive environment (Hrastinski, 2009), the role of the e-teacher, which requires the teacher to constantly motivate, feedback, and manage interaction between learners. The study of Kang & Im (2013) showed that the interactive presence of the teacher is one of the strongest motivators for active participation. Characteristics of the learner such as learning motivation, independence, digital competence, and having self-directed strategies to organize learning, all of which affect the learner's ability to interact positively within the electronic environment (Zimmerman, 2002).

Interactive communication is not just a means of communication, but it is an essential element to build effective and deep learning, especially in the electronic environment. Several studies have shown that high levels of interaction lead to: increased motivation and engagement, as the study of Moore & Kearsley (2011) confirms that learners in interactive environments show higher enthusiasm and a sense of belonging, which enhances their continuity and achievement of their academic goals. Improved content comprehension: Interaction with the teacher or peers provides an opportunity to ask questions and exchange ideas, which contributes to deepening understanding and clarifying vague concepts (Anderson, 2003) - Developing critical and collaborative thinking: Garrison et al. (2001) research confirms that pedagogical interaction through discussions and survey questions develops analytical, interpretive, and critical thinking skills, all of which are indicators of learning quality. Increased satisfaction with educational experience: The close relationship between the quality of interaction and learner satisfaction emerges, making interactive communication a central indicator in evaluating the quality of any electronic program (Alqurashi, 2019).

Academic achievement is one of the most important quantitative indicators that measure the effectiveness of the educational program, and studies indicate that: Achievement reflects the extent to which educational objectives have been achieved: If learning outcomes are high, this is evidence of the quality of the content and the effectiveness of the teaching strategies used (Biggs & Tang, 2011) - Achievement expresses the integration of the learning environment: Improved academic performance in electronic environments indicates the presence of supportive elements such as interaction, technical support, and diversity of activities (Means et al., 2014) - Achievement as a tool for program improvement: By analyzing achievement results in electronic programs, strengths and weaknesses can be identified, and thus improvements in content or teaching methods (Zhao et al., 2005).

Many researchers point out that interactive communication and academic achievement are not independent variables, but rather have an inter-organizational and complementary relationship that affects the quality of e-learning: Anderson (2003) argues that "interaction is the backbone of any successful learning

environment, and if well controlled, it stimulates academic achievement.", Chen et al. (2010), found that students who showed high levels of interaction achieved better academic results compared to their peers with low interaction, and finally Alqurashi (2019) indicates that perceived interaction in the learner is one of the strongest predictors of academic achievement and satisfaction.

Literature Review

There are many studies conducted in this regard, the study of Bernard et al. (2009) aimed to analyze the extent to which interaction patterns (teacher-learner, learner-content, learner-learner) affect student achievement, and found that interaction has a moderate to significant effect on academic achievement, and the study confirmed that the integration of various interactive strategies enhances the quality of educational outcomes, and Martin Wang, & Sadaf 's study (2018) aimed to explore interaction strategies that enhance teacher presence and learner engagement, and the results of the study found that regular interaction and academic support increase satisfaction and achievement, and the study of Al-Fraihat et al. (2020) attempted to develop a model to evaluate the success of e-learning systems based on multiple factors (interaction, satisfaction, performance), and the study showed Interaction and achievement as the two most important indicators that affect the evaluation of the system and the satisfaction of learners.

The study of Sher (2009) also aimed to measure the relationship between types of interaction and the level of learning and satisfaction in electronic environments and confirmed the existence of a strong relationship between interaction on the one hand, and both satisfaction and achievement on the other.

There are also studies that tackled interactive communication and the quality of e-learning, including the study of Anderson (2003), which aimed to develop a theoretical framework for interaction in e-learning, and proposed three types of interaction: (learner - content), (learner - teacher), and (learner - learner). The study concluded that the quality of e-learning depends heavily on the degree of interaction designed in the program, and the study of Hrastinski (2009) explained. Interaction is not just an exchange of information, but it is an active participation in knowledge construction. The study confirmed that interactive participation is closely related to the quality of e-learning, and the study of Alqurashi (2019) sought to determine the impact of interaction perceived by the learner in the electronic environment on academic satisfaction and achievement. The results showed that interaction with the teacher was the strongest predictor of academic achievement, followed by interaction with peers.

On the other hand, academic achievement studies were handled as an indicator of the quality of e-learning, including the study of Zhao et al. (2005), a meta-analysis that included more than 100 studies on distance education. It showed that programs with high interaction and structured content led to higher academic achievement, confirming that achievement can be used as an indicator of program quality, and reviewed Bernard et al. (2009) The impact of interaction strategies in e-learning on academic achievement. Well-designed interaction has been shown to positively affect student achievement, especially simultaneous interaction, and Martin et al. (2018) focused on the relationship between the quality of educational design of an e-learning environment and academic achievement. She stressed that interactive activities and immediate feedback are associated with increased levels of achievement.

There are also studies that have addressed interactive communication and academic achievement together as quality indicators, with Gray & DiLoreto (2016) aiming to identify factors affecting the quality of online courses from the students' point of view. Both interaction and academic achievement were found to be the most important indicators associated with program quality, and Kuo et al. (2014) examined The relationship between interaction, achievement, and learner satisfaction in electronic courses, and the results confirmed that interaction directly affects achievement, and that the two together contribute to evaluating the quality of the electronic program, and the study of Moore (1989) developed a theoretical framework for the types of interaction in distance education, which became the basis for more subsequent research. It focused on three main types: the interaction between the learner and the content, the learner and the teacher, and the learner and the learner. His study confirms that the absence of one of these dimensions weakens the quality of the educational program. Besides, Swan's (2001) study sought to identify the relationship between perceived interaction by learners and their academic satisfaction and achievement. It was found that increased interaction significantly enhances the quality of e-learning, and Arbaugh (2008) examined the relationship between e-course design and interaction

effectiveness and its effect on educational outcomes. She stressed that the quality of design and education depends heavily on the nature of the interaction that exists within the electronic system.

Finally, there are studies that have combined interaction and achievement as quality assessment criteria, including Martin & Bolliger (2018), which investigated strategies to enhance interaction in e-learning and their impact on academic achievement and quality of educational experience. It recommends the provision of continuous interactive tools within e-courses and examined the study Sun & Rueda (2012) The relationship between interaction (behavioral, emotional, cognitive) and the level of achievement in e-learning environments. It found that cognitive interaction in particular is what most affects academic achievement and thus reflects the quality of the program, and the study of Zhang et al. (2020) dealt with assessing the quality of electronic platforms by analyzing the relationship between interactive content design and students' academic performance indicators.

Certain studies indicate that there is a scientific consensus on the importance of interactive communication as a key component in e-learning environments, and its direct impact on the level of academic achievement. These studies have taken different approaches from descriptive to meta-analysis, enhancing the reliability of the results. The tools used included questionnaires, achievement tests, and course content analysis, all of which contributed to providing a multidimensional view of the relationship between interaction and achievement.

Despite more research conducted in this context, most studies tackled interactive communication or academic achievement separately, or focused on one of the forms of interaction without linking it to the system for evaluating the quality of the educational program as a whole, in addition to that these studies are based on solid interactive frameworks and their application to reality, and use quantitative and factual tools to measure the two indicators, and aim to bridge the gap in studies that link interaction, achievement, and quality simultaneously, and provide applicable recommendations to improve the design of e-learning programs.

Methodology of the Study

This study is based on two main methods: the descriptive method and the quasi-experimental method, the descriptive method was utilized in the stages of developing the electronic program to teach the course methods of teaching Islamic Legality sciences, as well as in the preparation of the interactive communication scale, and the achievement test, while the semi-experimental method was used with the aim of measuring the effectiveness of the electronic program based on the (Moodle) system for developing interactive communication in the e-learning environment and achieving higher academic achievement among students.

Participants of the Study

The study participants consisted of sixth-level students at the College of Arts at King Faisal University in Saudi Arabia during the relevant academic year. The total number of students at this level reached (150) students, and they were divided into two equal groups: the experimental group, which includes (75) students, who underwent an experiment using the electronic program, the control group, and includes (75) students who received the same content but in the traditional paper-based method.

Instruments of the Study

The study instruments included both the interactive communication scale in e-learning as well as the achievement test, and the following are detailed steps for developing study instruments:

First: Interactive Communication Scale in E-Learning:

The interactive communication scale in e-learning is built according to the following steps (Al-Sharif, 2020; Hassan, 2019; Richardson & Swan, 2003; Bolliger & Martindale, 2004; Picciano, 2002):

(a) **The objective of the scale**: The scale aims to identify the aspects of interactive communication in the course methods of teaching Islamic Legality sciences, which is taught electronically from the point of view of students of the sixth level at the Faculty of Arts, King Faisal University, and this scale consists of five dimensions: (communication between the learner and the teacher - communication between the teacher and the learner - communication between the learner and the learner - communication between the learner and the content - communication between the learner and the e-learning environment)

(b) **Formulating items of the scale:** The items of the scale were formulated in the form of items revolving around some aspects related to the use of e-learning that are related to the learner's confidence in e-learning, and five alternatives were formulated for each item of the scale (strongly agree - agree - not sure - oppose - strongly oppose).

(c) **Validity of the scale:** The scale was subjected to a panel of jury members, who specialize in educational technology, and methods of teaching Islamic Legality sciences, and the initial version of the scale was modified in the light of their opinions by deleting or adding some items.

(d) **Pilot experimentation of the scale:** The scale was experimented on a group of students of the sixth level at the Faculty of Arts, King Faisal University, amounting to (15) students, for the purpose of: Calculating the reliability of the scale: The reliability of the scale was calculated using the "Alpha Cronbach" coefficient, which depends on the method of variance, and the scale reliability coefficient was 0.78, which is an appropriate and reliable.

Table (1)

Percentages of interactive communication scale dimensions in e-learning

Dimensions	Number of items	Percentage
First: Communication between the learner and the teacher	6	15.38 %
Communication between teacher and learner	9	23.07%
Communication between learner and learner	7	17.94%
IV. Communication between the learner and the content	10	25.64%
Communication between the learner and the e-learning environment	7	17.94%
Total	39	100%

The scale reliability coefficient was 0.79, which is an appropriate and reliable

(z) **Scale time:** The response time on the items of the scale was calculated by calculating the averages of the time of the first student who finished answering the scale and the last student who finished answering the items of the scale), and the average response time for all test items was (60) minutes.

Second: The Achievement Test

Objective of the test:

This test aimed to measure the level of academic achievement of sixth-level students at the College of Arts at King Faisal University, Saudi Arabia, in a number of topics included in the course "Methods of Teaching Islamic Legality Sciences".

Components of the Test:

The initial version of the test included an instruction card explaining to students how to deal with test questions and the method of answering, in addition to how to use automatic correction sheets. The researcher was keen that these instructions be written in a clear, easy and appropriate language for the level of students, the test consisted of two main parts: **Part I**: "True or false" questions (30) questions, **Part II**: The (30) "Multiple Choice" questions, and the questions have been designed in line with the content of the "Methods of Teaching Sharia Sciences" course for sixth-level students.

Validity of the Test:

The test was subjected to a group of specialized panel of jury members, numbering (9) professors, in addition to four faculty members specialized in psychology, in order to ensure the compatibility of its items with its objectives, clarity of instructions, correctness of wording, and suitability to the nature of the study sample. The opinions of the jury members resulted in a number of suggested modifications to the wording and arrangement of some questions, which were taken into account in the final version. The review also confirmed that the test

has a good degree of clarity and relevance to the level of the target students.

Reliability of the Test:
The test was applied a second time to the same survey sample two weeks after the first application, taking into account the repetition of the same conditions to ensure the reliability of the results. The reliability coefficient was calculated using Pearson's equation, and the reliability coefficient was (0.86), which is a high coefficient indicating the consistency and stability of the test. Thus, the final version of the test was accepted, which consists of (60) questions distributed as follows: (30) questions in multiple choice format, and (30) questions in true or false form.

Results of the Study
To answer the research questions, the collected data was processed using various statistical methods, including descriptive methods such as mean scores and standard deviations, as well as analytical methods such as the "T" test at the significance level (0.01). The equation for Carl's effect size and Blake's adjusted gain ratio were also used to determine the effectiveness of the electronic program.

Answering the first question:
It is stated "What is the suggested electronic program for the course methods of teaching Islamic Legality sciences using the (Moodle) system?"

First: The concept of the Moodle system, its advantages, and its educational activities:
Moodle is an e-learning management system (LMS), also known as "virtual learning environments" (VLEs). These systems are used to support and facilitate the educational process, as they allow teachers to upload lectures, organize tests, provide various educational resources, in addition to discussion tools, and electronic portfolios for student work (E-Portfolios).

Moodle is an open-source e-course management system, designed with pedagogical foundations, making it a suitable environment for creating e-courses interactively and effectively (Kumar & Daniel, 2016; Rashid & Asghar, 2016; Cavus & Zabadi, 2014).

Second: Stages of designing the electronic program
Based on educational literature and models of designing educational programs, and the researcher's review of many models for designing electronic programs, the researcher suggested a model consisting of the following stages:

1. The stage of analysis, study and setting of educational objectives.
2. The instructional design phase, which includes defining content and organizing it according to objectives.
3. The stage of designing interactive communication to ensure interaction between the student, the content and the teacher.
4. The initial production phase, which includes the preparation of educational materials in their initial form.
5. The experimentation and modification phase, which includes the pilot experiment and the judging of the program by specialists.
6. The final production stage after making the proposed modifications.
7. The stage of uploading the program on the Moodle platform, to be available to students electronically.

Third: description of the electronic program:

After the completion of the design and production stages, the contents of the suggested electronic program were added to the Moodle platform, to include courses related to "Methods of Teaching Islamic legality Sciences" for seventh-level students. The program includes a range of modules, interactive presentations, educational activities, electronic tests, feedback tools, and virtual classroom discussions, all organized within an easy-to-use interface that is compatible with the course's learning objectives.

The following is a sample description of the program, represented by a quick presentation of some of the frames included in the suggested electronic program for the course methods of teaching Islamic legality sciences using the Moodle system as mentioned in the body of the electronic program.

- ✓ Screenshot of the electronic program containing the objectives of the electronic headquarters. As in Figure (1).

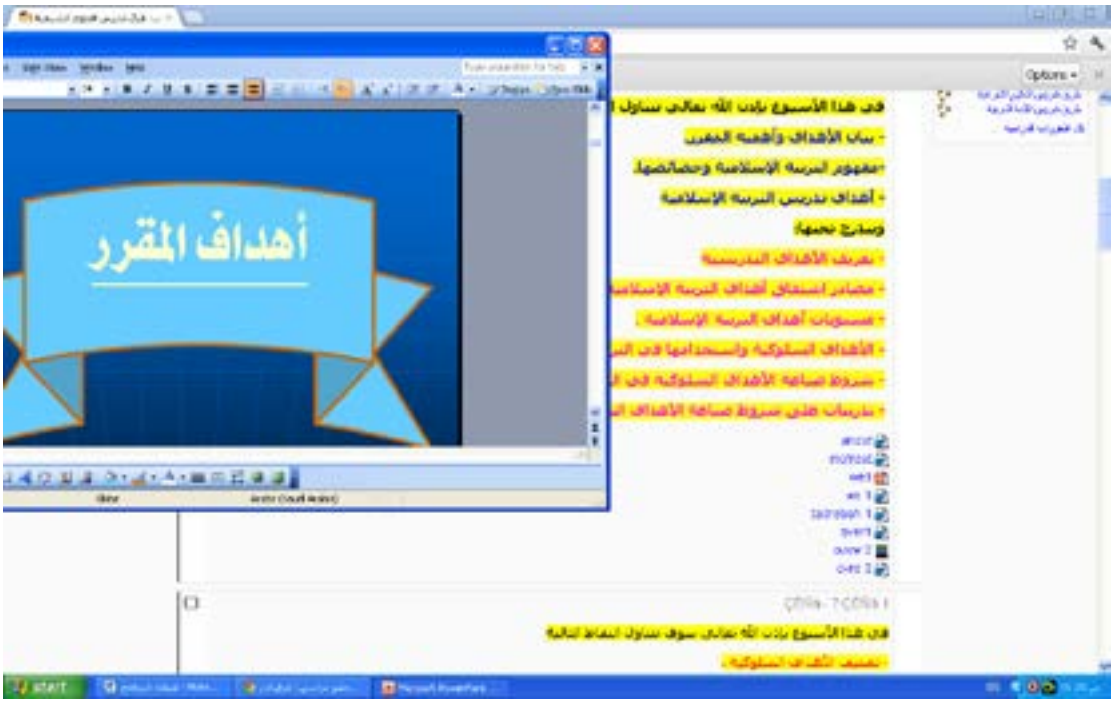

Figure (1) E-Course Objectives

- ✓ Screenshot of the contents of the electronic program. As in Figure (2).

Figure (2) Contents of the e-course

Answer to the second question:

Answering the Second Question:

It is stated "How effective is the suggested electronic program for the course methods of teaching Islamic legality sciences using the (Moodle) system in developing interactive communication among sixth-level students at the Faculty of Arts, King Faisal University?"

To answer this question, the researcher measured the statistical differences between the averages of the scores of the students of the research group (sixth level students at the Faculty of Arts, King Faisal University) in the pre- and post-applications on the interactive communication scale, after administrating the suggested electronic program through the (Moodle) platform, and the data was analyzed using appropriate statistical methods to measure the significance of the differences, and the following table presents the results reached by the researcher:

Table (2)

Percentages of students' mean scores on the pre- and post-scale

Interactive communication scale in the suggested electronic program

Data	Number of Students	Mean Scores	Standard deviation	Percentage of mean	Maximum Score of the scale
Pre-Testing Control Group	75	43.5	11.6	22.30	195
Pre-Testing Experimental tribal Group	75	45.4	11.3	23.28	
Post-Testing Control Group	75	44.6	11.5	22.87	
Post-Testing Experimental Group	75	149.9	9.7	76.87	

The data of Table (2) shows that the mean score of the students' scores on the interactive communication scale in the pre-testing was in the control group (43.5) points with a percentage of (22.30%), while the experimental group reached (45.4) degrees (23.28%). With regard to the dimensional application, the table showed that the average scores of students in the control group amounted to (44.6) degrees by (22.87%), while the average scores of the experimental group increased to (149.9) degrees by (76.87%).

For measuring the effectiveness of the suggested electronic program in the development of interactive communication, Blake's Gain Ratio equation was used. The following table shows the adjusted gain percentage on the interactive communication scale, which the electronic program aimed to develop among sixth-level students at the Faculty of Arts at King Faisal University in Saudi Arabia.

Table (3)

Blake's ratio to the effectiveness of the electronic program in developing interactive communication among sixth-level students at the Faculty of Arts, King Faisal University

Data	Number of teachers	Pre-testing mean	Post-testing mean	Maximum Score of the scale	Adjusted gain ratio
Experimental Group	75	43.5	44.6	195	0.01290
Control group	75	45.4	149.6	195	1.23441

It is clear from the previous table that the percentage of modified gain among the control group - which was not exposed to the suggested electronic program - is (0.01290), which is considered a low percentage and it

indicates the weak effectiveness of the traditional method of teaching in developing interactive communication, as students were unable to achieve 50% of the expected or targeted gain, in contrast, the percentage of modified gain in the experimental group - Which underwent the experience of the suggested electronic program - (1.23441), which is a high percentage that indicates the high effectiveness of the program in developing interactive communication skills among seventh-level students at the College of Arts at King Faisal University, where the percentage exceeded the accepted limit (1.2), which is a strong indicator of educational effectiveness, and accordingly, it can be said that the effectiveness of the suggested electronic program in improving interactive communication has been verified, which is a direct and convincing response to the second question of the current research.

Answering the Third Question

It is stated "What is the effectiveness of the suggested electronic program for the course methods of teaching Islamic Legality sciences using the (Moodle) system in developing the achievement of sixth-level students at the College of Arts at King Faisal University?"

To answer this question, the researcher calculated the differences between the mean scores of the pre- and post-performance of the seventh level students at the Faculty of Arts at King Faisal University - members of the study sample - in the achievement test, which tackled a number of topics of the course "Methods of Teaching Islamic Legality Sciences". Statistical intervention was used to analyze these differences and determine the effectiveness of the suggested electronic program in improving students' academic achievement levels. The detailed findings are shown in the following table:

Table (4)

Percentages of students' averages on pre- and post-performance in the achievement test

Data	Number of students	Mean scores	Standard deviation	Percentage of mean	Maximum Score of the scale
Pre-Testing Control Group	75	10.3	23.3	17.16	60
Pre-Testing Experimental tribal Group	75	10.5	23.3	17.50	
Post-Testing Control Group	75	30.2	17.6	50.33	
Post-Testing Experimental group	75	49.8	11.3	83.00	

Table (4) shows that the mean scores of the control group students in the achievement test before was (10.3) degrees, representing (17.16%) of the total grade, while the average scores of the experimental group students in the pre-testing reached (10.5) scores, by (17.50%), while in the post-testing, the mean scores of the control group students increased to (30.2) degrees, i.e. by (50.33%), while the mean score of the experimental group students was (49.8) degrees, with a percentage of (83.00%) of the total grade.

To determine the effectiveness of the suggested electronic program in developing academic achievement in some subjects of the course "Methods of Teaching Islamic Legality Sciences" among sixth-level students at the College of Arts at King Faisal University, Blake's Gain Ratio equation was used as an appropriate tool to measure the extent of real change resulting from experimental treatment. The following table presents the adjusted gain rate in the achievement test, which represents one of the main indicators of the effectiveness of the electronic program in achieving its educational objectives among the target group.

Table (5)

Blake's ratio to the effectiveness of the proposed electronic program in developing achievement among sixth-level students at the Faculty of Arts at King Faisal University

Data	Number of teachers	Pre-testing mean	Post-testing mean	Maximum Score of the scale	Adjusted gain ratio
Experimental Group	75	43.5	44.6	195	0.73206
Control group	75	45.4	149.6	195	1.44893

It is clear from the previous table that the percentage of adjusted gain for the group of students who did not receive the suggested electronic program amounted to (0.73206), which indicates the limited effectiveness of traditional education, as students were unable to achieve 50% of the expected or targeted earnings. On the other hand, the percentage of adjusted gain for the group of students who benefited from the suggested electronic program was (1.44893), which reflects the high effectiveness of the program in enhancing academic achievement in some subjects of the Methods of Teaching Islamic Legality Sciences course among students of the level Seventh at the Faculty of Arts at King Faisal University, Saudi Arabia, where this percentage exceeded the reference limit (1.2). Accordingly, the fourth research question has been clearly answered.

Answering the Fourth Question

Which states: "What is the interactive relationship between interactive communication and academic achievement as indicators of the quality of the suggested electronic program for the course of methods of teaching forensic sciences using the system (Moodle)

Table (6)

Pearson's correlation coefficient between students' scores on the interactive communication scale and the academic achievement test as an indicator of the quality of the electronic program

Correlation between students' scores on the interactive communication scale and the academic achievement test	Pearson's correlation coefficient value	Significance level
	0.933**	0.01

Table (6) shows that the value of the Pearson correlation coefficient between students' scores in the interactive communication scale and the results of the academic achievement test was (0.933), which indicates a strong positive correlation with statistical significance at the level of 0.01. This indicates that by increasing the level of interactive communication in the electronic program, the level of academic achievement of students increases.

Discussion of the Results

The results of this research showed the effectiveness of the suggested electronic program, based on the Moodle system, in developing interactive communication in e-learning and increasing the level of academic achievement of students in the course methods of teaching Islamic Legality sciences. These findings are consistent with previous studies, including Laurillard (2012), Black & Wiliam (2009), Zimmerman (2002), and Mayer (2005), and show that academic achievement improved significantly in programs that provide continuous interaction and immediate formative assessment, consistent with Black & Wiliam (2009). In their study on Assessment for Learning, they emphasized that immediate and constructive feedback enhances motivation and supports cognitive development, which was evident in high-engagement programs within this study.

The findings of this study also indicate that the quality of the e-learning program is not only based on the availability of content or technical platforms, but on the extent to which effective and fruitful interaction is integrated within the learning environment. This interaction reflects the nature of the educational relationship and the academic support practices that the student receives, which in turn constitutes one of the most prominent dimensions of quality in distance education, as explained by Garrison, Anderson & Archer (2000) in the Community of Inclusion model.

The results of the study showed that social presence, cognitive presence, and educational presence

– components *of the Community of Inquiry* model – were clearly reflected in programs in which students achieved higher achievement and more active interaction. The more the learner feels the teacher's presence and continuous communication and finds opportunities to express his ideas within a supportive environment, the higher his evaluations of the quality of the program, which enhances the role of this model as an analytical reference for studying the quality of digital learning environments.

The results supported the hypothesis that academic achievement not only reflects final learning outcomes but is a revealing indicator of the quality of educational practices within the program. A learner who is allowed to engage in meaningful discussions, receives effective feedback, and encourages critical thinking is better prepared to achieve advanced learning outcomes (Swan, 2001) and this is clearly reflected in the results, as high academic performance was associated with an active interactive structure within the e-learning environment.

In this context, these results emphasize the importance of interaction as an integral component of e-learning quality engineering, not just a side tool for communication. This reinforces Zhao et al. (2005) in their analytical study, which showed that online courses that ensure high interaction clearly outperformed others in raising students' achievement and motivation.

The current findings are also in line with what has been set by the UK Higher Education Quality Assurance Authority (QAA, 2021), which confirms that quality indicators in online education include: clarity of learning objectives, support for interaction, flexibility of the learning environment, and diversity of assessment methods. These aspects were most prominent in programs where students scored higher grades and deeper engagement, the research results showed.

Recommendations of the Study:

1. Adopting interaction as a basic criterion in evaluating the quality of electronic programs, by including it in quality manuals and ensuring multiple communication patterns (student-teacher, student-student, student-content).
2. Designing e-learning programs according to the "Community of Inquiry" model, which focuses on social and cognitive presence and education, to achieve an integrated and supportive learning experience.
3. Enhancing the infrastructure of educational platforms such as Moodle by enabling synchronous (such as virtual classrooms) and asynchronous (such as forums and interactive activities) interaction tools and integrating them with real-time feedback tools.
4. Linking academic achievement to evaluating the quality of e-courses through educational data analysis tools (Learning Analytics), allowing understanding the relationship between interaction style and educational outcomes.
5. Adopting evidence-based evaluation models to develop and design electronic programs and focusing on activating educational practices that support critical thinking and constructive discussion.
6. Including various interactive strategies in online courses, such as collaborative learning, frequent feedback, and simulations, to achieve effective student engagement.
7. Developing teachers' digital and pedagogical skills to enable them to efficiently manage interactive e-learning environments and achieve effective pedagogical communication.
8. Integrating indicators of interaction and academic achievement into internal quality assurance systems, through periodic reports to monitor the effectiveness of electronic courses and improve them based on quantitative and qualitative evidence.

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