Research Article

The Effectiveness of a Gamified Electronic Application in Developing Reading Comprehension Abilities among First-Grade Intermediate Students in Saudi Arabia

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Gamification-based learning is one of the interactive and student-centered instructional strategies that has emerged as a result of academic attempts to fulfill the needs of the current period. This method has been adopted by scholars, administrators, and teachers, and it has been applied in academic contexts. Thus, the study used an electronic gamification program to improve reading comprehension skills in Saudi first-graders. Using a gamified computer application and a reading comprehension assessment, the study achieved its goals. The sample was comprised of 46 students split into two groups. Each group had 23 students. The researchers analyzed the data using SPSS. The experimental and control groups did not differ statistically in the reading comprehension test. When comparing the experimental group's reading comprehension before and after test results, there were statistically significant changes in favor of the postmeasurement. The study suggested employing a gamified electronic application to teach English to first-graders. In addition, the findings of research which were looked at to determine whether or not the use of gamification Saudi Arabia was beneficial pointed mostly to the advantages of learning via gamification-based platforms. In addition to this, the systematic review offers helpful advice for both future researchers and practitioners.

1. Introduction

Numerous countries have taken care of teaching English as a foreign language. Language is the source of dissemination of information and communication between people, and it can only be accomplished through mastering the language and teaching students to master the language. The method of teaching English as a foreign language should be reviewed. Language learning is based on comprehension. It is necessary for the learner to reach a stage in which he establishes a correct connection between the symbol and the meaning, ascertains the meaning from the context, selects the appropriate purpose, organizes the ideas, remembers them, and applies them to present for future activities. This is referred to as reading comprehension.

Reading comprehension is the primary objective of all reading processes and the reason for reading. This is because increasing the reader's comprehension levels enables gaining a thorough understanding of the writer's message. It also empowers the reader to collect and organize information. It enhances the ability to recall, analyze, interpret, and evaluate text. In this way, the reader employs all of his intellectual skills in comprehending the read text.

Although computer-assisted education is widely regarded as a formidable instrument for teaching and learning foreign languages, its adoption is significantly lower than anticipated. Much work and patience are required to complete all duties in educational applications. This is because fun, entertainment, and suspense methods are lacking, and bringing fun and entertainment to educational applications is not easy [1, 2]. From this, the term "gamification"

was coined, which is based primarily on fun, entertainment, and participation and involves using gaming components in nonplaying circumstances to drive students to learn and maximize their enjoyment and involvement [3, 4]. With advancements in technology and creativity in new apps for mobile devices, mobile learning will continue, bringing it closer to the ideal scenario for this sort of learning, which is contextual, collaborative, and pervasive. Flores [5] maintains that gamification benefits foreign language learning and recommends conducting additional empirical research in gamification and foreign language learning, combining gamification with contemporary technological trends, foreign language learning approaches, and strategies.

1.1. The Statement of the Problem.

The EF English Proficiency Index (EF EPI) focuses on acquiring English language skills for middle and high school [6]. The Middle East and North African regions have minimal English language skills. It is the only region that has seen a decline in adult English language proficiency, with Saudi Arabia ranking 104 out of 112 in this indicator's estimate, which is very low in English language proficiency. It indicates that there is a problem with English language teaching.

The symposium on teaching English in Saudi Arabia, "Reality and Challenges," was held in 2012. It revealed a decline and weakness in English language learning among more than 400,000 male and female students still enrolled in government studies, even though Saudi Arabia's educational plans mobilized all available resources and enormous financial support and increased the number of lessons and academic hours.

Al-Soghayer [7] indicated that the Saudi student's ability in the English language is at its lowest level upon completion of his general education. The student cannot conduct a brief dialogue in the English language, comprehend a short reading text, or write a brief article. The average overall achievement rate for middle school is 34.15 percent and for secondary school it is 34.15 percent. Al-Qahtani [8] attributes the reasons for poor reading skills of English among Saudi intermediate students. There is a lack of necessary reading habits in students and weak teaching abilities, and lack of professional development opportunities for English language teachers brings a lack of interest in reading comprehension, a heavy emphasis on reading aloud, low student motivation, and a lack of emphasis on reading skills in English language school courses. The system lacks reading skills training for students, in addition to students' poor vocabulary and parents' lack of involvement in encouraging their children to read. Moreover, with the availability of high-speed Internet and the widespread use of mobile devices, which Al-Khathami [9] refers to as the "first Internet tool," changes in society were necessary. The Communications and Information Technology Commission [10] announced that the Kingdom of Saudi Arabia ranked third in the world in mobile communications out of the 139 member states of the International Telecommunication Union.

According to the Communications and Information Technology Commission [11], the Kingdom now has 24

million Internet users, while the average number of applications downloaded on every mobile device in Saudi Arabia has reached 82, which is a significant number. Each mobile handset in Saudi Arabia comes preloaded with an average of seven paid applications; the process of downloading is not limited to free applications [12]; additionally, 95% of Internet users in Saudi Arabia have at least one account on social media platforms, with 80% regularly participating [13].

Education is a fundamental pillar of society. It has become critical to utilize mobile devices, as Suhaimi [14] and Al-Shammari [15] recognize the necessity to increase mobile learning applications and benefit from mobile devices and their associated services. The "Second International Conference on Education," held in Riyadh in 2011, emphasized the importance of collaboration and coordination between educational authorities and mobile telecommunications companies in developing specialized systems that enable the distribution of educational materials and examinations via mobile devices and their management by professors. In addition, Al-Ghamdi [16] also examined the usage of mobile phones and their integration into English language instruction and [17] urged additional research on the influence of mobile devices used on reading comprehension. Moreover, Al-Qahtani [8] recommends educating teachers, spreading the concept of gamification and its application strategies in English language lessons and its numerous applications, and conducting additional research and studies on the role of gamification in the educational process. Al-Shehri [18] also recommends conducting further research and studies on gamification in the educational process.

Based on the previous discussion and the researchers' belief in the importance of utilizing contemporary educational trends, it is necessary to design an electronic application based on gamification and determine its effectiveness in developing reading comprehension skills among first-grade students in Riyadh.

1.2. Study Hypotheses

(1) There is no statistically significant difference at the 0.05 level between the mean scores of the experimental group and the control group in the postmeasurement in the reading comprehension skills at the direct comprehension level.

(2) There is no statistically significant difference at the level of 0.05 between the average scores of the experimental group and the control group in the postmeasurement in the reading comprehension skills at the deductive comprehension level.

(3) There is no statistically significant difference at the level of 0.05 between the mean scores of the experimental group and the control group in the postmeasurement in the reading comprehension skills at the critical comprehension level.

1.3. Study Aims.

The purpose of this study was to determine the efficacy of a gamified electronic application in developing reading comprehension skills at direct

comprehension, deductive comprehension, and critical comprehension levels among first-grade intermediate students in the Kingdom of Saudi Arabia.

1.4. Significance of the Study. This paper examines gamification, a popular educational trend in educational technologies. English language teachers can benefit from the study's use in the classroom.

The electronic application, which is gamified, enables first-grade kids to engage in self-learning.

1.5. The Study Limitations. The study was limited to measuring the effectiveness of an electronic application based on gamification in developing reading comprehension skills in the English language course among first-grade intermediate students in Saudi Arabia, according to the following determinants:

(1) The fourth unit of the English language course is Full Blast among the first intermediate grade and second semester (Module 4: See the World).

(2) Dick & Cary model.

(3) Reading comprehension skills: the level of direct comprehension, deductive comprehension, and critical comprehension.

(4) The study was limited to first-grade intermediate students in the "sixty-fourth intermediate school" in Riyadh, Saudi Arabia.

(5) The study was implemented in the second semester of 1437 AH-1438 AH.

2. Literature Review

2.1. Theoretical Framework

2.1.1. Gamification. The researchers define procedural gamification as "incorporating all of the characteristics of games and their design principles into an electronic application designed to teach English to first-grade kids." Gamification is similar to educational games, which solve problems, motivate people, and enhance learning through the techniques and methods of thinking games.

2.1.2. Game Elements. Gamification consists of at least one or more of the game elements referred to by Oxford Analytica [19]. It can be extracted in Table 1.

2.1.3. The Second Dimension: Reading Comprehension. The primary goal of reading is to gain access to reading comprehension, which the researchers define procedurally as the ability of first-middle-grade students to comprehend different words in the English language by making the correct connection between the symbol and the meaning, determining the meaning from context, and selecting the appropriate meaning.

The reading comprehension processes are classified into five stages, each involving different processes [20]:

(1) Literal comprehension level.

(2) The level of explanatory or deductive comprehension.

(3) The level of critical comprehension.

(4) The level of taste comprehension.

(5) The level of creative comprehension.

2.2. Previous Studies

2.2.1. Studies on Gamification. Su and Cheng [21] conducted a study to determine the effectiveness of gamification based on the mobile phone in science education. Their findings indicated that students prefer activities outside of the classroom by using the smartphone and its functions. They asserted that teaching science via gamification on mobile phones improved the process of achievement and motivation. The immediate and delayed English language achievement of first-year secondary school students and their attitudes toward it were examined. The results revealed a statistically significant difference in the students' immediate and delayed English language achievement in favor of the experimental group. The study showed positive aptitude test results for the gamification environment. Besides, Al-Shehri [18] sought to determine the influence of gamification on fifth-grade students' conceptual and procedural knowledge of conventional fractions. The study discovered significant differences in the mean scores of experimental and control group students in conceptual and procedural knowledge and the total degree to test each separately, favoring the experimental group. Asiri and Al-Wafi [22] used gamification to develop engineering concepts for second-grade students in Yanbu. The results indicated statistically significant differences in the mean scores of the experimental and control groups in the dimensional application favoring the experimental group. Moreover, Al-Shammari [23] determined the efficacy of gamification for English learning among secondary school students at Hail. The results indicated statistically significant variations in mean scores between experimental and control group students on the dimensional assessment used to assess motivation for English language learning in favor of the experimental group. In addition, Al-Ghamdi [24] determined the efficiency of gamification in developing students' desire for Mathematics in the city of Makkah Al-Mukarramah. There are four dimensions: difficulty, enjoyment of learning, confidence and self-efficacy, and an overall score indicating the experimental group's favor. Furthermore, Al-Harbi and Al-Baqmi [25] explained teachers' perspectives to ascertain the requirements for designing an educational environment based on gamification in education and identifying the barriers to its implementation. The study identified several critical requirements for applying gamification in education, including the need for the teacher to be familiar with the target group's characteristics and the ability to adapt. Recently, Al-Khuzaim [26] defined the efficacy of an electronic course based on gamification in increasing academic achievement in the Mathematics course among third-grade students in

TABLE 1: Game elements.

Element	Meaning
(1) Points	Players acquire them.
(2) Rewards	Players exchange points to get them.
(3) Badges	To show achievements to peers.
(4) Leaderboards	They contain a table with the high scores achieved; these show the players' progress and motivation to compete.
(5) Levels or stages	They start with the starting stage, and then the player moves to the next step based on the participation or use of the desired mode.
(6) Challenges	Challenges provide missions for players to achieve and then reward them.
(7) Virtual goods	They are bought by default, through the points gained, and when the player spends them, he tries to get more points.
(8) Integration and accessibility	Mergers are concerned with the player's first reaction to the game, so, in many games, there are educational clips aimed at guiding players in the first minutes of playing, and, in the absence of detailed instructions, the initial levels play the role of the teacher, which is usually straightforward, and the aim is to introduce the concepts of the game one by one.
(9) Immediate feedback	The player's selection results or his actions appear during the game immediately after his decision.
(10) The proposal character as an avatar	Some games offer a virtual character representing the human personality within the game, where other players can see it, and their design varies from using 3D techniques to abstract symbols and is designed to allow personal expression and creativity.
(11) The rules	They are binding limits in the game to keep the game under control, like the number of players in a game.
(12) Feelings	Curiosity, competition, frustration, and happiness.
(13) Progress	Player growth and development.
(14) Relationships	Social interactions generate feelings of intense friendship, status, and altruism.
(15) Aesthetics	Aesthetics, art, and visual elements are part of every game.
(16) Objectives	An essential part of the game, the player either achieves them or fails to achieve them at the end.
(17) The story	This element provides significance and meaning to the experience and the context for implementing the tasks.
(18) Time	It is used to motivate players to play.
(19) Attention curve	It is the flow and sequence of events during playing time to sustain the player's interest.
(20) Repeat or second chance	This option gives the player permission to lose.

Riyadh. The total accomplishment exam and the knowledge, application, and inference tests favor the experimental group.

2.2.2. Studies on Reading Comprehension.

Al-Omari [27] studies the effect of cognitive trips on developing reading comprehension skills, vocabulary acquisition, and reducing reading anxiety among third-grade secondary students. The results indicated that cognitive trips positively affected developing reading comprehension skills, vocabulary acquisition, and reducing reading anxiety among third-grade secondary students. Moreover, the purpose of the study of Al-Mutairi and Al-Ghazwa [28] was to determine the effect of metacognitive methods on the development of reading comprehension of the English language among female students in the second year of secondary school in Jeddah. The results indicate no statistically significant variations in the mean scores of students in the experimental and control groups. There are differences at the absorption and critical understanding levels. In addition, the study by Al-Farani and Al-Asmari [29] sought to determine the influence of software based on the idea of multiple intelligences on the development of reading comprehension abilities among intermediate-level third-grade pupils. The findings indicated statistically significant differences favoring the posttest of reading comprehension skills.

2.2.3. Commenting on Previous Studies.

The experimental group's pre- and postmeasurements were compared to the results of Su and Cheng [21], Al-Qahtani [30], Asiri and Al-Wafi [22], Al-Shammari [23], Al-Ghamdi [24], and Al-Khuzaim [26]. The study concluded that gamification is effective.

Additionally, this study agreed with the findings of Al-Omari [27], Al-Mutairi and Al-Ghazwa [28], and Al-Farani and Al-Asmari [29] regarding the development of reading comprehension skills.

This study differed from previous research in several ways. It is different because it incorporates gamification into its design, focuses on the grade level (first intermediate), utilizes an electronic application based on gamification as the independent variable, and utilizes reading comprehension skills in the first intermediate English language course as the dependent variable.

3. Research Methodology

The study used the experimental method with a semi-experimental design based on the experimental and control groups, with pre- and posttest performance.

3.1. The Population of the Study.

The study community consisted of female students in the first intermediate grade studying in public education schools in the Riyadh

Educational District, in the second semester of 1437 AH/ 1438 AH, and their number was 32,493, according to the statistical card issued by the Ministry of Education for the year 1437 AH.

3.2. Study Sample.

The study sample consisted of a control group and an experimental group of first-grade intermediate students in Riyadh, selected in a multistage cluster random manner. Sixty-four intermediate students were selected from 36 middle schools in West Riyadh. The drawing was done randomly between three classes in the school, and two groups were determined, which are experimental group and control group, and the total number of these two groups was 46 students, with 23 students for each group.

3.3. Study Tools and Materials.

It consisted of testing reading comprehension skills and electronic application based on gamification. The following steps were followed when preparing them.

3.3.1. Reading Comprehension Skills Test. The reading comprehension skills test was prepared according to the following steps:

(1) Determining the test aim: This test aims to measure the reading comprehension skills among first-grade intermediate female students according to the levels of comprehension: direct comprehension, deductive comprehension, and critical comprehension.

(2) Determining a list of reading comprehension skills: A list of reading comprehension skills appropriate for the first intermediate grade have been identified according to the stages (direct comprehension, deductive comprehension, and critical comprehension) by consulting educational literature and the English framework of reference (SELF). The authors used this to guide selecting appropriate educational content and experiences for each level. Six language levels were identified, ranging from beginner to advanced, and the language skills and competencies that the learner should acquire to master the specific level were defined.

(3) The initial reading comprehension skills list: The list was initially composed of eleven skills distributed across three levels: (direct comprehension, deductive comprehension, and critical comprehension). It was then presented to a group of thirteen specialized arbitrators in English curricula and teaching methods; the researchers benefited from the arbitrators' opinions and modified several paragraph forms.

(4) Preparation of the test in its initial form: A test of reading comprehension skills was prepared in its initial form, based on the list of skills. The test consisted of 11 multiple-choice questions distributed over three texts.

(5) Clarity of test instructions: Instructions were developed for the test. Clear instructions were placed in the introduction to the test.

(6) Validity of the test: The test was presented in its first version to thirteen arbitrators with expertise in English language curricula and teaching methodologies, who reviewed the test statements and provided input.

(7) The test was administered to a pilot sample (not drawn from the study sample) of first-grade intermediate female students in the middle class from public education schools in Riyadh, with a sample size of 25, to determine the extent of the test instructions' clarity, to calculate the test stability coefficient, to determine the ease and difficulty coefficients for the test items, to determine the discrimination coefficients for the test items, and to calculate the test time.

(8) Stability: The stability of the test was calculated by reapplying it. The correlation coefficient was calculated between the scores of the two applications representing the reliability coefficient, and the test reliability coefficient reached 0.924, which is a high and appropriate stability coefficient.

(9) Determining the coefficients of ease, difficulty, and discrimination: The coefficients of ease for the test items ranged between 0.32 and 0.8, and the coefficients of ease were considered acceptable. The coefficients of difficulty for the test items ranged between 0.2 and 0.68, and the coefficients of difficulty are considered acceptable when they are in the range of 0.20–0.80 [31]. The discrimination coefficients for the test items were also determined, and they ranged between 0.28 and 0.86, which are deemed acceptable discrimination coefficients, as Oueda [31] says that acceptable discrimination coefficients should be more than 0.20.

(10) Determining the time of the test: After the experimental application of the test, the time of the first student was 15 minutes, while the time of the last student was 25 minutes, and, by applying the equation of the appropriate time for the test, it was found that the appropriate time was 20 minutes, and thus the reading comprehension skills test reached its final form.

3.3.2. An Electronic Application Based on Gamification. The application was designed using the Dick & Cary model, and the steps of the Dick & Cary model were followed to design the electronic application based on gamification:

(1) Needs assessment: This was done by defining the current and desired situation and then defining the educational aim that the learners should do at the end of the course.

(2) Educational analysis: The teaching material is explicitly provided by the Ministry of Education.

Therefore, the researchers divided the single topic into parts so that the learner can be placed sequentially in the application and determine the time taken for each part.

(3) Analysis of learners and the learning environment: This stage was conducted concurrently with the educational analysis.

(4) Analysis of learners: The abstract operations stage considered first-grade female students aged 12 years and older. Piaget mentions that their characteristics are characterized by the following [32, 33].

Other benefits of gamification were solving abstract problems in logical ways, practicing critical thinking and self-esteem, reaching a high level of balance where everything become clear with laws, rules, and functions, having a sense of social integration, and having a classification based on definite criteria.

3.3.3. Analysis of the Learning Environment.
The public intermediate schools in the city of Riyadh consist of the following:

The school buildings are in poor condition. Schools are considered to have inadequate amenities. Several of the intermediate schools are housed in self-contained government structures. Others are housed in the same structure as the secondary stage. The duration of the period is 45 minutes. The school's enrollment varies depending on the residential community in which it is located. All public-school teachers hold a Bachelor's degree or above.

(1) Writing the performance goals: The appropriate unit was selected from the textbook (Module 4: See the World) and its goals were determined.

(2) Developing assessment tools: A test that aims to measure the reading comprehension skills of first-intermediate-grade female students is constructed according to the following levels: direct comprehension, deductive comprehension, and critical understanding.

(3) Developing the educational strategy: The educational strategy that was used to teach this unit was defined, which is choosing the most appropriate solutions for problems, tasks, working process, and educational process.

3.3.4. Gamification.
The researchers identified the appropriate elements of gamification for the first intermediate grade by referring to the educational literature, and it consisted of the following.

Points, badges, levels, and leaderboards in an electronic application designed to teach English to first-intermediate-grade students and other game elements have been taken into account, and other game elements have been taken into account to be used as immediate feedback. They show the task progress by displaying what remains for the student to complete the task, what visual elements employed in the application, and allowing a second chance for the students when they can not complete the task.

3.3.5. Teaching Materials Development

(1) Electronic Application. The following steps were taken to design the electronic application:

(1) Entering (Talentlms) website: https://www.talentlms.com/, an educational platform that allows creating an educational domain based on gamification.

(2) Creating the domain for the application: "nfzuhair" and registering it on the website of "Talentlms."

(3) Creating the electronic application within: on the private domain created.

(4) Adding content within the electronic application.

Then the electronic application was presented to a group of arbitrators specializing in educational technologies, and their number was ten to verify its suitability for the class according to the technical and educational standards attached in the form.

A teacher guide was prepared to understand activating gamification in the electronic application.

(1) Designing and conducting the formative evaluation: This was done through the oral questions for the students during the class period and by following up on the students' progress in the electronic application based on gamification.

(2) Teaching revision: The revision process is synchronized with all previous steps through addition, deletion, and modification for each step.

(3) Designing and implementing the final evaluation: The reading comprehension skills test was applied as a postapplication as the final step was done.

3.3.6. Study Procedures.
The preapplication was carried out on the two groups, control and experimental, on Tuesday, corresponding to 29/6/1438 AH, and the application of the study began on Sunday, corresponding to 12/7/1438 AH. The researchers controlled the variables affecting the study, as follows:

(i) The researchers taught the control and the experimental groups by 5 class periods per week, and the teaching time in one period was 45 minutes for the two groups: the experimental and control.

(ii) The equivalence of the two groups was verified in the reading comprehension skills of the English language, through the preapplication, using the t-test as follows.

It is clear from the table that the t value equals 0.75, which is not a statistically significant value, which means that the two groups, the experimental and the control, are equal in reading comprehension skills (Table 2). Moreover, as Table 2 shows, the t value equals 1.1, which is not a statistically significant value, which means that the two groups, the experimental and

TABLE 2: *t*-test and the significance of the differences for the premeasurement of the two groups, experimental and control, in the reading comprehension skills test.

Measurement	Number	Mean	Standard deviation	*t*	Statistical significance
Experimental	23	5.22	1.91	0.75	Insignificant
Control	23	4.78	2.04		
Experimental	23	3	1.34	1.1	Insignificant
Control	23	2.57	1.34		
Experimental	23	1.48	0.95	0.32	Insignificant
Control	23	1.39	0.87		
Experimental	23	0.78	0.42	−0.364	Insignificant
Control	23	0.83	0.39		

the control, are equal in the direct comprehension skill. In addition, based on Table 2, the *t* value equals 0.32, which is not a statistically significant value, which means that the two groups, the experimental and the control, are equal in deductive comprehension skill. Another result is that the *t* value equals −0.364, which is not a statistically significant value, which means that the two groups, the experimental and the control, are equal in critical comprehension skills (Table 2).

The equivalence of the two groups in the academic achievement of the English language was also verified through the students' grades for the first semester, using the *t*-test (Table 3).

It is clear from Table 3 that the *t* value equals −1.68, which is not a statistically significant value, which means that the two groups, the experimental group and the control group, are equal.

  (i) The preapplication was carried out on the two groups, the experimental group and the control group, on Tuesday 13/8/1438 AH.

  (ii) The researchers listened to the students' opinions about the experiment, the benefits students saw, and the difficulties they faced during the period of implementing the experiment, and the researchers benefited from them in interpreting the results.

3.3.7. Data Analysis Methods. The researchers utilized the following statistical techniques.

Pearson correlation coefficient is used to determine the test's stability, ease, difficulty, and discrimination coefficients for reading comprehension skills assessment questions. The *t*-test with two independent samples was used to establish the two groups' equivalence, evaluate the presence of differences, and calculate the differences between the postmeasurement mean scores of the research instrument for the experimental and control groups. The *t*-test for binary samples was used to determine the difference in mean scores between two measurements, pre and post, for the study tool used in the experimental group.

4. Study Results

4.1. First Research Question. What is the effectiveness of a gamified electronic application in enhancing reading comprehension skills in the English language course for female first-intermediate-grade students in Saudi Arabia?

The statistical hypothesis was as follows: There is no statistically significant difference at the 0.05 level between the mean scores of the experimental group and the control group in the postapplication in reading comprehension skills at the direct comprehension level. To determine the validity of this hypothesis, statistical differences were calculated between the mean scores for the postmeasurement of the experimental and the control groups, on the reading comprehension skills test, at the level of direct comprehension, in the English language course for first-grade female students in the intermediate school in Saudi Arabia, and by calculating the value of "*t*" in the *t*-test statistics.

As shown in Table 4, the result of $t = 0.42$ is not statistically significant; this means that no statistically significant differences exist between the experimental and control groups in the postmeasurement reading comprehension skills test at the direct comprehension level. Thus, the first hypothesis is accepted based on the results.

Then, after arriving at the study's conclusion regarding the effectiveness of the electronic application in comparison to the two groups, experimental and control, the researchers evaluated the application's effectiveness by comparing the two applications, pre and post, for the experimental group.

As shown in the Table 5, the value of $t = 10.67$ is a statistical function with a significance level of 0.01, indicating that there are statistically significant differences between the two measurements, pre and post, on the reading comprehension abilities test at the direct comprehension level, where the mean of the postmeasurement was 3.22, compared to 3 for the premeasurement. This suggests that female students' reading comprehension skills improved using a gamified electronic application.

To ensure the statistical result's educational significance and the fact that the application's effectiveness justifies these assumptions, the researchers calculated the effect size using the Eta-squared indicator and discovered the following.

The value of the Eta statistic squared = $10.67^2/(10.67^2 + 23 − 1) = 0.84$. This indicates that using the electronic application based on gamification had a huge impact.

4.2. The Second Research Question. What is the usefulness of the gamified electronic application in enhancing deductive reading comprehension abilities in the English language course for female first-intermediate-grade students in Saudi Arabia?

TABLE 3: *t*-test and the significance of the differences for achievement in the English language for the two groups: the experimental group and the control group.

Measurement	Number	Mean	Standard deviation	*t*	Statistical significance
Experimental	23	34.85	11.01	−1.68	Insignificant
Control	23	39.94	39.94		

TABLE 4: The results of the *t*-test and the significance of the differences for the postmeasurement of the two groups, the experimental and the control, in the reading comprehension skills test at the level of direct comprehension.

Measurement	Number	Mean	Standard deviation	*t*	Statistical significance
Experimental	23	3.22	1.48	0.42	Insignificant
Control	23	3.04	1.33		

TABLE 5: The results of the *t*-test and the significance of the differences for the two measurements, pre and post, for the experimental group in the reading comprehension skills test at the direct comprehension level.

Measurement	Number	Mean	Standard deviation	*t*	Statistical significance
Pre	23	3	1.34	10.67	Significant at 0.01
Post	23	3.22	1.48		

The statistical hypothesis was as follows: There is no statistically significant difference at the level of 0.05 between the mean scores of the experimental group and the control group in the postapplication in the reading comprehension skills test at the deductive comprehension level. To determine the validity of this hypothesis, the difference between the mean scores for the experimental and control groups in the reading comprehension skills test at the level of deductive comprehension in the English language course for first-intermediate-grade students in Saudi Arabia was calculated statistically using a *t*-test. The following table summarizes the findings (4-3).

Table 6 demonstrates that the value of *t* of −0.208 is not statistically significant, indicating that no statistically significant differences exist between the experimental and control groups in the postmeasurement reading comprehension skills test at the deductive comprehension level. Thus, the second hypothesis is accepted based on the previous discussion.

Having determined the effectiveness of the electronic application in comparison to the two groups, experimental and control, the researchers evaluated the application's effectiveness by comparing the two applications, pre and post, for the experimental group.

In Table 7, the value of *t* of 7.48 indicates that there are statistically significant differences between the two measurements (pre and post) in the reading comprehension skills test at the level of deductive comprehension in favor of the postmeasurement, where the mean of the postmeasurement was 1.65 compared to 1.48 for the premeasurement. This suggests that female students' reading comprehension skills improve using a gamified electronic application.

To ensure the statistical result's educational significance and the fact that the application's effectiveness justifies these assumptions, the researchers calculated the effect size using the Eta-squared indicator and discovered the following.

The value of the Eta statistic squared= $7.48^2/(7.48^2 + 23 − 1) = 0.72$. This indicates that using electronic applications based on gamification had a huge impact.

4.3. The Third Research Question.

What is the usefulness of a gamified electronic application in strengthening critical understanding reading comprehension abilities in the English language course for first-grade students in the Kingdom of Saudi Arabia?

The statistical hypothesis was as follows: There is no statistically significant difference at the level of 0.05 between the mean scores of the experimental group and the control group in the postapplication in reading comprehension skills test at the critical comprehension level. To determine the validity of this hypothesis, the difference between the mean scores for the postmeasurement of the experimental and the control groups in the reading comprehension skills test at the critical comprehension level in the English language course for first-grade students was calculated statistically using the *t*-test. The following findings are displayed in Table 8.

As can be seen from Table 8, the value of *t* = 0.387 is not statistically significant, indicating no statistically significant differences between the experimental and control groups at the critical comprehension level in the postmeasurement reading comprehension skills test. Thus, the third hypothesis is accepted based on the results.

Then, after determining the electronic application's efficiency by comparing the experimental and control groups, the researchers evaluated the application's effectiveness by comparing the two applications, pre and post, for the experimental group.

As shown in Table 9, the value of *t* = 8.9 is a statistical function at the level of 0.01, indicating that there are statistically significant differences between the two

TABLE 6: . The results of the *t*-test and the significance of the differences for the dimensional measurement of the two groups, the experimental group and the control group, in the test of reading comprehension skills at the level of deductive comprehension.

Measurement	Number	Mean	Standard deviation	*t*	Statistical significance
Experimental	23	1.65	0.87	−0.208	Insignificant
Control	23	1.70	0.63		

TABLE 7: The results of the *t*-test and the significance of the differences for the two measurements, pre and post, for the experimental group in the reading comprehension skills test at the deductive comprehension level.

Measurement	Number	Mean	Standard deviation	*t*	Statistical significance
Pre	23	1.48	0.95	7.48	Significant at 0.01
Post	23	1.65	0.78		

TABLE 8: The results of the *t*-test and the significance of the differences for the postmeasurement of the two groups, experimental and control, in testing the reading comprehension skills at the critical comprehension level.

Measurement	Number	Mean	Standard deviation	*t*	Statistical significance
Experimental	23	0.96	0.88	0.387	Insignificant
Control	23	0.87	0.87		

TABLE 9: The results of the *t*-test and the significance of the differences for the two measurements, pre and post, for the experimental group in the test of reading comprehension skills at the critical comprehension level.

Measurement	Number	Mean	Standard deviation	*t*	Statistical significance
Pre	23	0.78	0.42	8.9	Significant at 0.01
Post	23	0.96	0.88		

measurements (pre and post) of reading comprehension skills at the critical comprehension level in favor of the postmeasurement, with the average value of postmeasurement being 0.96 versus 0.78 for the premeasurement. This suggests that female students' reading comprehension skills have improved due to using a gamified electronic application. To ensure the statistical result's educational significance and the fact that the application's effectiveness justifies these assumptions, the researchers calculated the effect size using the Eta squared indicator and discovered the following.

The value of the Eta statistic square= $8.9^2/(8.9^2 + 23 − 1) = 0.78$. This indicates that using electronic applications based on gamification had a huge impact.

5. Discussion and Conclusion

The researchers explain the lack of statistically significant differences between the experimental and control groups in the postmeasurement reading comprehension skills test as follows.

First, the control group's traditional method of instruction utilizes the active board, as all classrooms in "Intermediate 64" are equipped with a computer connected to the projector, an active board, headphones connected to the board, and a documentary camera, and the active board enables, as Ubari [34] mentioned, a variety of options for selecting appropriate illustrations, such as images, videos, audio files, or presentation files. Al-Ghamdi [16] demonstrated the smart board's efficacy in achieving English

language proficiency, which resulted in a convergence of the technique used and the absence of differences between the experimental group and the control group. Second, MM Publication's English language series contains an interactive book devoted to explaining in the classroom. The interactive book is a current technology that may have contributed to the control group's increased student motivation.

While the two researchers attribute statistically significant differences in the reading comprehension skills test between the pre- and postmeasurements to the experimental group, this indicates the effectiveness of the electronic application based on gamification in developing the reading comprehension skills of first-grade students in the city of Riyadh. The electronic application based on gamification increases students' motivation by increasing their willingness to accept new challenges and then progress toward achieving more points and fulfilling achievement mixed with pleasure, enhancing learning to read, write, and speak a foreign language. The attribution theory explains this. In this theory, the student attributes the failure or success to factors within students' control. The gamification-based electronic application also aids in the development of various aspects of the student's personality, such as overcoming shyness and fear of error when learning English in all of its skills, as demonstrated by students who have some difficulties with the English language, as it assisted them in developing their levels. The gamified electronic application demonstrates how much it has progressed in the learning process relative to its peers. It is evidenced by the students' attention to their position on the leaderboard and their enthusiasm at the start

of each lesson. Each student was eager to mention her progress in order. Additionally, by monitoring the application throughout the day, it was discovered that female students continued to use it outside of school hours. This encouraged continuous self-learning, as content is accessible throughout the day. This facilitated learning a foreign language more effectively, which is one of the most critical features of mobile learning. The electronic application based on gamification doubled the potential for classroom fun and increased the excitement and attractiveness of the learning process, as evidenced by increased engagement and involvement during the lecture or via the application. The evaluation process was transparent for the students, which is one of the characteristics of mobile learning. This was accomplished through immediate and continuous feedback, where it was noted that the students accepted the error and attempted again without reversing, which aided in increasing acceptance of the repetition of learning processes and tasks.

Multiple factors contributed to the favorable impact that gamification had on the students in terms of their performance on the posttest for general reading comprehension. The well-scheduled material of the reading activities that were based on gamification is one of the potential key reasons, and it is aimed at boosting learners' success in reading comprehension. The core curriculum had a particular step that guided the instructor as well as the learners through the processes of completing each particular lesson's processes and achieving the lesson's results. Therefore, the well-planned exercises of gamification had a favorable impact on learners' ability to comprehend what they read.

The nature of gamification provides another possible justification for these results. To be more precise, it was founded on the idea of incorporating gaming aspects into each and every task that the learners are required to do, such as scores, awards, and scoreboards. Learners were more engaged in their studies thanks to the incorporation of gamification, which led to a more dynamic and enjoyable learning experience. According to Denny [35], the use of gamification encouraged learner participation in the learning process. In addition, gamification played a significant part in the process of shaping learners' behaviors by motivating them to participate in the class with a higher passion and desperate desire and concentrate on educational activities that were beneficial. Because of the advantages offered by gamification, the learners were motivated to take charge of their own education and, as a result, achieved greater performance and productivity. Therefore, the researchers who conducted this study had the hypothesis that the gamified reading tasks that were given to the respondents in this study made students feel more motivated and passionate about continuing their education in reading comprehension tasks. In the same vein, Figueroa [36] noted that gamification opened the way for learners to practice the language and develop certain abilities that may be advantageous to tackle a multitude of activities. This idea is supported by the fact that gamification has been more popular in recent years.

Another possible reason for the experimental group's improved performance may be the educational program's substance. The study's teaching program included a variety of exercises in this regard. Reading comprehension subskills, such as scanning the text for detailed information and skimming the text for the key themes, were emphasized throughout the course. Survey respondents were able to acquire reading comprehension abilities more successfully via gamification exercises and challenges, and their proficiency in reading comprehension classes was subsequently improved. Learners' academic performance is improved by gamification, according to Antin and Churchill [37] and Da Rocha Seixas, Gomes, and de Melo Filho [38].

In addition, the researchers speculate that the utilization of activities focused on gamification offered a pleasant chance to deal with a variety of reading comprehension challenges, which was really welcomed. Initially, there were just five reading tasks included in each unit of this research project; however, once gamification was included, there were between 10 and 12 reading activities included in each unit. As a result, the rigorous gamification activities that were utilized in this research were able to increase participants' capacity to respond to questions based on their reading comprehension. Every reading comprehension lesson was comprised of a variety of reading comprehension assignments, each of which addressed a distinct subject matter from the several units that were chosen. This educational program made many attempts to fulfill its objectives. One of these goals was to encourage respondents to discuss reading comprehension items by improving their reading comprehension and getting them involved in reading activities. This would then lead to getting them motivated to respond reading comprehension inquiries. As a consequence of this, the instructional program was effective in assisting students in achieving higher levels of performance in reading comprehension exercises.

In addition, the teaching approach was largely responsible for the significant improvement in the students' levels of reading comprehension. To encourage participants to take part in these gamified tasks, it was developed to take into consideration both the skill level of the learners and the amount of difficulty posed by the activities themselves. To clarify, the educational program consisted of a variety of various exercises and tasks. The difficulty of these tasks ranged from simple (literal level) to moderate (inferential level) to difficult (critical level), beginning with the easiest (literal level) and working its way up to the most difficult (critical level). This variance in the difficulty of reading comprehension levels encouraged the range of questions used in reading comprehension sessions. As a result, this feature made it possible for students of varying grade levels to participate actively in the gamified exercises. At this stage, Salen and Zimmerman [39] proved that gamification provided genuine possibilities for the learners to participate and rehearse the tasks several times depending on their level.

It would appear that the educational program that included gamification was successful in improving the participants' reading comprehension skills in a variety of ways. To begin, the respondents embraced the usage of

gamification, since it was the first time that they had the opportunity to study outside of the context of traditional education in a fun atmosphere. When it comes to interacting with reading comprehension passages, they consistently deviated from the norm. Reading comprehension lessons that followed were afterwards brimming with energy and happiness for the students. These findings are consistent with those of Al-Azawiet, Al-Blushi, and Al-Faliti [40], who emphasized that gamification assisted the instructors in making their classes seem to be more participatory for their students. In this regard, Johnson, Adams Becker, Estrada, and Freeman [41] claimed that the use of gamification in the educational process may make students more involved in the activity.

All in all, the research employed an electronic gamification tool to increase reading comprehension abilities in Saudi first-graders. Using a gamified computer program and a reading comprehension evaluation, the research fulfilled its aims. The sample composed of 46 students divided into two groups. Each group had 23 students. The researchers assessed the data using SPSS. The experimental and control groups did not vary significantly on the reading comprehension test. When comparing the experimental group's reading comprehension before and after test scores, there were statistically significant changes in favor of the postmeasurement. The research advised adopting a gamified computer application to teach English to first-graders.

6. Recommendations and Suggestions for Future Research

The researchers recommend the following in light of the study's findings: Firstly, the use of the electronic application described in this study and expanding schools' use at various stages are recommended. Secondly, conducting training sessions on implementing gamification for female instructors from supervisory offices is proposed. The third recommendation is the inclusion of approaches for teaching English using new technology in teacher preparation programs at faculties of education. In light of the findings of this study, the researchers propose performing additional research on strengthening a gamified electronic application and evaluating its efficiency in developing reading comprehension abilities in the reading course at the University's College of Languages and Translation and creating a gamified electronic application and evaluating its efficiency in learning further English language abilities (writing, listening, and speaking).

Data Availability

The data that support this study are available within the article.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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