The Effectiveness of Utilizing Gamification Using the Class 123 Program on the Academic Achievement of Students in the College of Education at Kuwait University

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Abstract

This study aims to investigate the effectiveness of utilizing a gamification strategy using the class 123 program on students' academic achievement in the College of Education at Kuwait University. To achieve that, the Quasi-experimental approach was used on a random sample of (42) female students from the College of Education. The sample was divided into two groups. The first group is the experimental group, in which the Class123 program was utilized, and the second group is the control group, in which there was no intervention and the traditional teaching method was applied. The achievement test was conducted as a pre-post-test tool for the sample. The results revealed the effectiveness of utilizing the gamification strategy in the Class 123 program in increasing and raising undergraduate students' academic achievement. Where there were statistically significant differences in the achievement test results in favor of the experimental group. The study calls for training university faculty members on employing the gamification strategy in general and using the Class123 program in particular in courses due to its positive impact on students' academic achievement.

Keywords: Gamification, Class 123 Program, Academic Achievement, Kuwait University, Higher Education.

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الملخص

تهدف هذه الدراسة إلى اكتشاف مدى فاعلية توظيف استراتيجية التلعيب باستخدام برنامج class 123، على التحصيل الدراسي للطلبة في كلية التربية بجامعة الكويت. لتحقيق ذلك تم استخدام المنهج شبة التجريبي على عينة عشوائية البالغ عددها (٤٢) طالبة من طالبات كلية التربية. حيث تم تقسيم العينة إلى مجموعتين. المجموعة الأولى هي المجموعة التجريبية والتي تم فيها استخدام برنامج Class123، والمجموعة الثانية هي المجموعة الضابطة والتي لم يكن فيها أي تدخل وتم اعتماد الطريقة التقليدية في تدريسها. كما تم استخدام الاختبار التحصيلي كأداة اختبار قبلية وبعدية للعينة. وكشفت النتائج عن فاعلية توظيف استراتيجية التلعيب باستخدام برنامج Class 123 في زيادة ورفع مستوى التحصيل الدراسي لدى طلبة المرحلة الجامعية. حيث كانت هناك فروق ذات دلالة إحصائية في نتائج الاختبار التحصيلي لصالح المجموعة التجريبية. ولذلك تدعو الدراسة إلى ضرورة تدريب أعضاء هيئة التدريس في الجامعة على توظيف استراتيجية التلعيب بشكل عام، واستخدام برنامج Class123 بشكل خاص في المقررات الدراسية لما له من تأثير إيجابي على التحصيل الدراسي للطلاب.

الكلمات المفتاحية: التلعيب، برنامج class 123، التحصيل الدراسي، جامعة الكويت، المرحلة الجامعية.

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Introduction

Our current era witnesses remarkable progress and development. What was impossible or unimaginable 200 years ago has become a reality because of technology. Technology has contributed to an unprecedented knowledge and industrial revolution. This development has led to a rapid change in the way people work, think, and communicate, and has had a positive impact on facilitating and simplifying people's lives and solving their problems. Technology has brought about progress in the field of knowledge and scientific research. It has enabled humanity to explore different worlds, even reaching space with his discoveries. The rapid and continuous advancement of technology has been applied to every aspect of people's lives. It has not stopped there, but has spread to all sectors and fields, such as medicine, engineering, commerce, industry, the environment, transportation, education, etc. (Al-Anṣārī, 2016).

This technological progress has brought about a major transformation in the education sector. Economics researcher Wardoyo believes that the use of technology in education has played a pivotal role in supporting 21st-century learners, building their skills, and developing their educational level (Wardoyo et al., 2021).

Therefore, we have now what is known as E-Learning, Blended Learning, Distance Learning, smart classrooms, and other methods and technologies that have revolutionized the education sector. The

International Journal of Language Learning reported that in the 21st century, traditional classrooms have been transformed into e-learning-based classrooms, becoming more convenient for students. Reducing the use of traditional classrooms has also become a prevailing trend (Pitoyo et al., 2020). We can say that most activities and learning processes in the future will rely largely on E-Learning (Hava & Şen, 2020), such as employing AI, a rapidly advancing technology, in teaching (Tan et al., 2025).

It is worth noting that the growth of E-Learning has led many companies to invest in the education technology sector and establish numerous educational platforms, such as Microsoft, Facebook, and companies. Investment in the E-Learning market is expected to reach more than $350 billion by 2025 (Itd,2022).

The entire world has witnessed an unprecedented pandemic, namely the novel coronavirus (COVID-19), which has had a significant impact on major aspects of life. The international community has taken fateful decisions, including comprehensive curfews and quarantines, which have had a profound impact on various fields and sectors different countries around the world, such as trade, economics, medicine, education, and others (Elamrousy, 2021).

The Education Sector has had its share of these fateful challenges. After some countries found themselves forced to close schools and educational institutions, it was necessary to adapt, confront challenges, deal with crises, make decisions, and choose appropriate alternatives. E-Learning was the alternative choice that many countries turned to (Al-Metrif, 2020).

E-Learning is one of the fundamental issues that educators have long advocated for, yet many countries around the world were not interested in it before the COVID-19 crisis. According to a 2014 UNESCO report, a large number of Arab and developing countries lack the use of e-learning. The report described teachers' ability to absorb technology as weak compared to international standards (UNESCO, 2014). The COVID-19 pandemic has helped highlight the importance of E-Learning through available means and technologies, which have helped students continue thier learning process and

academic achievement. The opportunity was given to teachers with their various experiences and fields, learners of different school ages, and also parents to understand the importance of the great role of E-Learning in the educational process (Barghūth, 2021)

With the spread of E-Learning in many educational institutions, the importance of employing teaching methods and approaches that are appropriate for E-Learning environments has emerged. An example of this is the gamification approach. The use of technology and the urgent need to introduce fun and enjoyment into the educational process have encouraged this approach.

Gamification has taken on new forms to keep pace with this technological development, especially in the field of education. Today, we see many programs and applications based on the principle of gamification. Most learners today play virtual electronic games, and it is necessary to integrate the two worlds—education and gamification. People often confuse the word "gamification" with the idea that learners play electronic games in the classroom, but the reality is quite different. Gamification is the simultaneous integration of fun and learning, whereby the academic material is learned enjoyably with the goal of achieving the desired goals and making the learner's role in the educational process positive and effective (Vanolo, 2018).

Study Problem:

In contemporary times, university education (pre and post-education) has become an essential pillar for the advancement of both individuals and society (UNESCO, 2023). It plays a pivotal role in shaping individuals' competencies and serves as a critical gateway to diverse professional fields. As a transformative tool, university education equips learners with future-oriented skills, enabling them to adapt to ongoing global developments. Furthermore, it fosters holistic personal growth by enhancing intellectual, cognitive, social and technological capacities, while expanding their knowledge and experience across various disciplines (Shakban & Al-Shehrani, 2021). In this context, the university has emerged as a key driver in shaping societal progress and development (Ḥusayn & Aʿbdālqādr, 2016).

However, several research studies have indicated the existence of various issues within higher education that hinder students'

willingness to enroll or actively participate. (Chen & Soldner), in their study conducted at a college of education in the United States, revealed that some educational programs experience a noticeable decline in student enrollment due to an unengaging learning environment (Chen & Soldner, 2013). Similarly, (Swap & Walter) pointed out that the university learning environment encounters several challenges, including low levels of student engagement, feelings of boredom among some students, and a general lack of motivation and academic achievement (Swap & Walter, 2015).

University education has increasingly faced challenges related to moving away from traditional methods such as rote learning, lecturing and conventional classroom instruction, and toward adopting more engaging and motivational teaching strategies (Ouanouki, 2018). The findings of a study conducted by Al-Daba' and Egail, which targeted undergraduate students at King Fahd University, revealed that students' levels of academic boredom were moderate overall. Furthermore, low-achieving students have been found to experience higher levels of boredom compared to their peers (Agail & El-Dabee, 2020).

This fact, in turn, is reflected in students' academic achievement, which is considered as one of the most significant indicators of the success or failure of the educational process (Abderrahmane, 2018). Youssefi emphasized that academic achievement is closely connected with the lack of motivation among university students (Yūsufī, 2017).

Lack of variety in teaching strategies and instructional methods is considered as one of the key factors contributing to students' low motivation and poor academic performance (Agail & El-Dabee, 2020).

Therefore, in light of modernity and rapid advancement, the new educational approach emphasizes the need to move away from rote learning and traditional methods, and to enhance the quality of education through innovation in content, diversification of teaching strategies and instructional methods, and the use of modern presentation techniques, tools, and technologies (Al-Zboon & Mūsá, 2021).

Many educators and teachers also strive to enhance their academic performance and have consistently sought methods and strategies that improve students' learning outcomes and academic achievement. The rapid advancement of technology has opened new doors and opportunities for educators to integrate innovative and modern strategies and techniques into the teaching process (Peixoto et al., 2021). Gamification and the use of gamified applications have emerged as motivational tools that encourage greater student engagement and have a positive impact on the educational process (Yildirim, 2017).

Significance of gamification has emerged clearly in its vital role in enhancing students' motivation and reducing their anxiety within the general education sector. It also contributes to transforming the learning environment into a more engaging and enjoyable space, which in turn leads to higher levels of academic achievement among students (Al-Khezy & Al-Khezy, 2021).

However, a number of educators and researchers still struggle to distinguish between the concepts of play and gamification. An analytical study conducted by Ceker and Özdaml revealed that a significant number of scholarly articles failed to differentiate between the two concepts, highlighting this as a common issue within the field of education (Ceker & Özdaml, 2017).

Another study concluded that although academic interest in the gamification approach has increased, most teachers consider it an effective and beneficial method. However, only a small percentage of teachers, approximately 11.30%, actually implement gamification in their teaching practices (Martí-Parreño et al., 2016).

Various studies have addressed the significance of gamification and its effective role in the educational sector. Moreover, a number of educators and researchers have observed that the effectiveness of gamified applications varies, as they may prove to be more successful and impactful in certain fields or disciplines compared to others (Çeker & Özdaml, 2017).

Celasun & Kaya emphasized that despite the enormous advantages of the gamification strategy, there are challenges, such as over-reliance on extrinsic rewards, that require further studies on the

long-term effectiveness of the gamification strategy, its adaptation to different curricula, and the continuous development of the educational field (Celasun & Kaya, 2025).

Based on the foregoing, it becomes evident that there is a need for further experimental studies to validate the effectiveness of gamification as a systematic and impactful instructional strategy (Dehghanzadeh et al., 2019). A review of previous literature indicates that very few Arabic studies have examined the impact of gamification on academic achievement at the university stage, with most gamification-related studies focusing on the primary, middle, and secondary education stages.

Hence, the study problem arises in response to the recommendations calling for further investigation into this topic, in addition to the scarcity of Arabic studies in this field, particularly within the higher education sector.

The problem of the study can be summarized in the following study question:

What is the impact of gamification on the academic achievement of university students?

Study Questions:

Main Question:

What is the effectiveness of gamification on the academic achievement of university students?

A set of sub-questions emerges from the main question, as follows:

1. Are there statistically significant differences between the experimental group and the control group attributable to the pre-test?
2. Are there statistically significant differences between the experimental group and the control group attributable to the post-test?
3. Are there statistically significant differences between the control group and the experimental group in the pre-test and post-test?

Study Objectives:

1. To examine the effectiveness of the gamification strategy in improving and enhancing the academic achievement of university students.
2. To identify the impact of the gamification strategy in higher education (university level).

Study Significance:

1. Guide curriculum designers toward the necessity of developing teaching methods and strategies, and to encourage the integration of engaging activities, such as gamification, into curriculum design.
2. Facilitate teachers' efforts in motivating and engaging students by delivering lessons based on the gamification strategy.
3. Highlight the significance of developing instructional materials grounded in gamification strategies.
4. Provide a scholarly contribution that enriches the area of knowledge and research and opens new avenues for researchers.

Study Terminologies:

Concept of Gamification

Gamification is defined as the process of applying game elements and digital game design techniques in non-game contexts (Vanolo, 2018).

Operationally defined as: An instructional strategy that involves the use of gaming elements within an educational context through the (Class123) Platform, with the aim of examining its impact on the academic achievement of university students.

Concept of Academic Achievement:

It refers to the level of a student's performance or proficiency during a given academic term, as assessed by teachers as well as standardized tests (El-Naggar & Shehata, 2003, p. 89).

Operationally defined as: the total score obtained by the student in the achievement test for the course "Instructional Media and Educational Technology", which was specifically prepared for this purpose.

Concept of CLASS 123 Program

It is a free web-based and mobile application that employs gamification as a core strategy for classroom management, communication, student engagement, task assignment, and feedback delivery. It provides a variety of tools for both teachers and classrooms.

Operationally defined as: A software to be used by the teacher with the experimental group in the "Instructional Media and Educational Technology" course in order to answer the study questions.

Study limitations:

Human: This study has been applied to a sample of university students at the College of Education, Kuwait University, in the " Instructional Media and Educational Technology" course.

Subject: This study has been limited to the study of the influence of gamification on academic achievement for university students.

Location: This study has been applied at the College of Education, Kuwait University.

Time: This study was applied during the second semester of the Academic Year 2023/2024.

Theoretical Framework

Educational systems strive to adopt modern methods and strategies aimed at improving the learning environment and transforming it into an engaging and motivating space for students. Among the most widely adopted strategies in the educational field is gamification, which has proven effective in stimulating student motivation by creating an atmosphere of fun, excitement, and challenge (Oliveira et al., 2022). This growing interest in the concept of gamification has contributed to the emergence of numerous platforms and applications based on gamification principles, which have assisted teachers in developing and enhancing the educational process (Al-Balushi & Al-Hosni, 2023).

Significance of Gamification

Gamification plays a vital role in the educational field, as it contributes to several key aspects (Morschheuser et al., 2017):

1. Break the monotony of traditional education by introducing fun and enjoyment.

2. Transform the student into an active and productive participant in the learning process.
3. Increase students' motivation and engagement.
4. Serve as an effective tool for enhancing knowledge retention over more extended periods.
5. Reduce students' levels of anxiety and stress.
6. Develop creative thinking and problem-solving skills.

Benefits of Gamification

Negrusa (2015) categorized the benefits of gamification into several domains, each comprising specific advantages:

Psychological Benefits of Gamification:

1. Provides an opportunity for expression of needs, interests, and attitudes.
2. Allows room for change, error, and trial.
3. Creates an engaging and appealing learning environment for learners.
4. Satisfies learners' psychological needs, such as leadership and autonomy.

Cognitive Benefits of Gamification:

1. Enhances comprehension and understanding abilities.
2. Links senses with perception and learning processes.
3. Fosters a creative and innovative learning environment.
4. Stimulates the mind to engage in problem-solving.

Social Benefits of Gamification:

1. Develops learners' interpersonal skills and promotes social integration.
2. Encourages team spirit and collaboration.
3. Promotes understanding of, and adherence to, rules and societal norms.
4. Helps shape learners' behavior by providing opportunities for practicing positive social roles.

Educational Benefits of Gamification:

1. Enhances both verbal and non-verbal communication skills.
2. Adds enjoyment, fun, and entertainment to the learning environment.
3. Encourages self-learning.

4. Supports learners' persistence in learning and continuous effort.

Challenges of Gamification

According to Kayyali (2023), although gamification is expected to become increasingly critical in the future of education, especially with the advancement of technology and the development of new learning systems based on it, there remain several challenges that may hinder its effective implementation. These challenges include:

1. External motivators such as gifts and rewards can positively encourage students to engage with various topics, but they do not always promote deep understanding or foster genuine passion for the subject matter.
2. Gamification strategies may be more appealing to individuals who possess a competitive or adventurous spirit, and may not suit those who do not share these traits. Therefore, gamification design must be approached with greater care and effectiveness to ensure inclusivity.
3. Effective implementation of gamification strategies requires a teacher to possess sufficient understanding and mastery of the approach. Without this requirement, learners may experience frustration, confusion, and dissatisfaction due to exposure to poorly designed gamification tools or techniques.
4. Gamification may not be universally suitable for all types of learning or academic disciplines. Therefore, it may require adaptation and customization to align with the specific needs of different fields of study.

Gamification Elements

According to Glover (2013), there are several elements upon which the gamification strategy is based, including:

1. **Mechanical Elements:**

- Points
- Badges
- Gradual Progress of student
- Levels
- Challenges and competitions among students
- Virtual goods
- Gifts and rewards

- Engagement
- Leaderboard
- Feedback
- Status
- Achievement

2. Personality-Related Elements

- Virtual character (Avatar) representing a student when performing gamification.
- Individual and collective responsibilities.
- Emotional elements that foster enthusiasm and continuity among students:
- Awareness of classroom conditions and environment.
- Immediate positive or negative feedback based on student performance.
- Balance in tasks and challenges.

Gamification Platforms and Applications in Education

There are numerous platforms, websites, and various applications that assist teachers in implementing a gamification strategy.

Tools and resources used by educators to apply gamification can be categorized into four main groups (Pujolà & Appel, 2022).

1. Motivational websites and applications that help teachers manage the classroom and design engaging and interactive lessons. Examples include (Classcraft, ClassDojo, and Grandcraft).
2. Gamified interaction and assessment platforms designed to increase student motivation and engagement by creating interactive, game-based activities and assessments. Examples include: Kahoot, Socrative, and Quizalize.
3. Website and applications that incorporate gaming elements into virtual learning platforms, allowing lessons to take place in immersive, game-like settings. Examples include: (Moodle, Ranking Block, and Level Up!).
4. Websites and applications that provide various information and communication technologies (ICT) to implement gamification in the learning process. Examples include: (Makebadge and Pointgram).

Class123 Website

Class123 is a foreign platform used as a tool for classroom management, classroom activities, and communication. This website is primarily and fundamentally based on the gamification approach. It is characterized by an interactive display style, the use of cartoon characters (avatars), and sound effects.

According to the (Class123) website, there are various features and functions offered to users, including:

1. Timer: Helps students and teachers keep track of time and allocate specific time periods for tasks and activities.
2. Seat Chart: Allows the teacher to organize and assign students' seats either randomly or manually through the seat board.
3. Random Selector: Assists in selecting students in an interactive and enjoyable way.
4. Attention Bell: Helps in easily and effectively capturing students' attention.
5. Attendance Check: Enables the teacher to record students' attendance and absences through an interactive attendance board.
6. Chalkboard: Allows the teacher to create and share lessons with students.
7. Announcements: The teacher can send notifications and messages to students and their parents.
8. Quick Rewards and punishments: The Teacher can instantly reward students by giving interactive badges or apply punishments, while also tracking students' performance.
9. Set Group Goals: The teacher can set target goals for students to achieve and monitor their progress engagingly and competitively.
10. Feedback: A teacher can provide feedback to students anytime and anywhere. Students can enjoy interactive feedback through feedback animations.
11. Feedback Reports: Teacher can understand each student's performance by reviewing individual performance reports generated by the program.

12. Parental Communication: The program allows parents to monitor their children's performance and communicate with the teacher through a dedicated parent username.
13. Invitation Sending: The program enables easy invitation of students and parents.
14. Multimedia Support: The program allows sharing of images, uploading videos, and audio clips.
15. Assignments and Polls: Students can submit their assignments through the program and also participate in polls or surveys.
16. Sharing Notes and Important Dates.
17. Messages and Links: Private messages can be sent to each student for individual communication with the teacher, as well as sending and sharing useful links.

Gamification & Instructional Design

The relationship between instructional design and gamification is not just complementary; it's transformative. Instructional design lays the groundwork by defining clear learning objectives, structuring content, and organizing activities that emphasize purposeful and systematic learning. Meanwhile, gamification introduces engaging elements like challenges, levels, points, and rewards that captivate learners and make the process enjoyable. By integrating gamification into instructional design, we not only enhance learner motivation but also foster ongoing interaction with the content (Harve, 2023).

Gamification empowers instructional designers to elevate educational activities into dynamic experiences, allowing learners to embark on a “learning journey” filled with excitement and challenges, rather than passively receiving information through traditional methods. This powerful combination goes beyond mere entertainment; it significantly boosts knowledge retention, hones critical thinking and problem-solving skills, and ultimately leads to far superior learning outcomes. Embracing this synergy is essential for creating impactful and effective educational experiences (Kotp et al., 2025).

Previous studies

Arabic studies

Al-Rehaili (2018) conducted a survey-based study on a sample of 41 female students at Taibah University. The study aimed at investigating the effectiveness of a multimedia-based collaborative learning environment grounded in gamification in enhancing academic achievement and motivation. The researcher employed a quasi-experimental approach, utilizing an achievement test and a motivation scale. The study outcomes showed a positive effect of gamification on improving academic achievement and motivation among the experimental group. The study recommended training faculty members on the use of gamification in various university courses. It also suggested conducting further research on enriching higher education environments with gamification elements and applying such studies to other university courses and larger student samples.

Al-Jraiwi (2019) conducted a study on a sample of 60 fourth-grade female students in the Kingdom of Saudi Arabia. The study aimed to explore the effect of web-based gamification on improving academic achievement and developing creative thinking among students. The researcher adopted a quasi-experimental approach by dividing the students into two groups: an experimental group and a control group. The outcomes indicated an improvement in academic achievement and the development of critical thinking skills among the experimental group, highlighting the role of gamification in enhancing higher-order thinking skills as well as students' academic performance. Based on the study's findings, it emphasized the necessity of implementing training programs on gamification and urged educational professionals to adopt gamification as part of the teaching and learning process. The study also recommended the need for conducting further research on gamification across different age groups and educational levels.

In Shahin's (2020) study, the aim was to investigate the effectiveness of the gamification strategy implemented through the Class Dojo application in improving the academic achievement of third-grade elementary students, as well as in managing various learning environments. The study was conducted on a sample of 15

students from Al-Islah Primary School (Combined) in Egypt. The researcher employed a pre-test and post-test design on the same sample to achieve the study's objective. The outcomes of this study indicated the effectiveness of the gamification-based program in enhancing students' performance and managing the classroom environment. The study recommended the necessity of training educational staff on the use of gamification applications. It proposed conducting further research across different courses and educational levels to explore the effectiveness of gamification.

However, Alkhobra (2020) conducted a study to examine the impact of badges and points within the gamification strategy on enhancing motivation and academic achievement among middle school students in the Hail region.

The study included a sample of 50 students and employed a quasi-experimental approach. The outcomes revealed statistically significant differences in favor of the badge group in terms of improved academic achievement, increased student participation, and enhanced motivation. The study recommended the necessity of the development of educational applications based on gamification across various courses and educational levels.

Al-Ghāmidī & sāmyh (2020) conducted a study aimed at carrying out a systematic review of previous studies on gamification in education between the years 2015 and 2019. The review addressed the elements of gamification, the variables associated with it, the courses in which gamification was applied, the educational levels targeted, as well as the key outcomes and recommendations. The study revealed a scarcity of Arabic studies on the topic of gamification and emphasized that most of the reviewed studies agreed on the effectiveness of gamification in enhancing students' academic achievement.

Foreign studies

Turan et al. (2016) conducted a research study using a mixed approach. The researchers employed a quasi-experimental design alongside descriptive data analysis and interviews to explore the impact of gamification on students' comprehension and academic achievement, as well as to understand students' perceptions of gamification. The study has been conducted on a sample of 94 sixth-

grade students in Turkey, 48 students in the control group, and 46 in the experimental group. The findings indicated significant differences in achievement in favor of the experimental group. Moreover, the interviews revealed that students held positive views toward gamification. The study recommended conducting further research on the impact of gamification across different age groups and educational levels.

However, Yildirim (2017) conducted a quasi-experimental study using a quantitative research methodology on a sample of 97 university students in Turkey. The sample consisted of 49 students in the experimental group and 48 in the control group. The study aimed to investigate the effect of gamification-based instructional practices on students' academic achievement. The outcomes indicated that instructional practices based on gamification had a positive impact on students' academic performance and also significantly influenced their attitudes toward the courses and lessons.

As for the study of Wardoyo & others (2021), it was conducted during the COVID-19 pandemic with the view of examining the impact of gamification on students' academic achievement in distance learning. The study used the "e-crowdwar" platform as a gamification model and was applied to a sample of 945 high school students in Indonesia. The sample was initially taught using traditional methods, followed by instruction through gamification. The outcomes indicated that the gamified teaching model outperformed the traditional teaching approach and that gamification had a positive impact on students' academic achievement.

Camacho & others (2022) conducted a study in Spain aimed at examining the impact of gamification on student motivation, learning ability development, and the improvement of academic performance among university students. The sample consisted of 126 students, and the quasi-experimental method was used, with the sample divided into an experimental group and a control group. A questionnaire has also been administered to assess motivation and engagement. The outcomes revealed statistically significant differences between the experimental and control groups in favor of the experimental group. The outcomes indicated that gamification is an effective educational tool that aligns

with active learning, achieves a high level of motivation, and enhances academic performance.

In addition, Palaniappan & Md Noor (2022) conducted a quasi-experimental study using two quantitative methods for data collection: a Questionnaire and a pre-post test, on a sample of 29 undergraduate second-year students. The study aimed to estimate the effect of gamification on students' academic performance and measure the level of students' self-directed learning in an online learning environment. The findings revealed that implementing a gamification strategy influenced students' academic performance in online learning environment and emphasized students' self- directed learning.

Lampropoulos & Sidiropoulos (2024) conducted a longitudinal study at the International Hellienic University in Greece aimed to explore the impact of gamification on students' learning outcomes and academic performance in comparison to two different approaches included online and traditional learning. The study lasted for 3 years and divided in 3 phases: phase 1 (2020-2021) online learning, phase 2 (2021-2022) traditional learning, and phase 3 (2021-2023) gamified learning. The sample consisted of 101 higher education students, the quasi-experimental method and questionnaire were used. The finding revealed that gamification is an effective approach that has an excellent rate in enhancing and improving student's learning outcomes, academic performance, and engagement over traditional and online learning.

In Kuwait Alabdulhadi (2025) conducted a study aimed to explore the impact of a proposed gamification environment for teaching biography and jurisprudence on the development of performance and motivation or teaching biography and jurisprudence among a high school students in Kuwait. The researcher employed a quasi-experimental approach, utilizing an achievement test and a motivation questionnaire.. The sample included 46 female grade 12 students. To achieve this study goal the sample divided into two groups experimental and traditional one. The findings revealed a significant

enhance in the students' understanding of biography and jurisprudence, engagement and overall performance.

Commentary on Previous studies

In light of the foregoing, it becomes clear that most of studies emphasize the significance of gamification and its role as an effective tool in enhancing students' motivation and improving their academic performance. The quasi-experimental method has been commonly employed across these studies. Moreover, prior studies consistently recommended the need for conducting further studies on the effectiveness of gamification across different subjects and educational stages. However, it is noteworthy that the majority of the previous studies, particularly the Arabic ones, focused on the effectiveness of gamification in pre-university educational levels, with a noticeable scarcity of Arabic studies addressing gamification in higher education.

Procedures of study

Study Methodology:

To answer the study questions, the quasi-experimental approach has been employed. The study has been conducted on students enrolled in the "Instructional Media and Educational Technology" course. Two divisions taught by the same faculty member were selected: the first division served as the experimental group, in which the Class123 program was used, while the second division served as the control group, with no intervention applied.

Study population and Sample

Study population: All students enrolled in the College of Education at Kuwait University.

Study Sample: The study has been applied to two female divisions from the Instructional Media and Educational Technology course.

Achievement Test

Preparation of the Achievement Test:

1. **Purpose of the Test:**

   The purpose of the test is to measure students' academic achievement in the "Instructional Media and Educational Technology" course.

2. **Lessons Covered in the Test:**
   Three instructional units from the course have been selected based on the course instructor's recommendation. Namely:
- Chapter 1: The Evolution of the Concept of Instructional Media and Educational Technology - A Historical Overview
- Chapter 2: Classification of Instructional Media and Educational Technology.
- Chapter 6: Systematic Planning for the Use of Instructional Media and Educational Technology - The ASSURE Model

3. **Test Format:**
   The test consisted of objective questions, comprising a total of 30 items: 15 true/false questions and 15 multiple-choice questions.
4. **Test Scoring:**
   Each correct answer was awarded 1 point, while incorrect or unanswered questions were given 0 points. The total score was calculated based on the total number of test questions.
5. **Test Duration:**
   The test duration has been determined based on the time taken by the pilot group, which was 45 minutes.
6. **Validity Coefficient**:
- The test has been reviewed by five subject-matter experts to evaluate content validity. Their feedback was considered, and the test items were revised accordingly.
- Additionally, the test has been experimented on a group of students to assess the clarity of the items, their level of difficulty or ease, and the time required to complete the test.

7. **Reliability Coefficient**:

In this study, (Rasch model) has been used to evaluate the psychometric properties of the achievement test items and to assess the validity and reliability of students' responses. The test was conducted on a random sample of 21 students from the College of Education, Kuwait University. The analysis also included item difficulty and discrimination indices, individual ability levels, and fit statistics (both internal and external) to determine how well each item aligns with the underlying trait being measured. Furthermore,

the reliability of individual ability estimates was calculated to assess the consistency of students' responses. “JAMOVI” software has been used to perform all statistical calculations and analyses, ensuring a robust and comprehensive evaluation of the test's effectiveness.

Table 1. Item analysis - Thresholds and item fit indices after item separation.

	Proportion	Measure	S.E.Measure	Infit	Outfit
Q1	0.810	-1.6442	0.594	1.200	1.524
Q2	0.905	-2.5487	0.782	0.788	0.504
Q3	0.762	-1.3190	0.549	1.236	1.632
Q4	0.952	-3.3575	1.059	1.164	1.527
Q5	0.857	-2.0355	0.662	1.243	1.150
Q6	0.857	-2.0355	0.662	0.956	1.562
Q7	0.429	0.3541	0.471	1.370	1.807
Q8	0.905	-2.5487	0.782	0.788	0.504
Q9	0.714	-1.0345	0.519	0.762	0.667
Q10	0.429	0.3541	0.471	0.887	0.834
Q11	0.810	-1.6442	0.594	0.732	0.555
Q12	0.571	-0.3073	0.474	1.069	1.077
Q13	0.810	-1.6442	0.594	0.827	0.702
Q14	0.952	-3.3575	1.059	0.726	0.216
Q15	0.571	-0.3073	0.474	1.204	1.374
Q16	0.952	-3.3575	1.059	0.726	0.216
Q17	0.857	-2.0355	0.662	1.059	1.825
Q18	0.524	-0.0852	0.469	1.232	1.243
Q19	0.667	-0.7764	0.498	1.305	1.375
Q20	0.619	-0.5361	0.483	1.222	1.277
Q21	0.524	-0.0852	0.469	1.002	0.977
Q22	0.762	-1.3190	0.549	0.940	0.926

	Proportion	Measure	S.E.Measure	Infit	Outfit
Q23	0.476	0.1340	0.468	1.031	1.035
Q24	0.905	-2.5487	0.782	0.742	0.408
Q25	0.857	-2.0355	0.662	0.745	0.504
Q26	0.714	-1.0345	0.519	0.944	0.897
Q27	0.524	-0.0852	0.469	0.959	0.942
Q28	0.619	-0.5361	0.483	0.818	0.757
Q29	0.667	-0.7764	0.498	0.803	0.730
Q30	0.762	-1.3190	0.549	0.759	0.644

Note. Infit= Information-weighted mean square statistic; Outfit= Outlier-sensitive means square statistic.

Table 1 presents an item analysis using the Rasch model, indicating that items with higher proportions and more negative measures, like Q2 and Q4, are easier, while items with lower proportions and positive measures, like Q7, are more difficult. The fit indices, Infit and Outfit, suggest that most items align well with the Rasch model, as their values are close to 1, indicating a good fit. However, items like Q7, with higher Infit (1.370) and Outfit (1.807), may need further review due to their unpredictable behavior, which could impact the overall reliability and validity of the assessment.

Table 2 provides a summary of the total scores for 21 participants, with scores ranging from 7 to 27. The mean score is 21.8, and the median is 22.0, indicating a slight skew towards higher scores, as confirmed by the negative skewness value of -1.33. The standard deviation (SD) of 4.87 reflects moderate variability in scores, and the standard error (SE) of 1.06 suggests a reasonable precision of the mean estimate. The high kurtosis value of 4.56 indicates a leptokurtic distribution, with scores more concentrated around the mean. The person reliability coefficient of 0.736 suggests that the test has acceptable reliability, indicating consistent performance across participants.

Table 2. Summary of total score

N	Minimum	Maximum	Mean	Median	SD	SE	Skewness	Kurtosis
21.0	7.00	27.0	21.8	22.0	4.87	1.06	-1.33	4.56

Person Reliability = 0.736

Implementation Phase:

1. Sample Selection:

The study sample has been selected from students of the College of Education at Kuwait University who were enrolled in the "Instructional Media and Educational Technology" course. Two division taught by the same faculty member were chosen: one division served as the experimental group, consisting of 20 female students, while the other division served as the control group, consisting of 22 female students.

2. Implementation of the study

- A list of the experimental group students' names has been prepared and added to the Class123 program in order to begin implementing the gamification strategy.
- The study has been conducted during the second semester of the academic year 2023–2024 at the College of Education - Kuwait University. A pre-test has been administered at the beginning of the semester on 12.02.2024, prior to applying the gamification strategy using the program. The post-test was conducted at the end of the semester on 13.05.2024, after completing the implementation of the gamification strategy.

Statistical Analysis

- Statistical analysis of the data was carried out using the SPSS program. The following methods were used:
- Mean - Standard Deviation - Validity Coefficient - Skewness Coefficient
- Independent Samples T-Test to compare independent groups
- Paired Samples T-Test to compare related samples

Outcomes:

To answer the study questions, a set of statistical tests has been applied to derive the results for each study question separately.

Study question 1: Are there statistically significant differences between the experimental group and the control group attributed to the pre-test?

To assess the assumption of normality, a Shapiro–Wilk test was conducted for the achievement test scores. The results showed that the post-achievement test scores did not significantly deviate from normality, $W = 0.985$, $p = .844$, indicating that the data were approximately normally distributed. Thus, the assumption of normality was met, supporting the use of parametric tests in the subsequent analyses. Based on this, independent-samples t-tests and repeated measures analyses were performed to examine the differences between the control and experimental groups.

Figure (1) presents the Q–Q plot of the standardized residuals for the pre- and post-achievement test scores. The points closely follow the diagonal reference line, with only minor deviations at the tails, indicating that the residuals are approximately normally distributed. This visual inspection further supports the Shapiro–Wilk test results, confirming that the assumption of normality was met. Therefore, parametric tests such as the independent-samples t-test and repeated measures ANOVA were deemed appropriate for subsequent analyses.

Figure (1)

Q–Q plot of standardized residuals for the pre- and post-achievement test scores. The data points align closely with the diagonal reference line, indicating that the residuals are approximately normally distributed, thereby supporting the assumption of normality for subsequent parametric analyses.

Pre-Achievement Test - Post-Achievement Test

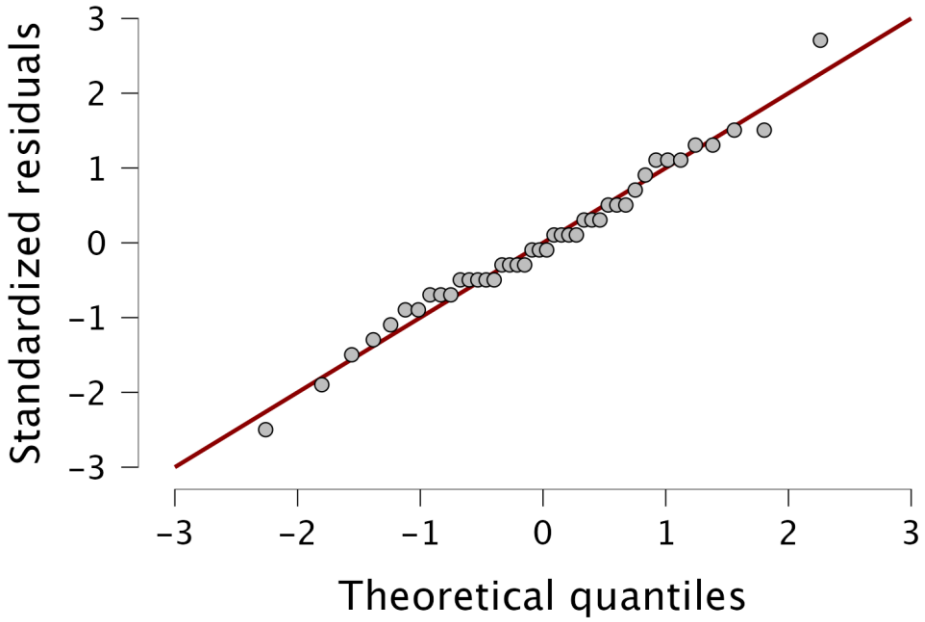


Table (3)

Results of the T-test for differences between the experimental group and the control group in the pre-achievement test.

	No. of sample	Mean	Standard deviation	T Value	Free scores	Significance
Control Group	22	19.4091	3.89944	.047	40	0.963
Experimental Group	20	19.3500	4.19618	.047		

To answer the study question 1 concerning whether there are statistically significant differences between the experimental group and the control group in the pre-test, Table (3) shows that the results indicate no statistically significant differences between the two groups (0.963). This means that the groups are equivalent, and there are no differences in knowledge prior to the implementation of the experiment.

Table (4)

T-test Results for Differences Between the Experimental Group and the Control Group in the Post-Achievement Test

	No. of sample	Mean	Standard deviation	T Value	Free scores	Significance
Control Group	22	19.9091	3.93893	-3.653	40	0.001
Experimental Group	20	24.1000	3.44735			

To answer the study question 2 regarding the existence of statistically significant differences between the experimental group and the control group in the post-test, it is evident from Table (4) that the results indicate the existence of statistically significant differences between the two groups (0.001) in favor of the experimental group. This means that the academic achievement of the experimental group was higher than that of the control group, indicating a positive impact of applying the gamification strategy on the experimental group.

In addition, a non-parametric test using the Wilcoxon signed-rank test was conducted to verify the robustness of the results when the assumptions of normality were not met. The overall Wilcoxon analysis (Table A1) showed a significant improvement in achievement scores from pre-test to post-test, $Z = -3.06$, $p = .002$. When analyzed by group, the control group did not exhibit a significant change ($Z = -0.44$, $p = .657$; Table A2), whereas the experimental group showed a highly significant improvement ($Z = -3.52$, $p < .001$; Table A3). These results are consistent with the parametric analyses, providing further confirmation of the robustness of the findings and reinforcing the conclusion that the gamification intervention through Class123 enhanced students' academic achievement.

Table (5)

Repeated measures ANOVA results for within-subjects and between-subjects effects on achievement test scores (pre-test and post-test).

Repeated Measures ANOVA Within Subjects Effects

Cases	Sum of Squares	df	Mean Square	F	p	η^2	ω^2
Achievement Test (pre-test and post-test)	144.375	1	144.375	13.861	< .001	0.094	0.098
Achievement Test ✻ Group	94.613	1	94.613	9.084	0.004	0.062	0.064
Residuals	416.625	40	10.416				

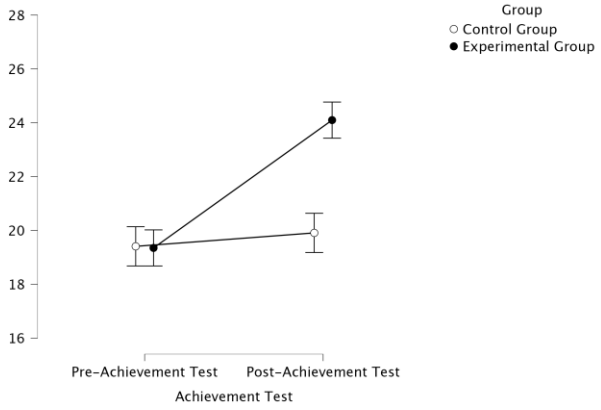
Repeated Measures ANOVA Between Subjects Effects

Cases	Sum of Squares	df	Mean Square	F	p	η^2	ω^2
Group	89.424	1	89.424	4.534	0.039	0.058	0.041
Residuals	788.861	40	19.722				

Note. Type III Sum of Squares

Figure (2)

Mean pre- and post-achievement test scores for the experimental and control groups with standard error bars.



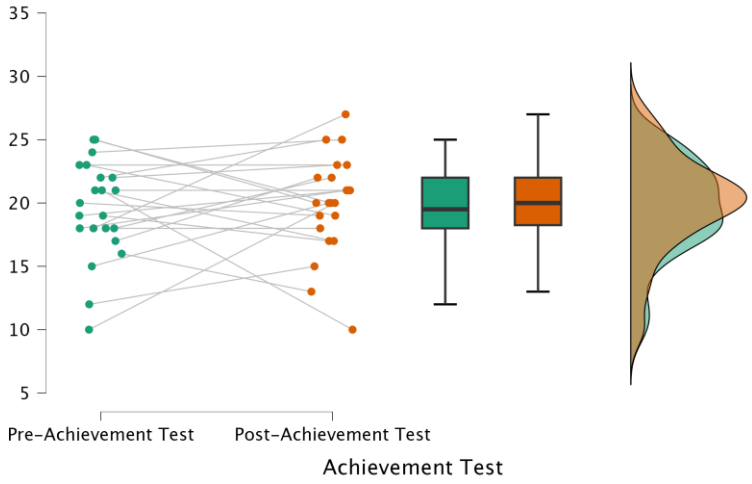
The repeated measures ANOVA results in table (5) and, figure (2) demonstrated both significant within- and between-subjects effects. For the within-subjects effects, there was a significant difference in achievement scores between the pre- and post-test, $F(1, 40) = 13.86$, $p < .001$, $\eta^2 = .094$, $\omega^2 = .098$, indicating that student performance improved over time. Moreover, the interaction effect between time and group was significant, $F(1, 40) = 9.08$, $p = .004$, $\eta^2 = .062$, $\omega^2 = .064$, suggesting that the degree of improvement differed across groups, with the experimental group showing greater gains. For the between-subjects effects, the results revealed a significant main effect of group, $F(1, 40) = 4.53$, $p = .039$, $\eta^2 = .058$, $\omega^2 = .041$, confirming that students in the experimental group consistently outperformed those in the control group. Taken together, these findings provide robust support for the study's hypothesis that employing gamification through the Class123 program significantly enhances academic achievement among university students.

Figure 3 displays a raincloud plot of pre- and post-achievement test scores for the control group. The individual data points, boxplots, and density distributions collectively show that the control group's performance remained relatively stable across the two time points, with only slight variation between pre-test and post-test scores. The boxplots indicate minimal shifts in central tendency, and the overlapping density curves suggest that the distribution of scores did not substantially change over time. These results support the finding that the control group did not exhibit significant improvement in achievement, in contrast to the experimental group.

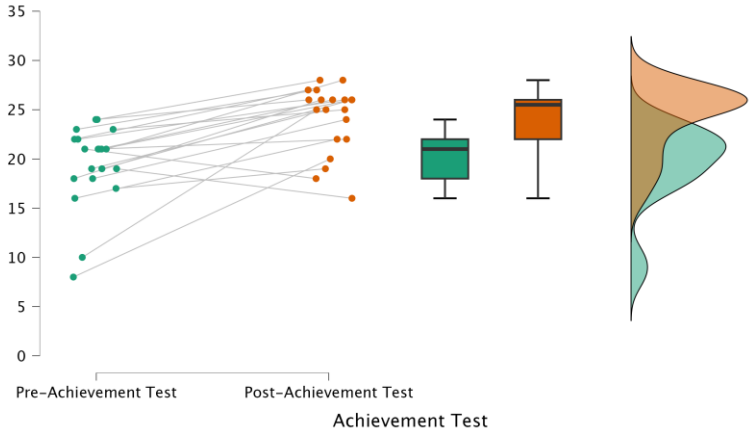
Figure (3)

Raincloud plot of pre- and post-achievement test scores for the control group and Experimental Group, showing minimal change over time.

Figure 3-a - Group: Control Group



5. Figure 3-b -Group: Experimental Group



To answer the study question 3, which investigates whether there are statistically significant differences between the experimental group and the control group in the pre-test and post-test achievement scores, the results shown in Table (5) indicate a statistically significant difference between the two groups at (0.004) in favor of the experimental group. This outcome means that the academic achievement of the experimental group was significantly higher than that of the control group after the application of the gamification

strategy. Furthermore, the experimental group exhibited a greater increase in scores when comparing their pre-test and post-test results, proposing that the gamification approach had a positive and effective impact on their learning outcomes.

Overall, the repeated measures ANOVA confirmed that the gamification strategy implemented through the Class123 program had a significant positive impact on students' academic achievement. The within-subjects analysis demonstrated that achievement scores improved from pre-test to post-test, while the significant time × group interaction revealed that these gains were considerably greater for the experimental group compared to the control group. Furthermore, the between-subjects effect indicated that students in the experimental group consistently outperformed their peers across both testing occasions. Collectively, these findings provide strong empirical evidence that integrating gamification into university-level instruction enhances learning outcomes and supports the effectiveness of Class123 as a pedagogical tool.

Discussion of Outcomes:

The key findings of this study clearly demonstrate a positive impact on students' academic achievement in the experimental group enrolled in the "Instructional Media and Educational Technology" course, following the implementation of the gamification strategy using the CLASS123 program. When the pre-test was conducted to verify the equivalence between the experimental and control groups, the results indicated no statistically significant differences, confirming that both groups had similar academic abilities in the pre-test. However, the post-test results (after applying the gamification strategy) showed a clear advantage in favor of the experimental group, reflecting an improvement in academic achievement compared to the control group. Results of the experimental group were higher than those of the control group in the post-test. Moreover, when examining the progress made by both groups through a comparison between the pre-test and post-test results, it is evident that the experimental group, which was

exposed to the gamification strategy, showed greater improvement than the control group. This clearly indicates the effectiveness of applying the gamification strategy in enhancing students' academic achievement.

Also, the findings indicate that the use of gamification methodology has led to a significant boost in academic achievement for students in the experimental group, especially compared to their peers in the control group. The results highlight a statistically significant advantage for those engaged in gamification, which effectively enhances students' motivation to learn through fun and interactive elements like points, rewards, progress tracking, and captivating challenges. These engaging features not only draw students into the learning process but also inspire them to invest more time and energy into their tasks. As a result, their academic performance noticeably improved, with a deeper understanding of concepts and better retention of knowledge due to the combination of repeated practice and immediate feedback. Additionally, the gamification approach fostered a more interactive and well-structured learning environment that distinguishes itself from traditional methods. It helped clarify learning goals, encouraged healthy competition, and strengthened both individual and group achievements. This collaborative spirit contributed to the development of higher-order thinking skills and effective cognitive strategies, such as self-assessment and learning planning. Ultimately, the notable differences in academic performance serve as a testament to the positive impact of gamification techniques, transforming the learning experience into something more engaging and effective while boosting students' success.

When examining the Main study Question: "What is the effectiveness of gamification on the academic achievement of university students?", it becomes clear that the effect was positive in favor of the experimental group, in which the gamification strategy was applied using the CLASS123 Program. This outcome aligns with many previous studies reviewed in the previous studies, such as those conducted by (Yildirim, 2017), (Al-Rehaili, 2018), (Camacho et al, 2022), (Palaniappan & Md Noor, 2022), and (Lampropoulos &

Sidiropoulos, 2024), whose samples also consisted of university students.

When comparing outcomes of this study with the outcomes of other studies, we find that they are consistent in demonstrating a positive impact on academic achievement at various educational levels as well. For instance, similar positive outcomes have been reported in the study conducted by (Wardoyo et al, 2021) and (Alabdulhadi, 2025) on high school students, the study by (Alkhobra, 2020) on middle school students, and the studies by (Al-Jraiwi, 2018), and (Shahin, 2020) on elementary school students.

Recommendations:

1. To train university faculty members on how to utilize the CLASS123 Program in their academic courses.
2. To integrate the concept of gamification strategies, particularly digital gamification, into certain professional preparation courses at the College of Education, such as Teaching Methods, Instructional Media and Educational Technology, and Classroom Management.
3. To introduce dedicated courses that specifically address the issue of gamification, particularly within graduate programs at the College of Education.
4. To expand scientific research in this field, whether by faculty members of the College of Education, post-graduate students, or undergraduate students.

Future studies :

1. A study on the impact of gamification on the level of engagement and participation at higher education institutions.
2. An analytical study on the role of gamification in enhancing critical thinking and problem-solving skills at higher education institutions.
3. A study on the challenges encountering implementation of gamification strategies at higher education institutions.
4. A comparative study on the application of gamification in different scientific and humanities disciplines, and its impact on the learning process.

5. A study on the psychological impact of gamification in enhancing student motivation at higher education institutions.
6. A study on the impact of gamification on students' academic achievement in distance learning environments.

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Complimentary Analysis – Non-parametric test

Table A1. Wilcoxon Signed Ranks Test for both groups

		N	Mean Rank	Sum of Ranks	Z	Asymp. Sig. (2-tailed)
Post-Achievement Test - pre-achievement test	Negative Ranks	10	17.10	171.00	-3.062	0.002
	Positive Ranks	29	21.00	609.00		
	Ties	3				
	Total	42				

Table A2. Wilcoxon Signed Ranks Test for Control Group

		N	Mean Rank	Sum of Ranks	Z	Asymp. Sig. (2-tailed)
Post-Achievement Test - pre-achievement test	Negative Ranks	8	10.50	84.00	-.444	0.657
	Positive Ranks	11	9.64	106.00		
	Ties	3				
	Total	22				

Table A3. Wilcoxon Signed Ranks Test for Experimental Group

		N	Mean Rank	Sum of Ranks	Z	Asymp. Sig. (2-tailed)
Post-Achievement Test - pre-achievement test	Negative Ranks	2[b]	5.50	11.00	-3.515[c]	0.0004
	Positive Ranks	18[c]	11.06	199.00		
	Ties	0[d]				
	Total	20				