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The Effectiveness of Combining the Type of Implicit Questions and Their Presentation Density in an Adaptive Digital Assessment Environment on Reducing Electronic Stress and Electronic Test Anxiety Among Educational Technology and Computer Students

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Abstract

The current research aims to know the effectiveness of combining the type of implicit questions (open/closed) and the density of question presentation (single/multiple) in an adaptive digital Assessment environment to reduce electronic stress and reduce electronic test anxiety among educational technology and computer students.To achieve this goal, a digital Assessment environment was applied to the research sample, which consisted of (60) first-year students in the Department of Educational Technology and Computer Science at the Faculty of Specific Education, Kafr Elsheikh University. They were distributed into four main groups, each group having (15) students, A group using the implicit question type (open) and the presentation density (single), a group using the implicit question type (closed) and the presentation density (single), a group using the implicit question type (open) and the presentation density (multiple), and a group using the implicit question type (closed) and the presentation density (multiple) when using electronic tests, according to the variables of the current research.The electronic stress and electronic test anxiety scale was applied pre-test to the research sample, to know the level of students, and these scales were applied post-test to the students. The results indicated that the combination of the type of implicit questions (open-closed) and the density of their presentation (single-multiple) in the adaptive digital Assessment environment reduced electronic stress and electronic test anxiety in favor of the interaction between the type of questions (closed) and the density of their presentation (single-multiple).

Keywords: *Digital Assessment Environment, Implicit Question Type, Question Presentation Density, Electronic Stress, Electronic Test Anxiety.*

Introduction

As a result of the amazing and rapid development in digital transformation technologies within Egypt's Vision 2030, educational institutions have become interested in implementing the electronic Assessment system using e-learning environments and platforms, The success of any educational system depends on the accuracy and strength of the measurement and assessment process, which in turn requires good design of the measurement and assessment process and its tools to overcome the problems facing the nature of measurement of the educational process in general and the learner's readiness in particular, and the need to use and employ modern

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technologies to arrive at a more accurate and effective method of assessment.

Implicit questions are one of the most important variables in designing adaptive digital assessment environments. They promote deeper engagement by learners and serve as tools for formative Assessment, as implicit questions increase students' engagement with the educational content provided. (Palaigeorgiou, et al., 2018)

Implicit questions are questions that test the knowledge contained within an online assessment environment. They allow students to pause and reflect on the content they have viewed. They typically do not yield grades, but they do provide students with the opportunity to practice and train before the main exam, which helps reduce test anxiety and academic stress that may affect learners when taking the main exam. (Marshall,F,B 2019)

One of the design variables associated with designing implicit questions in adaptive electronic Assessment environments is the type of questions. The current research addressed two types of implicit questions: closed questions and open questions. Closed questions are those questions that have one specific, fixed, correct answer that the learner is expected to have been exposed to previously during the learning process. Closed questions are characterized by ease of answering, objectivity, and speed of correction. They can also be corrected automatically if they are included within an electronic learning environment. There are different types of closed questions, including: true or false questions, multiple choice questions, matching questions, and reordering questions. Open questions are questions that have a wide and open range of expected and acceptable correct answers, which fall under the essay question type and include short answer questions, completion questions, and free response questions.(Hubbard, Potts, & Couch, 2017).

One of the design variables also related to the design of implicit questions in adaptive electronic Assessment environments is the density of question presentation, The density of the implicit questions is one of the important Assessment variables that affect the effectiveness of the implicit questions in the electronic digital Assessment environment. It means the number of questions that appear before the student. Although previous research and studies have confirmed the importance of implicit questions, the results of research have varied regarding the appropriate number of questions that appear each time. Some research has proven that the appearance of multiple questions may distract the learner.(Vondrick et al., 2013; Vijayanarasimhan & Grauman, 2012)

Many studies have indicated the positive impact of the type of implicit questions (open/closed) as a tool for active learning and interaction, but they have not proven the superiority of any question type over the other, including the study of (Ketsman, Santana & Daher) ;(2018, (Hubbard, et al., 2017), However, some studies have compared the two types of embedded questions and indicated that open-ended embedded questions are more effective than closed questions, such as the studies of(Torress, D., Abramas, B., 2022; Kestin, G. & Miller, K., 2022; Kim & Sungho, 2021; Cakir, H., & Cengiz, O., 2016; Aziza, M., 2015; Hubbar, 2017; Desai & Reimers, 2018), Other studies indicate that closed questions are more effective when compared to open questions, such as the studies of (Tweissi, A., 2016; Joshi, P. & Bodkha, P,2020).

Some studies have also attempted to compare the density of implicit questions and their impact on some learning outcomes, including a study (Dieck, A, et al., 2020) which showed that high-density implicit questions enhance students' understanding and retention of information in applied electronic courses. Blasco-Arcas et al., 2013 study also showed that interactive questions

improve performance and engagement in learning, and that the density of questions affects students' interaction. On the other hand, there are those who support the single-style presentation of questions based on the cognitive load theory (Clark & Mayer, 2016; Mayer, 2009) and information processing theory. Dividing the presentation of questions and reducing their density while presenting them to students and switching between implicit questions during viewing may be a continuous memory refreshing process, which may facilitate the recall processes , This is known as the test effect (Brame, 2015). (Nazareth, A et al., 2018) believes that the multiple-choice style of presenting questions is an additional cognitive load on the learner and a confusion for him.

From the above, it is clear that there is a difference in opinions and results regarding the design of the type of implicit questions and the intensity of their presentation in adaptive electronic Assessment environments and their impact on test anxiety and electronic stress. Therefore, the current research aims to develop two types of implicit questions in adaptive electronic Assessment environments (open/closed) and their presentation density (single/multiple) and to reveal the effect of their interaction on reducing test anxiety and electronic stress among educational technology students at the Faculty of Specific Education.

Theoretical Framework

The current study attempts to examine the effectiveness of combining the type of implicit questions and the density of their presentation in an adaptive digital Assessment environment to reduce electronic stress and test anxiety among educational technology and computer students. Therefore, the theoretical framework of this research comes in three main themes as follows:

The first theme: Adaptive Digital Assessment Environment.

Adaptive digital assessment environments are digital systems that use data analytics to deliver tests or Assessments that adapt to the learner's level during the Assessment process. These environments aim to improve assessment accuracy and effectiveness by delivering questions tailored to the learner's abilities in real time.

An adaptive testing environment is a computer-based Assessment that adjusts to the examinee's abilities, where the difficulty of the questions in the test is managed according to the examinee's level . (Barrada & Olea ,2017), Using a number of algorithms, it determines the next question for the examinee. One of the simplest forms of this is that if the examinee answers the question incorrectly, he is directed to the next easier question. If the examinee answers the question correctly, he is directed to the next more difficult question (Magis, yan& Davier,2017)

Adaptive assessment environments can be employed not only to measure learning outcomes, but also to facilitate learners' retention of the material and as a motivation for students to learn and succeed, since what remains in the learner's mind are the educational situations associated with a specific stimulus, Among these educational situations are the questions that the learner is exposed to during the assessment process, as the educational material associated with these questions is fixed in the minds of the students and becomes linked to the educational situation in which the learning took place. (Raiche & Peterson, 2016).

In the same context, (Wang et al., 2016) indicate that adaptive tests represent one of the tools and capabilities that enable the learner to improve and develop his educational performance to achieve his desired goals, and that by using these tests, his self-confidence and determination to reach the highest grades increases, which leads to a reduction in the anxiety resulting from the

test.

(Aherne ,2019) confirms that adaptive electronic tests are more flexible than traditional computer-based tests, as they clearly contribute to reducing the length and time of the test to assess the performance of examinees. In addition to reducing stress, boredom, and lack of motivation, providing accurate statistical information about the examinees' performance on each item and determining the level required to be reached through the smallest number of items in the test.

The second theme: Implicit questions in the adaptive digital assessment environment:

The concept of implicit questions:

Implicit questions are defined as a set of constructive questions within digital learning environments, which the learner may answer before, during, or after learning, depending on their integration within the digital environment and the purpose of integrating the questions (Garcia-Rodicio, 2015; Kim et al, 2015; Vural, 2013)

Implicit questions are questions that test the knowledge contained within an online assessment environment. They allow students to pause and reflect on the content they have viewed. They typically do not yield grades, but they do provide students with the opportunity to practice and train before the main exam, which helps reduce test anxiety and academic stress that may affect learners when taking the main exam.(Marshall,F,B 2019)

Implicit questions are defined as a set of constructive questions, or sometimes called adjunct questions, that are integrated within digital learning environments accompanied by appropriate immediate feedback.(Kovacs,2016) defines them as short questions that appear automatically to the teacher at certain points when viewing the digital content presented to him and are corrected automatically.

Theoretical foundations supporting implicit questions in an adaptive digital assessment environment:

Implicit questions are based on a set of theoretical foundations that support their effectiveness in enhancing understanding and learning, which can be listed as follows:

Constructivist theory: This theory assumes that learning occurs best when the learner is active and constructs knowledge through interaction. Implicit questions can motivate learners to think and interact with the content presented to them rather than viewing it passively, From the perspective of constructivist theory, learning represents an interconnected and interactive network, and Assessment represents one of its tools that maintains this interconnectedness and interaction, enhances the student's role in constructing knowledge, and helps him form connections between information. Implicit questions are a form of formative Assessment that helps the learner to actively invest in the learning experience. Harris (2007) confirms that acquiring Assessment habits in learning helps students discover the content, as it does not constitute a cognitive burden on them, as much as it enables them to achieve active learning and enhances their expectations towards the content and its goals.

Cognitive load theory: This theory explains the importance of controlling cognitive load to avoid overburdening working memory. Implicit questions and their well-designed presentation density can help distribute cognitive load in an effective manner, directing learners to retrieve and process information in a variety of ways within a specific time. (Sweller, 1988), If the

density of information presented to the student and received by the temporary memory increases at the same time, this leads to an additional mental load on the student and learning may fail. Tweissi (2016) believes that fragmenting implicit questions works to reduce the cognitive load for learners.

Behavioral theory: The principles of behavioral theory are based on identifying the main learning task and then analyzing it into a set of sub-tasks. The content is formulated in a gradual manner from simple to complex. The role of performance-criteria tests comes through testing the student with different forms of questions (closed/open) in order to determine the level of achievement and learning outcomes. Finally, the student is provided with appropriate feedback, in order to determine the extent of performance improvement and identify strengths and weaknesses. Assessment is carried out in light of the educational objectives that are determined to ensure the extent of their achievement at the required level.(Cooper, J, et al., 2007)

Standards for submitting implicit questions in electronic assessment environments:

Many researchers have agreed on the criteria for designing implicit questions in electronic Assessment environments, namely Vural, 2013, (Barhoumi & Kabli, 2013; Kundi & Nawaz, 2010; Cullen & Forsyth, 2018):

- Questions should be expressive, concise, and clear, not too long or wordy.
- The number of questions should be appropriate to the length of the content presented.
- Determine the appropriate timing for questions to appear, along with the type of each question, to avoid confusion in the student's understanding of the information and its arrangement within their cognitive structure.
- Choose the type of questions to suit the nature of the educational content to be delivered to the student, whether it involves knowledge, concepts, or mental skills.
- Ensure the correctness and accuracy of the linguistic formulation of the questions.
- Provide immediate feedback after the question is presented to the student.

Types of implicit questions and their classifications:

Educational literature and previous studies have focused on classifying educational questions, including the hierarchical classification based on the level of knowledge. The classification of Bloom, et al., 1956 is the most important and famous pattern in these classifications, as the cognitive levels were classified in a hierarchical manner starting from the bottom with the lower cognitive levels and including memory, understanding, and application, It moves upwards towards the higher cognitive levels, which include analysis, synthesis and assessment. On the other hand, others classified questions on non-hierarchical bases. (Minor, 1966) classified questions into two types: real questions and synthetic questions. (Nystrand & Gamoran, 1997) classified them into real questions and multiple-choice questions, According to the type of knowledge, (Papadopoulou & Palaigeorgiou, 2016) classified it into conceptual questions, procedural questions, and inductive questions.

Szöllősi (2019) showed in his study that there is a scarcity regarding the type of questions that are most effective, and given that the specific types of questions posed may have a significant impact on knowledge acquisition, it is therefore necessary to pay attention to the design of implicit questions within adaptive electronic Assessment environments.

Implicit questions are classified into three new and different types: implicit questions that introduce content, i.e., compensatory implicit questions, implicit questions that enhance learning, and implicit questions that highlight and repeat important parts of the content (Sorva,J & Sirkiä,T ,2015). (Festo,k, 2016) classifies them into open and closed questions. Closed questions are those questions that have a single, specific, and fixed correct answer that the learner is expected to have been exposed to previously during the learning process. Closed questions are characterized by ease of answering, objectivity, and speed of correction. They can also be corrected automatically if they are included within an electronic learning environment. There are different types of closed questions, including: true/false questions, multiple-choice questions, matching questions, and reordering questions. Open questions, on the other hand, have a wide and open range of possible correct and acceptable answers, which fall under the essay question type and include short-answer questions, completion questions, and free-response questions (Hubbard, Potts & Couch, 2017). The current research relied on closed and open questions.

Closed-ended questions :are a type of question that does not allow the student to say everything he wants, as the answer is specific. Open-ended questions are a type of question that allows the examinee to answer them from any side, meaning that they provide him with more freedom to say what he wants, and do not confine him to specific answers. They give him a chance to think, and they also encourage the continuation of the discussion and to learn more about his personality, ideas and tendencies. **(**Overmyer, J. ,2015).

Closed questions are characterized by objectivity in correction, ease of answering, and the possibility of correcting them electronically without teacher intervention, Closed questions are usually used to ensure the learner's ability to remember previously learned information, and the extent of his ability to retrieve it. There are different types of closed questions, including: multiple-choice questions, true-false questions, matching questions, and reordering questions (Kim, et al., 2015; Tweissi, 2016)

Open-ended questions: A type of question with a wide, open range of possible correct and acceptable answers. They fall under the essay question category and include short-answer questions, completion questions, and free-response questions (Hubbard, et al., 2017). Open questions depend on the learner's previous experience. They give him the opportunity to express his opinion, put forward ideas, impose hypotheses, and deduce information (Blosser, 1973). Since open questions are characterized by having a wide range of expected answers, they are affected by the examiner's subjectivity. It also requires effort in correction, and depends on the students' writing skill.

Density of implicit question presentation in an adaptive digital Assessment environment:

The density of implicit questions in an adaptive digital Assessment environment is an important design variable when designing implicit questions. It refers to the number of implicit questions presented to learners at one time. The density of implicit questions in an adaptive digital Assessment environment depends on the design of the environment, its content, and the desired educational goals, The density of questions can also be determined based on the level of interaction required and the type of content. The density of questions can affect the extent of learners' interaction and understanding of the content. (Kestin and Miller ,2022)

In the context of online tests, question display density refers to how questions are presented on the screen. It affects the amount of information displayed at once and can impact the user

experience and test efficiency. Factors such as the number of questions per page, their size, layout, and the use of scrolling or numbering contribute to perceived display density. (Nazareth, A et al., 2018)

It can be argued that the density of implicit question presentation can help design more effective content that is more appropriate to the learners' needs, leading to improved learning outcomes in general. (Vondrick et al., 2013), In this contex (Koçdar ,2018) points out that one of the most important considerations that must be taken into account when designing implicit questions is the number of implicit questions (the density of implicit questions) in the in the adaptive digital assessment environment.

In this context, (Meij and Meij,2013) point out that there is a need for a delicate and effective balance in the density of questions presented, as presenting a large number of questions can be exhausting and distracting for the learner, while presenting a small number of them can be ineffective in motivating the learner. In the same context, (Koczwara, A., & Demmans Epp, C. ,2019) add that displaying more questions on a single page increases the display density. This can be helpful for quickly reading a large number of questions, but it can also increase cognitive load.

(Toepoel, V, et al., 2009) examined the effect of the number of questions displayed on a single screen on response quality and participant behavior in online surveys. They indicated that displaying many questions on a single screen increases complexity and affects survey completion rates. The results of this study directly support the idea that the density of question display (number and size of questions on the page) can affect user experience and test efficiency, (Leppink, J, et al., 2014) add that for shorter tests with relatively simple questions, it may be acceptable to use a higher display density. Longer, more complex tests may benefit from a lower display density to reduce cognitive load, On the other hand, other studies have shown that the answers should be broad and that the learner should answer multiple questions, and that one question is not sufficient. (Deng et al., 2014)

effectiveness of combining the type of implicit questions and their presentation density on reducing electronic stress and electronic test anxiety:

Test anxiety is defined as a state that a student experiences as a result of an increase in the degree of fear and tension during the test situation, and it represents a disturbance in the cognitive, emotional, and psychological aspects. (Adyin ,S, 2009)

Online exams, especially those that involve proctoring, may create a feeling of constant surveillance, which can lead to feelings of discomfort and anxiety (David G et al., 2021), Technical issues during the exam, such as internet connection problems or malfunctions in the online platform, can also cause significant stress and anxiety (Assumpta C. et al., 2022), Students may feel more anxious when taking exams in a new online environment, especially (Lee , J ,2020), The structure and format of the test (type of questions, time limits, and navigation between questions) can also contribute to online stress (Elsalem,L et al., 2020).

Creating flexible, adaptive assessment environments can help mitigate some of the negative effects of online testing (Dikmen,M ,2022), In this context (Peter A Novick , 2022) adds that carefully designed online exams, which minimize technical difficulties and allow for flexibility, can reduce student anxiety.

Some studies have attempted to compare different types of questions and their impact on some

learning outcomes, including the study by (McDermott et al., 2014) which concluded that there is no effect of the different types of implicit questions, whether closed or open, on increasing achievement and retaining learning within the virtual classroom. While the study by (Hubbard, et al., 2017) aimed to compare closed questions represented by multiple-choice and true-false questions, and open questions represented by free-response questions, and their effect on students' thinking about some specific concepts, The study indicated that students view open questions as more difficult than closed questions, and this perception may lead to increased test anxiety, which may affect students' performance.

In an adaptive digital Assessment environment, open-ended questions increase test anxiety compared to closed-ended questions, as they require more complex cognitive processing and place a greater burden on memory. Open-ended questions require formulating answers from scratch, which can lead to increased cognitive load and anxiety, especially for students prone to test anxiety. In contrast, closed questions, such as multiple-choice or true/false questions, provide more structure and may relieve the pressure associated with formulating answers, which can lead to lower anxiety levels. (Embse , V et al., 2013 ; Desai, S & Reimers, S ,2018)

Open-ended questions require students to formulate their own answers, which can be more challenging than choosing from pre-defined options. This can lead to increased cognitive load and increased anxiety, especially for students suffering from test anxiety.. (Pooja K. Agarwal, et al ., 2008) , on the other hand closed questions provide a range of options, allowing students to select the most appropriate answer. This format reduces the pressure associated with finding answers and may help reduce anxiety levels, especially for students prone to test anxiety. (Enders , N, 2020)

Online academic stress related to online exams refers to the psychological, emotional, and physical stress experienced by students due to the pressures and demands of online Assessments. It also refers to technical stress, such as internet problems and system malfunctions, and includes feelings of anxiety and stress associated with the format and demands of online exams.

Although exams are an essential part of academic life, the sheer number of questions in online exams can negatively impact students' mental health, increasing stress and anxiety. It's essential to consider the impact of exam design on students' mental health and implement strategies to mitigate its negative effects.(Deng, Y, 2022)

Online exams can exacerbate academic pressure, leading to increased stress and anxiety among students. This is due to factors such as unfamiliarity with the format and structure of online exams and potential technical issues. (Elsalem,L et al., 2020)

The question format in online tests plays a crucial role in shaping students' academic stress levels. Although open-ended questions promote deep learning, this comes at the expense of increased cognitive load, which can contribute to increased academic stress. (Desai, S& Reimers , S,2018)

The effect of question density in online tests on test anxiety is unclear. While some studies suggest that providing feedback and allowing review of answers can reduce anxiety, other studies suggest that high question density may increase anxiety due to cognitive load. Question type, student familiarity with online tests, and individual factors such as test anxiety levels also play an important role. (Cassady, J. C., & Johnson, R. E. ,2002)

The increased intensity of exam questions can significantly contribute to academic stress for

students. This stress may manifest as anxiety and difficulty concentrating, and may lead to physical symptoms. The way questions are worded also exacerbates this stress. (Basit,S ,2022)

The density of questions presented on a test affects students' anxiety. The large number of questions can increase students' feelings of pressure and stress, especially if they don't have enough time to answer them. This, in turn, can negatively impact their test performance and lead to a decline in academic achievement.(Putwain, D,2008)

The density of questions can lead to test anxiety in terms of increased psychological pressure. When students are faced with a large number of questions in a limited time, they may feel panic and confusion, which increases their level of anxiety. Severe anxiety leads to a decline in performance on the test, even if the student is well prepared, which may lead to avoiding studying in the future, which negatively affects learning in the long run.(Demir, B ,2022)

By reviewing previous studies, it becomes clear that there is a discrepancy in the results related to the design of the type of implicit questions and the density of their presentation in adaptive electronic Assessment environments and their impact on test anxiety and electronic stress. Therefore, the current research aims to develop two types of implicit questions in adaptive electronic Assessment environments (open/closed) and the density of their presentation (single/multiple) and to reveal the effect of their interaction on reducing test anxiety and electronic stress among educational technology students at the Faculty of Specific Education.

Research Problem:

The adaptive digital assessment environment is one of the most important tools used for assessment in Egyptian universities, as a result of its adoption in many universities and dependence on it completely at times, so the most effective designs must be sought when applying digital assessment environments to reduce electronic stress and minimize the anxiety of the electronic test among students, Whereas the researchers noticed through the application of many electronic tests that many students obtained scores that do not reflect their actual skills in the course as a result of inadequate test performance and dread and fear when taking electronic tests, which led to a decrease in their scores in cognitive and skill attainment, Therefore, this research investigates the best ways to conduct an adaptive digital Assessment environment by selecting the most appropriate types of questions included, as well as the intensity of their presentation to students to obtain actual scores that reflect students' abilities by reducing electronic stress and reducing test anxiety in students.

Research Objectives

- Identify design criteria to be considered when using an adaptive digital Assessment environment to evaluate students.

- Measure the impact of the implicit question type (open- closed) when using an adaptive digital Assessment environment on reducing electronic stress and electronic test anxiety among students.

- Measuring the effect of the density of implicit question presentation (single-multiple) when using an adaptive digital Assessment environment on reducing electronic stress and electronic test anxiety among students.

- Measuring the effect of the interaction between (question type/question presentation density) when using an adaptive digital Assessment environment on reducing electronic stress

and electronic test anxiety among students.

The Importance of Research

The importance of the research lies in developing new technological methods that contribute to solving many of the problems that students face when using the adaptive digital Assessment environment, which contributes to:

- Providing those responsible for designing and building an adaptive digital Assessment environment with the best types of questions, their presentation density, and methods of interaction that achieve good learning outcomes.

- Directing learning designers and developers to provide new methods based on the adaptive digital Assessment environment to address the problem of fear and anxiety and reduce electronic test anxiety.

- Helping faculty members at Egyptian universities develop an effective method for reflecting students' actual achievement and skills through electronic tests based on question types and presentation intensity appropriate to students, which will add a new dimension to learning and student Assessment.

- Helping learners improve their learning by interacting with an adaptive digital Assessment environment using design and presentation methods tailored to each student.

Research Limits

- Students of the first semester of the Department of Educational Technology and Computer Science at the Faculty of Quality Education, Kafr El-Sheikh University

- Two types of implicit questions (open - closed) in an adaptive digital Assessment environment

- Density of question presentation (single-multiple) in the adaptive digital Assessment environment.

- Measuring e-pressure and e-test anxiety in the adaptive digital Assessment environment for students.

Research Design and Participants

Research Methodology

The research uses the descriptive approach to determine the specifications and standards of the adaptive digital Assessment environment, and the quasi-experimental approach to measure the effect of the interaction between the type of implicit questions (open-closed) and the density of their presentation (single-multiple) in the adaptive digital Assessment environment on reducing electronic pressures and electronic test anxiety among students.

Experimental Design

The current research is based on the experimental design to demonstrate the effect of the independent research variables (type of implicit questions - density of presentation of implicit questions) on reducing electronic pressures and electronic test anxiety in the adaptive digital Assessment environment for educational technology and computer students. In light of the independent variables of the research, the experimental design (2 x 2) was used, and the

following table shows the experimental design of the research.

Experimental Design of the Research		
density of presentation of implicit questions	**Implicit question type**	
	open	***closed***
single	Experimental Group (1) open + single	Experimental Group (2) closed + single
Multiple	Experimental Group (3) open + Multiple	Experimental Group (4) closed + Multiple

Participants in the Research Experiment

The research sample consisted of 60 male and female students in the first year of the Department of Educational Technology, Faculty of Specific Education, Kafr elsheikh University. They were distributed into 4 homogeneous groups, with 15 students in each group, as follows:

- The first group: uses the implicit (open) question type and the presentation density (single) when using electronic tests.

- The second group: uses the implicit (closed) question type and the presentation density (single) when using electronic tests.

- The third group: Uses the implicit question type (open) and the frequency of their presentation (multiple) when using electronic tests.

- The fourth group: Uses the implicit question type (closed) and the frequency of their presentation (multiple) when using electronic tests.

Search Tools

- An electronic stress scale for university students.

- An electronic test anxiety scale for university students.

- An adaptive digital Assessment environment, consisting of an electronic platform containing an electronic testing system that constructs questions based on research variables. The Moodle learning management system was used.

Research Hypotheses

1- There are statistically significant differences at a significance level of ($\alpha \geq 0.05$) between the mean scores of the experimental groups that used implicit question types (open-ended - closed) in an adaptive digital Assessment environment to reduce electronic stress.

2- There are statistically significant differences at a significance level of ($0.05 \geq \alpha$) between the average scores of the experimental groups that use the density of implicit question presentation (single-multiple) in the adaptive digital Assessment environment to reduce electronic pressures.

3- There are statistically significant differences at a significance level of ($0.05 \geq \alpha$) between the average scores of the four experimental groups due to the effect of the interaction between the type of implicit questions (open - closed) and the density of their presentation (single - multiple)

in the adaptive digital Assessment environment on reducing electronic pressures.

4- There are statistically significant differences at a significance level of ($0.05 \geq \alpha$) between the average scores of the experimental groups that use the implicit question type (open - closed) in the adaptive digital Assessment environment to reduce electronic test anxiety.

5- There are statistically significant differences at a significance level of ($0.05 \geq \alpha$) between the average scores of the experimental groups that use the density of implicit question presentation (single-multiple) in the adaptive digital Assessment environment to reduce electronic test anxiety.

6- There are statistically significant differences at a significance level of ($0.05 \geq \alpha$) between the average scores of the four experimental groups due to the effect of the interaction between the type of implicit questions (open - closed) and the density of their presentation (single - multiple) in the adaptive digital Assessment environment on reducing electronic test anxiety.

Search Procedures

First: The Preparation and Equipment Stage

Defining the Educational Content

Based on the general objectives of the Educational Audio Recordings course for first-year students in the Department of Educational Technology and Computer Science at the Faculty of Specific Education, Kafr Elsheikh University, the academic content was defined, tests were prepared, and questions were answered to assess students' mastery of the subject matter.

Digital Assessment Timeline

A digital Assessment timeline has been set based on the study plan after each course section and a final exam. Each student is notified of the digital Assessment date.

Introduction (Introductory Lecture)

This step aims to prepare students for adaptive digital Assessment through an introductory lecture on what is required of them during the Assessment. This is to prevent any electronic pressure or anxiety that may result from the learning management system used and affect research results. The lecture covered the following:

- Explaining the nature and requirements of online tests to students.

- Guiding students on how to use the Moodle learning management system and access the online test.

- Scheduling the online test for the course through the website's control panel.

- Explaining how to navigate, answer, and submit questions correctly on the Moodle digital Assessment environment.

Defining and Selecting Experimental Groups.

The electronic stress and electronic test anxiety scale was administered to a large number of first-year students in the Department of Educational Technology and Computer Science at the Faculty of Specific Education, Kafr Elsheikh University. Only 60 students with high scores on the scale and very high or high levels of electronic stress and electronic test anxiety were selected, The students were distributed into four main groups, with 15 students in each group,

so that the average scores on the electronic stress scale and electronic test anxiety for the groups would be homogeneous and equivalent, as any subsequent decrease in the level of any group was due to the influence of the research variables.

Second: Design and Production Phase

Building the Adaptive Digital Assessment Environment

The adaptive digital Assessment environment was built using the Moodle educational content management system, which enables the publishing of course content and includes an electronic testing system adapted to the research variables, It allows designing different types of questions such as (multiple choice - true or false - matching - short answer - numeric - essay - embedded answers and fill-in-the-blank - etc....) as in Figure 1, and it allows setting up the electronic test by displaying questions in more than one way such as (each question on a page - a group of questions on a page).

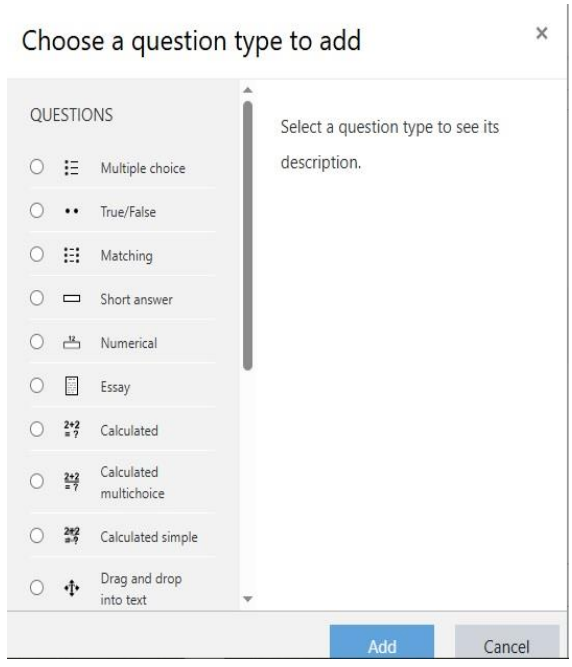

Figure 1 : Types of questions in Moodle

Student Registration on the Moodle Learning Management System

The data of the 60 students in the research sample was registered on the learning management system (LMS) in the adaptive digital Assessment environment, with a username and password for each student, as shown in Figure 2.

Figure 2 : System login window

Dividing Students into Groups Based on Research Variables

After registering, students were classified into four groups on the learning management system based on the research variables, as follows:

- Group No. (1): 15 students were provided with an adaptive digital Assessment environment based on the type of implicit questions (open) and the density of question presentation (single).

- Classification No. (2): 15 students will have access to an adaptive digital Assessment environment based on the type of implicit questions (open) and the density of questions presentation (multiple).

- Classification No. (3): 15 students will have access to an adaptive digital Assessment environment based on the type of implicit questions (closed) and the density of questions presentation (single).

- Classification No. (4): 15 students will have access to an adaptive digital Assessment environment based on the type of implicit questions (closed) and the density of questions presentation (multiple).

Building Digital Assessment Questions on the System

Implicit questions were provided based on the research variables in the digital Assessment environment as follows:

- Question type (open): This refers to essay questions and fill-in-the-blank questions. These are questions that do not contain tests and the student must write the answer. Questions of the type (essay - included answers and fill-in-the-blank) were used as in Figures 3, 4, 7, and 8.

- Question type (closed): These are questions that specify the answer through choices, and the student is not required to write the answer. Multiple-choice questions (true or false) were used, as in Figures 5, 6, 9, and 10.

- Question presentation density (single): This means displaying only one question on the page, and moving on to the next question on another page. As in Figures 3, 4, 5, and 6.

- Question presentation density (multiple): This means displaying a group of questions on one page and moving to another group of questions on a second page, as in Figures 7, 8, 9, 10.

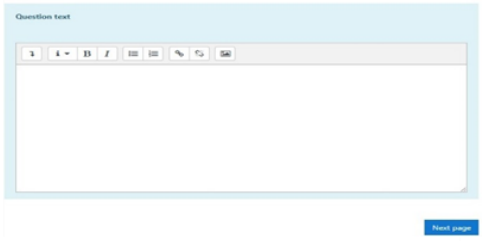

Figure 3 : Single open question Essay

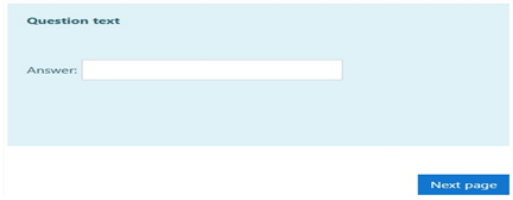

Figure 4 : Single open question Embedded answers (Cloze)

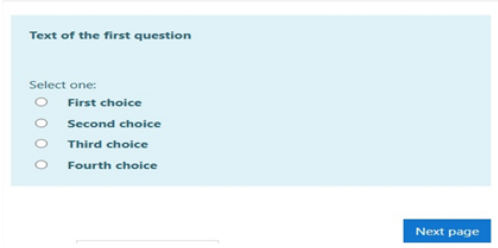

Figure 5 : Single closed question Multiple choice

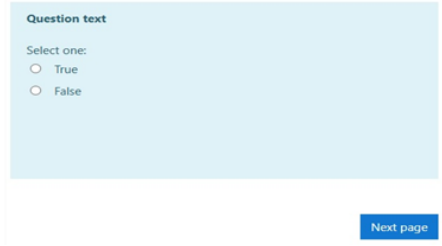

Figure 6 : Single closed question True or

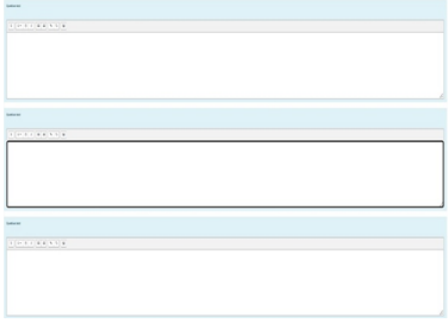

Figure 7 : Multiple open question Essay

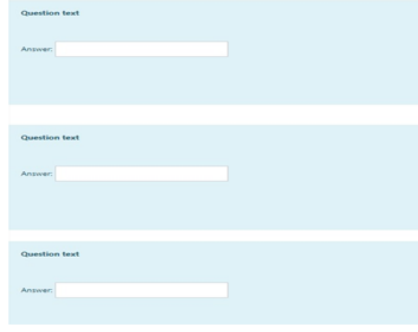

Figure 8 : Multiple open question Embedded answers (Cloze)

Figure 9: Multiple closed question Multiple

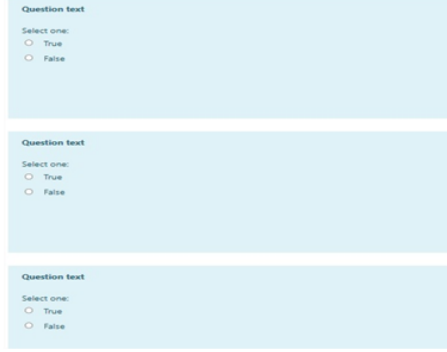

Figure 10 : Multiple closed question True or false

1- Electronic Stress Scale in Digital Assessment Environment

The purpose of the scale is to measure the level of Stress that students are exposed to while taking electronic tests. It refers to the pressures resulting from using the digital Assessment environment and determining the level and nature of these Stress: psychological, technical, organizational and design. A special scale was built to measure the pressures associated with electronic tests, Based on modern educational literature and previous studies that addressed the psychological pressures associated with the use of e-learning environments and digital Assessment, the scale included 20 statements distributed over four dimensions (technical, psychological, organizational, design), which were answered according to a five-point Likert scale as follows: (1 = strongly disagree) (2 = disagree) (3 = neutral) (4 = agree) (5 = strongly agree)

Scale dimensions: 20 statements distributed across four dimensions as follows:

1- technique Stress (internet problems, system malfunctions)

2- Psychological Stress associated with the unconventional environment (lack of supervision, fear of cheating)

3- Time and organizational pressures (limited time, navigating between questions)

4- Stress resulting from the electronic design of the test (number of questions per page, difficulty navigating)

Interpretation of results: After adding the scores, the total score on the scale ranges from 20 to 100. Stress levels are interpreted as follows:

- 20 – 39: Very low
- 40 – 59: Moderate
- 60 – 79: High
- 80 – 100 : Very high

1- Electronic Test Anxiety Scale

The purpose of the scale is to measure students' anxiety during electronic tests, in terms of psychological, physical, and digital environmental aspects. The test anxiety scale was constructed based on modern educational and psychological literature and previous studies, taking into account the characteristics of the digital Assessment environment. The scale consists of 18 items distributed across three dimensions: Cognitive anxiety, somatic/emotional anxiety, and digital environment anxiety. A five-point Likert scale was used to assess the level of the scale (1 = strongly disagree), (2 = disagree), (3 = neutral), (4 = agree), (5 = strongly agree).

Scale dimensions: 18 statements distributed across three dimensions.

1- Cognitive anxiety: 6 statements about negative thoughts and anticipation of failure.

2- Somatic/emotional anxiety: 6 statements about physical tension during performance.

3- Digital environment anxiety (digital contextual anxiety): 6 statements about tension resulting from the internet, the system, and the platform.

Interpretation of the results: After adding the scores, the total score for the scale ranges from 18 to 90, and the anxiety level is interpreted as follows:

- 18 – 35: Very low
- 36 – 54: Moderate
- 55 – 72: High
- 73 – 90 : Very high

Third: The research experiment implementation stage

Pre-assessment of research tools

1- Electronic Stress Scale

The electronic stress scale was applied pre-tested on the research sample before they were exposed to the basic research variables in order to ensure that all experimental groups were homogeneous and the level of electronic stress was equal. This is evident from the average scores of the scale for each group, as shown in the results of Table 1, which shows the level of electronic stress, which is high and close for all groups, as it reached approximately 78 degrees, which is a high value ,. To verify the absence of differences between the pre-electronic stress scale scores, the On Way ANOVA test was applied, as shown in the results of Table 2.

Group	N	Mean	Std. Deviation	Minimum	Maximum
1.00	15	78.6667	9.34778	65.00	92.00
2.00	15	78.5333	8.88712	65.00	92.00
3.00	15	78.8667	9.78239	65.00	94.00
4.00	15	78.9333	10.61311	64.00	95.00
Total	60	78.7500	9.43061	64.00	95.00

Table 1: Students' Mean Scores on the Pre-Electronic Stress Scale

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.517	3	.506	.005	.999
Within Groups	5245.733	56	93.674		
Total	5247.250	59			

Table 2

ANOVA

Differences between students' scores on the pre-electronic stress

The results in Table 2. show that there are no statistically significant differences at the level of ($\alpha = 0.05$) between the experimental research groups, which indicates the homogeneity of the participating students in groups of electronic pressures, and that the differences that appear later for electronic pressures are due to the effect of the independent variables of the research.

2-Electronic Test Anxiety Scale

The electronic test anxiety scale was applied pre-test to the research sample before they were exposed to the basic research variables in order to ensure that all experimental groups were homogeneous and that the level of electronic test anxiety was equal. This is evident from the average scores of the scale for each group, as shown in the results of Table 3. , Which shows the level of electronic test anxiety, which is high and close to all groups, as it reached approximately 71 degrees, which is a high value. To verify the absence of differences between the degrees of the pre-electronic test anxiety scale, the On Way ANOVA test was applied, as shown in the results of Table 4.

Group	N	Mean	Std. Deviation	Minimum	Maximum
1.00	15	71.4000	6.94674	60.00	81.00
2.00	15	71.2000	6.30419	64.00	80.00
3.00	15	71.8000	6.31551	64.00	83.00
4.00	15	71.6000	5.76690	64.00	82.00
Total	60	71.5000	6.18774	60.00	83.00

Table 3

Student mean scores on the pre-electronic test anxiety scale

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.000	3	1.000	.025	.995
Within Groups	2256.000	56	40.286		
Total	2259.000	59			

Table 4

ANOVA

Differences between students' scores on the pre-electronic test anxiety scale

The results in Table 4 show that there are no statistically significant differences at the level of ($\alpha = 0.05$) between the experimental research groups, which indicates the homogeneity of the participating students in terms of electronic test anxiety, and that the differences that appear later in electronic test anxiety are due to the effect of the independent variables of the research.

Research Results and Discussion

1- Presentation of Results on Electronic Stress

The average scores on the post-test electronic stress scale were calculated for each experimental group, with the two independent variables identified: the type of implicit questions (open/closed) and the intensity of their presentation (single/multiple). The results are shown in Table 5.

question type	presentation questions	group	N	Mean	Std. Error	95% Confidence Interval	
						Lower Bound	Upper Bound
Open	single	1	15	43.600	1.367	40.861	46.339
	multiple	2	15	50.800	1.367	48.061	53.539
Closed	single	3	15	39.200	1.367	36.461	41.939
	multiple	4	15	39.400	1.367	36.661	42.139

Tabel 5

Average scores for the post-electronic stress scale for each experimental group

The previous results show a difference between the average scores within the four experimental groups according to the independent research variables, which requires conducting various statistical analyses and ensuring the existence of statistically significant differences and proving the validity of the research hypotheses related to electronic pressures.

Therefore, a two-way analysis of variance test was applied between the students' scores in the dimensional electronic stress scale to show the statistical differences in the research variables, the type of implicit questions (open/closed) and the density of their presentation (single/multiple), as well as to show the interaction between the variables. Table 6 shows the results.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1325.250[a]	3	441.750	15.757	.000
Intercept	112233.750	1	112233.750	4003.242	.000
question type	936.150	1	936.150	33.391	.000
presentation questions	205.350	1	205.350	7.325	.009
question type * presentation questions	183.750	1	183.750	6.554	.013
Error	1570.000	56	28.036		
Total	115129.000	60			
Corrected Total	2895.250	59			

Table 6

Two-way analysis of variance between

students' scores on the post-electronic stress scale

Hypothesis No. (1): "There are statistically significant differences at a significance level of ($0.05 \geq \alpha$) between the average scores of the experimental groups that use the type of implicit questions (open - closed) in the adaptive digital Assessment environment to reduce electronic pressures".

From the results of the previous Table 6, it is shown that the significance is significant when 0.01 is presented in the first variable, the type of questions, with a degree of freedom of (1), which indicates the presence of significant differences between the averages of the entrance scale for the experimental groups that use the type of implicit questions (open/closed), To determine the direction of the hypothesis, the averages of the groups that used the type of

questions (open) with 30 students and the type of questions (closed) with 30 students were calculated, regardless of the other variable, as shown in Table 7.

question type	N	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
open	30	47.200	.967	45.263	49.137
closed	30	39.300	.967	37.363	41.237

Table 7

Average scores of the post-test electronic stress scale

in the type of questions (open/closed)

From the results of Table 7, it is clear that the type of questions (closed) has the lowest average score of (39.3), which indicates the level of electronic pressures (very low), the type of questions (open) has an average score of (47.2), the level of electronic pressures (medium), and this confirms that the type of questions (closed) leads to a significant reduction in electronic pressures in the adaptive digital Assessment environment for students.

Based on the previous result, hypothesis No. (1) was accepted and the direction of the difference was determined, which is: "There are statistically significant differences at a significance level of ($0.05 \geq \alpha$) between the average scores of the experimental groups that use the type of implicit questions (open - closed) in the adaptive digital Assessment environment to reduce electronic pressures in favor of the experimental groups that use the type of implicit questions (closed)".

Hypothesis No. (2): "There are statistically significant differences at a significance level of ($0.05 \geq \alpha$) between the average scores of the experimental groups that use the density of implicit question presentation (single-multiple) in the adaptive digital Assessment environment to reduce electronic pressures."

From the results of the previous Table 6, it is clear that the significance level is significant at the 0.01 level in the second variable, the density of the questions' presentation, with a degree of freedom of (1), which indicates the presence of significant differences between the average scores of the post-electronic stress scale for the experimental groups that use the density of the questions' presentation (single/multiple), To determine the direction of the hypothesis, the averages of the groups using the question display density (single) with 30 students and the question display density (multiple) with 30 students were calculated, regardless of the other variable, as shown in Table 8.

presentation questions	N	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
single	30	41.400	.967	39.463	43.337
multiple	30	45.100	.967	43.163	47.037

Table 8

Average scores of the post-test electronic stress scale

in question presentation density (single/multiple)

From the results of Table 8, it is clear that the density of question presentation (single) has the

lowest average score with a value of (41.4), which indicates a very low level of electronic pressure. The density of question presentation (multiple) has an average score with a value of (45.1), and a medium level of electronic pressure. This confirms that the density of question presentation (single) leads to a significant reduction in electronic pressure in the adaptive digital Assessment environment for students.

Based on the previous result, hypothesis No. (2) was accepted and the direction of the difference was determined, which is: "There are statistically significant differences at a significance level of ($0.05 \geq \alpha$) between the average scores of the experimental groups that use the density of the implicit questions presentation (single - multiple) in the adaptive digital Assessment environment to reduce electronic pressures in favor of the experimental groups that use the density of the implicit questions presentation (single)".

Hypothesis No. (3): "There are statistically significant differences at a significance level of ($0.05 \geq \alpha$) between the average scores of the four experimental groups due to the effect of the interaction between the type of implicit questions (open - closed) and the density of their presentation (single - multiple) in the adaptive digital Assessment environment on reducing electronic pressures".

From the results of the previous Table 6, it is clear that the level of significance is significant at the 0.01 level in the interaction between the first variable (type of questions) and the second variable (intensity of displaying questions) with a degree of freedom of (1), which indicates the presence of significant differences between the average scores of the post-electronic stress scale for the four experimental groups that use the interaction between the two variables, To determine the direction of the interaction, the average scores of the electronic pressure scale were calculated for each experimental group, and then the level of electronic pressure for each group was calculated as shown in Table 5.

question type	presentation questions	group	N	Mean	Level of Electronic stress
open	single	1	15	43.600	medium
	multiple	2	15	50.800	medium
closed	single	3	15	39.200	Very low
	multiple	4	15	39.400	Very low

Table 9

Electronic stress level for each experimental group

From the results of Table 9, it is clear that the experimental group that uses the type of questions (closed) with the density of the questions' presentation (single) has the lowest average score with a value of (39.4), which indicates the level of electronic pressures (very low), and this confirms that the use of the type of questions (closed) with the density of the questions' presentation (single) leads to a significant reduction in the electronic pressures in the adaptive digital Assessment environment for students.

Based on the previous result, hypothesis No. (3) was accepted and the direction of the interaction was determined, i.e.: "There are statistically significant differences at a significance level of ($0.05 \geq \alpha$) between the average scores of the four experimental groups due to the effect of the

interaction between the type of implicit questions (open - closed) and the density of their presentation (single - multiple) in the adaptive digital Assessment environment on reducing electronic pressures in favor of the interaction between the type of questions (closed) and the density of their presentation (single)".

2- Presentation of Results on electronic test anxiety scale

The average scores for the post-test anxiety scale were calculated for each experimental group, with the two independent variables identified: the type of implicit questions (open/closed) and the intensity of their presentation (single/multiple). The results are shown in Table 10.

question type	presentation questions	group	N	Mean	Std. Error	95% Confidence Interval	
						Lower Bound	Upper Bound
open	single	1	15	38.800	1.225	36.346	41.254
	multiple	2	15	45.400	1.225	42.946	47.854
closed	single	3	15	34.800	1.225	32.346	37.254
	multiple	4	15	36.200	1.225	33.746	38.654

Table 10

Average scores for the post-electronic test anxiety scale for each experimental group

The previous results show a difference between the average scores within the four experimental groups according to the independent research variables, which requires conducting various statistical analyses and ensuring the existence of statistically significant differences and proving the validity of the research hypotheses related to electronic test anxiety.

A two-way analysis of variance test was applied between the students' scores in the post-electronic test anxiety scale to show the statistical differences in the research variables, the type of implicit questions (open/closed) and the density of their presentation (single/multiple), as well as to show the interaction between the two variables. Table 11 shows the results.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	994.800[a]	3	331.600	14.728	.000
Intercept	90326.400	1	90326.400	4011.959	.000
question type	653.400	1	653.400	29.022	.000
presentation questions	240.000	1	240.000	10.660	.002
question type * presentation questions	101.400	1	101.400	4.504	.038
Error	1260.800	56	22.514		
Total	92582.000	60			
Corrected Total	2255.600	59			

Table 11

Two-way analysis of variance between students' scores on the post-electronic test anxiety scale

Hypotheses No. (4): There are statistically significant differences at a significance level of ($0.05 \geq \alpha$) between the average scores of the experimental groups that use the type of implicit questions (open - closed) in the adaptive digital Assessment environment to reduce electronic test anxiety.

From the results of the previous Table 11, it is clear that the level of significance is significant at the 0.01 level in the first variable, the type of questions, with a degree of freedom of (1), which indicates the presence of significant differences between the average scores of the post-electronic test anxiety scale for the experimental groups that use the implicit type of questions (open/closed). To determine the direction of the hypothesis, the averages of the groups that used the type of questions (open) with 30 students and the type of questions (closed) with 30 students were calculated, regardless of the other variable, as shown in Table 12.

question type	N	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
open	30	42.100	.866	40.365	43.835
closed	30	35.500	.866	33.765	37.235

Table 12

Average scores of the post-electronic test anxiety scale in question types (open/closed)

From the results of Table 11, it is clear that the type of questions (closed) has the lowest average score with a value of (35.5), which indicates a very low level of electronic test anxiety. The type of questions (open) has an average score with a value of (42.1), and a medium level of electronic test anxiety. This confirms that the type of questions (closed) leads to a significant reduction in electronic test anxiety in the adaptive digital Assessment environment for students.

Based on the previous result, hypothesis No. (2) was accepted and the direction of the difference was determined, which is: "There are statistically significant differences at a significance level of ($0.05 \geq \alpha$) between the average scores of the experimental groups that use the implicit question type (open - closed) in the adaptive digital Assessment environment to reduce electronic test anxiety in favor of the experimental groups that use the implicit question type (closed)".

Hypothesis No. (5): "There are statistically significant differences at a significance level of ($0.05 \geq \alpha$) between the average scores of the experimental groups that use the density of implicit question presentation (single-multiple) in the adaptive digital Assessment environment to reduce electronic test anxiety."

From the results of the previous Table 11, it is clear that the significance level is significant at the 0.01 level in the second variable, the density of question presentation, with a degree of freedom of (1), which indicates the presence of significant differences between the average scores of the post-electronic test anxiety scale for the experimental groups that use density of question presentation (single/multiple). To determine the direction of the hypothesis, the averages of the groups using the question display density (single) with 30 students and the question display density (multiple) with 30 students were calculated, regardless of the other variable, as shown in Table 13.

presentation questions	N	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
single	30	36.800	.866	35.065	38.535
multiple	30	40.800	.866	39.065	42.535

Table 13

Average scores of the post-electronic test anxiety scale in question presentation density (single/multiple)

From the results of Table 13, it is clear that the density of question presentation (single) has the lowest average score with a value of (36.8), which indicates a level of electronic test anxiety (low), the density of question presentation (multiple) has an average score with a value of (40.8), and the level of electronic test anxiety (medium), which confirms that the density of question presentation (single) leads to a significant reduction in electronic test anxiety in the adaptive digital Assessment environment for students.

Based on the previous result, hypothesis No. (5) was accepted and the direction of the difference was determined, which is: "There are statistically significant differences at a significance level of ($0.05 \geq \alpha$) between the average scores of the experimental groups that use the density of implicit questions presentation (single - multiple) in the adaptive digital Assessment environment to reduce electronic test anxiety in favor of the experimental groups that use the density of implicit questions presentation (single)".

Hypothesis No. (6): "There are statistically significant differences at a significance level of ($0.05 \geq \alpha$) between the average scores of the four experimental groups due to the effect of the interaction between the type of implicit questions (open - closed) and the density of their presentation (single - multiple) in the adaptive digital Assessment environment on reducing electronic test anxiety".

From the results of the previous Table 11, it is clear that the level of significance is significant at the 0.01 level in the interaction between the first variable (type of questions) and the second variable (intensity of displaying questions) with a degree of freedom of (1), which indicates the presence of significant differences between the average scores of the post-electronic test anxiety scale for the four experimental groups that use the interaction between the two variables. To determine the direction of the interaction, the average scores of the electronic test anxiety scale were calculated for each experimental group, followed by the level of electronic test anxiety for each group, as shown in Table 14.

question type	**presentation questions**	**group**	**N**	**Mean**	**Level of electronic test anxiety**
open	**single**	1	15	38.800	medium
	multiple	2	15	45.400	medium
closed	**single**	3	15	34.800	Very low
	multiple	4	15	36.200	medium

Table 14

Electronic test anxiety level for each experimental group

From the results of Table 14, it is clear that the experimental group that uses the type of questions (closed) with the density of the questions' presentation (single) has the lowest average score with a value of (34.8), which indicates a level of electronic test anxiety (very low), and this confirms that the use of the type of questions (closed) with the density of the questions' presentation (single) leads to a significant reduction in electronic test anxiety in the adaptive

digital Assessment environment for students.

Based on the previous result, hypothesis No. (6) was accepted and the direction of the interaction was determined, i.e.: "There are statistically significant differences at a significance level of ($0.05 \geq \alpha$) between the average scores of the four experimental groups due to the effect of the interaction between the type of implicit questions (open - closed) and the density of their presentation (single - multiple) in the adaptive digital Assessment environment on reducing electronic test anxiety in favor of the interaction between the type of questions (closed) and the density of their presentation (single)".

Discussion

The preceding analysis has provided a comprehensive exploration of the impact of Implicit questions in adaptive electronic Assessment environments (open/closed) and their presentation density (single/multiple) and revealing the effect of their interaction on reducing test anxiety and electronic stress among educational technology students at the College of Specific Education. This discussion aims to synthesize and interpret the findings, shedding light on the implications of the results, The effectiveness of combining the type of implicit questions and their presentation density, and the potential avenues for future research and interventions, By critically examining the statistical outcomes and considering the broader context, this discussion seeks to contribute to the understanding of how does the combination of implicit question type and presentation intensity affect test anxiety and online academic stress, Providing valuable insights for educators, researchers and practitioners in the field of education.

The main aim of this study was to evaluate the effectiveness of combining the type of implicit questions and their presentation density in an adaptive digital Assessment environment on reducing electronic stress and electronic test anxiety among educational technology and computer students, Various educational design models were reviewed to choose the best stages for conducting the research experiment, including the analysis, design, production, assessment and application stages. This is to study the characteristics of learners, formulate objectives for scientific content and activities, and implement the research experience, The results of the research found that the combination of the type of implicit questions (open-closed) and the density of their presentation (single-multiple) in the adaptive digital Assessment environment reduces electronic pressures and electronic test anxiety in favor of the interaction between the type of questions (closed) and the density of their presentation (single).

Researchers attribute this result to the fact that presenting a single question can help direct learners' attention to a specific point and prevent them from becoming distracted, and gives learners the opportunity to think more deeply about the subject of the question. On the other hand, increasing the density of presenting multiple questions can be exhausting for the learner if the questions are too numerous and not distributed appropriately, which leads to a negative impact on the learner, The increased number of exam questions can create a sense of increased workload, which can leave students feeling overwhelmed and stressed. This can lead to concerns about time management and their ability to successfully complete the exam, Closed questions provide a range of options, allowing students to select the most appropriate answer. This format reduces the pressure associated with finding answers and may contribute to lowering anxiety levels, especially for students prone to test anxiety.

The results of this study are consistent with the study of (Natalie Enders , 2020) , (Embse , V et al., 2013 ; Desai, S & Reimers, S ,2018), (Cassady, J. C., & Johnson, R. E. ,2002) , The results

of the study are also consistent with what was reviewed in the constructivist and behavioral educational theories, In short, the large number of questions in online exams can negatively impact students' mental health, increasing stress and anxiety. Open-ended questions can also increase students' anxiety, as students need to retrieve information from memory, organize their thoughts, and construct coherent answers. This increased cognitive load may contribute to increased anxiety levels.

Conclusion

In conclusion, this research illuminates the profound influence of the effectiveness of combining the type of implicit questions (open/closed) and the density of question presentation (single/multiple) in an adaptive digital Assessment environment to reduce electronic stress and reduce electronic test anxiety among educational technology and computer students. To achieve this goal, a digital Assessment environment was applied to the research sample, which consisted of (60) first-year students in the Department of Educational Technology and Computer Science at the Faculty of Specific Education, Kafr Elsheikh University. They were distributed into four main groups, each group having (15) students, A group using the implicit question type (open) and the presentation density (single), a group using the implicit question type (closed) and the presentation density (single), a group using the implicit question type (open) and the presentation density (multiple), and a group using the implicit question type (closed) and the presentation density (multiple) when using electronic tests, according to the variables of the current research.

The electronic stress and electronic test anxiety scale was applied pre-test to the research sample, to know the level of students, and these scales were applied post-test to the students. The results indicated that the combination of the type of implicit questions (open-closed) and the density of their presentation (single-multiple) in the adaptive digital Assessment environment reduced electronic stress and electronic test anxiety in favor of the interaction between the type of questions (closed) and the density of their presentation (single-multiple).

This research ultimately concludes that by using This research finally concludes that by applying the interaction between the type of questions (closed) and the density of the presentation of questions (single) in the adaptive digital Assessment environment, it helped learners to evaluate their understanding and monitor their progress continuously, which enhances self-organized and self-directed learning and increases their ability to learn independently, which leads to reducing test anxiety and alleviating electronic pressures on the learner.

Recommendations and Further Research:

First: At the level of educational practices

- Design adaptive digital Assessment environments that include a variety of implicit questions (open, multiple-choice, supplementary, etc.) while controlling their density based on the nature of the content and student level.

- Apply moderate densities of implicit questions within interactive content to avoid cognitive stress, especially in technical subjects such as computer science.

- Integrate implicit questions at planned times during digital content presentations to enhance interaction and reduce stress resulting from surprise Assessment.

- Customize flexible adaptive levels based on student responses, which reduces the psychological stress associated with constant test difficulty.

Second: At the level of teachers and digital content designers:

- Train teachers and designers to use strategies that combine question types and density to achieve a balance between assessing understanding and reducing anxiety.

- Analyze data on student interactions with implicit questions to determine the most effective types in reducing stress and improving performance.

- Moving away from a high density of questions that are directly evaluative in content, and instead relying on gradual, exploratory questions.

Third: At the educational policy level,

- Integrate psychological measurement tools (such as anxiety and online stress) into digital education platforms to monitor the psychological effects of online Assessment.

- Reconsider digital Assessment methods so that they focus not only on cognitive performance but also take into account the learner's mental health.

- Encourage further empirical research on the effectiveness of digital Assessment components (such as question type, timing, format, etc.) in reducing psychological stress.

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