The effect of the use of an educational software based on the strategy of artificial intelligence on students' achievement and their attitudes towards it

Mohammed A. Alomari[a*] and Manar Omar Jabr[b]

[a]Associate Professor of Teaching Techniques, Yarmouk University, Jordan
[b]Ministry of Education, Yarmouk University, Jordan

CHRONICLE	ABSTRACT
	The study aimed to find out the effect of the use of an educational software based on the strategy of artificial intelligence on second grade students' achievement in mathematics and their attitudes towards it. A quasi-experimental curriculum was adopted, and a sample of (34) students from Tagarob International School in Irbid Qsaba Directorate of education was chosen and distributed into an experimental and control groups randomly. The results of the study revealed statistically significant differences in the post test between the mean scores of the students of the experimental group and control group in favor of the students of the experimental group. Moreover, the results revealed statistically significant differences in the experimental and control group students' attitudes also in favor of the experimental group student's attitude.

1. Introduction

Today, societies aspire to develop themselves in various fields, including education, which plays a key role in the development of nations and peoples, and education has evolved from the process of stuffing the minds of learners with information to a process through which learners are directed to different sources of knowledge to benefit from them in the areas of future life. Education is the main driver of the development of civilizations and the focus of measuring the development of societies, and one of the most important aspects and features that play an important role in the progress of people, and the upbringing of a new generation on a sophisticated and modern basis (Halaiya, 2016). Modern methods of education are an indispensable tool for development, which has led to them being included as part of teaching methods since they involve planning and evaluation of the process and implementing it as a comprehensive system. It has a fundamental role to play in enriching education, engaging all the learner's senses, leading to increased positive participation and experience (Al-Buwaihi et al., 2018). Since mathematics is an approach that influences modern changes in society, it is of great importance in providing learners with varied skills, so it is necessary to develop their learning and teaching methods, so that they could raise the level of thinking of learners and keep pace with scientific and technological advances in various fields of knowledge (Aljawarneh & Atan, 2018). Modern educational technologies supported by Artificial Intelligence have an impact on the introduction of significant changes in the organization of educational institutions, the content and methods of teaching, as well as the institution that teaches and teaching (Kamuka, 2015). Artificial Intelligence is an important area that attracts the attention of scientists and researchers, and this field has witnessed continuous developments that have achieved important implications for the future of humanity, a science focused on the design of machines that share human beings in behaviors described as intelligent, and whose applications have covered various fields of health, science, technology and social (AlSalami, 2017). After reviewing the multiple research on the use of artificial intelligence in education, he found that they were rather few and needed to highlight technological advances based on the use of a AI strategy, especially in the field of teaching (Aljawarneh & Al-

Omari, 2018).The absence of positive attitudes among learners towards mathematics and their low level of education led to a difficult formation in the way of their learning, causing them to suffer some problems in dealing with this subject, which made them face a real problem and a significant challenge (Al-Waqfi, 2015). Because of the many advantages of mathematics, many countries around the world have called for a review of their curricula, and mathematics education and learning is gradually shifting from being a recipient of information to a learner who builds his own mathematical knowledge and information and is addressed by the investor of all his cognitive and creative potential, gaining confidence in his ability (Abu Zina, 2010). Because of the change and modification, the content of the new curriculum for the basic stages has become somewhat difficult, and the concepts it contains are new and the students have not been identified. There are various uses of artificial intelligence, and one of the most important and perhaps least researched by AI experts is the educational field, especially for children (Hamdi, 2018), and Artificial Intelligence may have a role in this area. Therefore, this study seeks to reveal the impact of the use of educational software based on the Strategy of Artificial Intelligence in improving the educational achievement of students in the basic stages of the second grade in mathematics, and to develop positive trends towards them, and in light of the above the problem of the study was identified in answering the following questions: What impact does the use of a AI -based educational software have on the achievement of second-class students in mathematics teaching?

The importance of the study lies in the following: introducing the responsible authorities to the importance of using the AI strategy in the learning process, providing them with the results achieved, opening up new horizons in teaching mathematics using the AI strategy, taking care of modern and appropriate methods of teaching mathematics to increase achievement and survival, helping learners find solutions to their educational problems in their learning to mathematics through the use of a Strategy of Artificial Intelligence in, making education more enjoyable and interesting, leading to the creation of positive interaction with students and the formation of intelligent systems.

2. Literature Review

2.1 Mathematics and Direction Towards

Mathematics and its scientific contents were in the past based on a network of concepts, theories, generalizations and mathematical issues, which are in the form of systems based on close relationships gained by the power of mathematical compositions, which makes them dry and complex material, which led learners to memorize examples, trainings and theories to obtain degrees in achievement tests, so that alternative and modern teaching entries were sought to help learners build knowledge and understanding meaningfully, so that they can see the components and relationships between concepts, laws and theories, and therefore the search for alternative and modern teaching entries that help learners to build knowledge and understanding meaningfully, so that they can see the components and relationships between concepts, laws and theories to obtain degrees in achievement tests, so the learners have been sought to learn to learn from the learning stage to learn to the learner. Development, practice and addressing the challenges posed by the technological and information revolution (Bedouin, 2019). Effective teaching of mathematics contributes to the formation of positive trends towards them, and it has been found that these positive trends towards mathematics are of great importance, as it affects students' demand for mathematics, it has become certain that students with a positive orientation towards mathematics accept their studies and overcome the difficulties they may face in their study and appreciate their importance, as well as the trend reveals the extent to which students interact with learning experiences and teaching methods. Awad (2018), a consultant pediatrician, pointed out that the research team from Stanford University in the United States consisting of scientists in psychiatry and behavioral sciences was surprise in terms of the positive trend they found about the contribution of positive trends in excellence in mathematics with the contribution of IQ to excellence (Awad, 2018). Mathematics is a subject of critical importance to the learner for the development of critical thinking, and the interest in studying trends towards mathematics is not new, but in recent years it has begun to increase to include multiple aspects of trends, their relationship to achievement, the factors influencing their formation and the methods that can be followed in modifying or creating desirable new trends, and contribute to academic and professional success (Yusuf, 2018). The use of technological innovations in mathematics teaching prepares learners for a world where advanced techniques are focused and develops higher mental cognitive skills, such as problem-solving, critical thinking and data collection and analysis, and demonstrating and resolving issues, which falls within the scope of creativity and invention, as the learner, while answering questions, is interested in a creative artist practicing the pleasure and pleasure that the artist exercises in the creative process (Bedouin, 2019). The positive trend towards mathematics is of great importance, as it affects students' demand for its study, it has become certain that students with a positive attitude towards this subject accept overcome the difficulties they may face in their study as well as the extent to which students interact with learning experiences and teaching methods (Al-Sarhani, 2014). Trends provide a range of functions: providing the learner's ability to respond and make decisions, to understand the world around him, to help him achieve the desired goals, and thus to positively affect the speed and efficiency of his learning, and to be linked to his level of performance, acquired, adjustable and configurable, as well as relative stability (Abu Ghanima, 2012). The process of changing trends is influenced by a combination of factors, some of which are associated with the individual, some of which relate to the subject of the same trend, the more open the individual is to experiences, the more receptive they are to modify their attitudes and some of them are related to the subject of the same trend (Bedouin, 2019). Since this research is designed to measure achievement and trends towards mathematics using artificial intelligence, many studies have indicated a strong correlation between the trend towards mathematics and its achievement, and have shown that the trend towards mathematics is a predictor of achievement (Judah, 2017; Bayoumi, 2011; Ahmed, 2009; Squirts, 2006; Al-Omari, et al., 2020).

2.2 Artificial Intelligence

Artificial intelligence is an attempt to simulate how to use human intelligence in a particular field as well as how to understand different languages and how to recognize images and speak, which has led to the development and emergence of techniques to design software to transform computers into intelligent and experienced machines (Kazim, 2012). It is a behavior that has certain characteristics characterized software and makes it simulate human mental abilities and working patterns, the most important of which is the ability to teach, in conclusion and react to situations that are not programmed in the machine, but this term is controversial due to the lack of a specific definition of intelligence, it is a branch of computer science, and many of the literature defines it as "studying and designing intelligent customers" and a smart customer is a system that accommodates its environment and takes positions that increase its chances of success in achieving its mission or team (mission or team) (Al Qasim, 2012).

Although systems that help learners are efficient, they do not provide individual care to the learner as the natural teacher (human) does, and in order for the educational system to uniquely teach, it must think and provide flexibility in the presentation of the scientific material and a greater ability to respond to the needs of the learner, and acquire the property of intelligence through its ability to present educational decisions about how the learning process goes through as well as to acquire information about the learner's personality, and this allows for a great deal of diversity by changing the interactions of the system. With learner (Christian, 2003).

Artificial intelligence has some advantages as it uses a similar method of human problem solving, deals with hypotheses simultaneously, accurately and at high speed, and also has a specialized solution for each problem and each homogeneous category of problems but requires the representation of huge amounts of knowledge in a particular area, in addition to processing non-digital avatars through logical analysis and comparison processes and it aims to simulate the human thought and style, and works to create new ideas that lead to the representation of huge amounts of knowledge of a particular area, in addition to it processes non-digital avatars through analysis and logical comparison and that it aims to simulate the human thought and style, and works to provoke new ideas that lead to the representation of huge amounts of knowledge of a particular area, in addition to that it processes non-digital avatar data through analysis and logical comparison and that it aims to simulate the human thought and style, and works to create new ideas that lead to the representation of huge amounts of knowledge specific to a particular field (Al-Omari, et al., 2018). In addition to that it processes non-digital avatars through analysis and logical comparison and that it aims to simulate the human thought and style, and works to create new ideas that lead to the representation of huge amounts of knowledge of a particular area, in addition to it processing non-digital avatar data through analysis and logical comparison processes and that it aims to simulate the human thought and style, and works to create new ideas that lead to the representation of huge amounts of knowledge specific to a particular area, in addition to it processes non-digital avatars through The system compensates for the experts (Osman & Jamil, 2012). Artificial intelligence also has a set of features, including its ability to deal with incomplete or confirmed data and give acceptable and appropriate solutions to the situation, in addition to the method of experimental research to solve the problem by developing possibilities and hypotheses to solve the problem, which requires computer speed to study these imposed possibilities, and the ability to represent symbolic where the AI programs deal with symbols that express the information available, and also the ability to learn and this ability is one of the characteristics of intelligent behavior, so it must adopt artificial intelligence On machine learning strategies, embracing and representing knowledge, as AI programs must include a large base of knowledge that includes the link between situations and results (Al-Jazaeri, 2015). Machine learning is an essential part of artificial intelligence, but artificial intelligence is broader than machine learning since it also includes the system's ability to perceive data (such as processing natural language or recognizing sound and image) or to control, transmit and process objects based on information learned whether it's a robot or another connected device (Kaplan & Haenlein, 2019). AI is defined as "one of the modern computer sciences, which seeks sophisticated software methods to carry out work and conclusions that are similar even to the realities of those methods attributable to human intelligence, so it is a science that first examines the definition of human intelligence and its dimensions, and then simulates some of its properties" (Mahmoud & Attiat, 2006:14). Al-Ratimi (2012:3) defined it as "a branch of computer science, interested in the study and manufacture of computer systems that enable them to accomplish work that require human intelligence, as these systems are characterized by learning new concepts and tasks". It is "part of computer science that aims to design intelligent systems that give the same characteristics that we know with intelligence in human behavior, and it deliberately works on the principle of matching formations by which objects, events and processes can be described using their qualitative properties and their logical and computational relationship" (Osman & Jamil, 2012: 224). AI is defined as "a set of computer system capabilities to understand, learn, solve, interpret and implement a complex mental process" (Canbek, & Mutlu, 2016). AI is defined as "the system's ability to interpret external data correctly, learn from this data, and use that knowledge to achieve specific goals and tasks through flexible adaptation" (Kaplan & Haenlein, 2019:12).

2.3 Educational Programs

In light of the challenges facing information and communication in societies, which have contributed to the development of educational institutions, particularly with the emergence of new forms of successful rapid education systems to access to computers and their application in education and training, the educational program has an urgent need to raise student performance so that students are ready to receive and assimilate on a large scale (Hatlestad, 2007).

This development is a tremendous development in the learning system as educators have sought new ways, strategies, methods, techniques and models to meet the challenges facing the educational process in order to achieve the best results (Al Turki, 2010). What distinguishes computerized educational software of different types is that it allows the learner to learn for himself without the need for in-depth knowledge of computer science, and may be appropriate to use it to teach various scientific detectives, due to its advantages, including: speed of search for information, presentation in different forms accompanied by audio-visual effects that increase the pleasure of education, in addition to providing knowledge to the learner in an interesting and attractive way to increase his ability to persevere, follow-up and continue learning, and there are several types of educational software, including Training and training software, private teaching software (alternative teacher), simulation software, educational gaming software, and education management software.

2.4 Educational Software & Artificial Intelligence

The purpose of mentioning previous studies is to clarify what distinguishes the current study, and to identify the tools used in these studies and to benefit from them in the construction of this study, and the previous studies are presented ranked from the oldest to the most recent, in addition to knowing the most important findings and recommendations of the study, and clarifying the differences between the studies and the differentiates compared to each other. Al-Rifai (2010) conducted a study at detecting the impact of the use of software in the teaching of engineering on the achievement of seventh graders and their attitudes towards engineering, where the researcher reformulated the engineering unit for the seventh grade basic according to the computer software "Adobe Flash". The sample of the study consisted of (60) female students, and used the following tools: educational software to teach engineering for the seventh-grade basic grade, and an educational test in the engineering unit for the seventh grade, and a measure of the trends of female students towards engineering was developed. The test was applied before and after the experiment, with the results showing that computer-assisted engineering teaching was more effective in increasing the level of achievement of female students and their understanding of mathematics, and the tendency of basic seventh graders towards computer-assisted engineering. Ahmed (2013) conducted a study aimed at identifying the effectiveness of an interactive computerized educational program to address the poor achievement of fourth-grade students in the subject of regular fractures and fractional numbers in the mathematics research at UNRWA schools for Palestinian refugees in the Gaza Strip, and used the pilot method. The researcher designed the computerized educational interactive software in the subject of regular fractions and fractional numbers based on the program PowerPoint and flash, and relied on the grades of female students in the end-of-term exam to measure the level of achievement in the research sample, where he identified in its light the members of the sample that reached (60) students of low-achieving students in the fourth grade of primary. The results indicated the effectiveness of the computerized interactive educational software in addressing the weakness of primary fourth graders in the subject of fractures and fractional numbers.

In a study conducted by Al Bakr and Al-Shawa (2014) aimed at measuring the impact of the use of computerized software in the development of mathematical thinking in fifth grade students in Saudi Arabia, the researchers used the semi-experimental curriculum, and the sample of the study consisted of (55) fifth-graders who were distributed into two experimental and female groups. The result of the study showed statistically significant differences between the degrees of mathematical thinking of students in favor of the experimental group. Al-Qaisi (2015) studied the impact of training math teachers to use a proposed model in effective learning to give them some teaching skills and learning and trends of their students towards mathematics. The study recommended that teachers adopt the proposed effective learning model. Jamaan (2016) conducted a study aimed at investigating the impact of the use of computerized educational games on the achievement of third-grade students in mathematics in Jordan, where four computerized learning games were used to teach the subject of multiplication in mathematics, and a test was prepared to measure students' achievement in mathematics. The sample of the study consisted of (56) students from the third grade in the co-educational female schools of the Directorate of Education of the Northwest Badia Brigade. The results showed that third-grade students achieved better in mathematics using computerized learning games than students who studied in the usual way. Al-Salami (2017) studied the goal of introducing AI applications to support information retrieval, illustrating the features of Artificial Intelligence that distinguish it from natural intelligence, and highlighting the applications of Google to take advantage of the applications of Artificial Intelligence in enhancing information retrieval and development services, and the documentary approach was followed by reference to the intellectual production of the use of the descriptive analytical method by referencing google, and using some applications to identify the characteristics and features of Google in the application of Artificial Intelligence to retrieve either text or voice information. The results of the study indicated the expansion of the strengthening of many Google applications and services with Artificial Intelligence technologies, and the continuous development of those services in accordance with the needs of the beneficiaries. In a study conducted by Salama and Attari (2019), it was aimed at measuring the impact of the use of electronic games in developing intuitive English skills for first graders in Oman. Two community schools have been selected to use e-games for teaching. The sample of the study consisted of 40 first-graders for experimental and control groups. A test was developed to measure intuitive English language skills, and an electronic program to measure the impact of the use of electronic games in the development of intuitive English skills. Use the semi-experimental approach. The results of the study showed statistically significant differences in intuitive English language skills for female students who studied using the e-gaming program. Yesilyurt et al. (2019) conducted a meta-analysis aimed at detecting the impact of computer-based education on students' attitudes towards lessons in physics, chemistry, biology and mathematics. In this study, a series of studies conducted between 2002 and 2011, which included comparing the impact of computer-based education on student trends with normal methods, were analyzed and subjected to the upper analysis method. The results of the study showed that computer education has a significant positive

impact on students' attitudes towards lessons compared to the usual method. After reviewing previous studies, the researchers found that most of these studies are similar in the general goal and pointed to the use of modern techniques in the field of education, specifically in mathematics education, and that positive trends have a big role in raising the level of achievement in the student, and that most of these studies confirmed the existence of differences statistically significant in favor of the experimental group, which confirms the effectiveness of educational software in the educational process. The researchers found that some studies were aimed at studying trends towards different educational materials through the use of e-learning, educational blogs, educational software and educational games such as Al Bakr al-Shawa, 2014. Other studies aimed at studying student achievement in mathematics through the use of interactive educational programs and educational games such as (Ahmed, 2013; Jaman, 2016), and studies conducted to measure students' achievement and trends in mathematics through the use of computerized educational models and software (e.g. Al-Rifai, 2010; Al-Qaisi, 2015; Mahafzah et al., 2020). Studies have been conducted to measure student attitudes towards lessons through the use of computer programs in education as a study (Yesilyurt et al., 2019). Studies have been conducted to measure the impact of the use of e-learning software on the development of English language skills as a study (Salama & Attari, 2019).

This study is distinguished from previous studies [to the knowledge of researchers] that there was no study whose goal was to study the impact of the use of educational software based on the strategy of artificial intelligence in the achievement of students of the basic second class and their attitudes towards mathematics, and that it is one of the rare studies in their application of artificial intelligence methods using educational software based on the strategy of artificial intelligence in the field of education, and this is an important addition to what the intelligence carries in dealing with computers significantly.

3. Methodology

The researchers followed the semi-experimental approach to the nature of the study and its association with the human, because the schools were deliberately selected and the people were randomly distributed. The study community is made up of all the students of the second grade in the Directorate of Education for the first semester of 2019-2020. The 34 students in the second class were deliberately selected from the second graders and randomly divided into two groups, one experimental and taught using the 17 AI strategy-based educational software, and the other a female officer who was taught in the usual way. To achieve the objectives of the study, the researchers built an educational site on which the educational software was loaded to teach mathematics through it, and developed an educational test and a measure of trends. The researchers designed an educational site to teach the plural and subtraction unit within the 999 number for the second grade students basic mathematics, and designed educational software based on the strategy of artificial intelligence, and the idea of software based on providing learners with a set of educational skills to be achieved in the curriculum, by logging into the site in the user's name and password, so that each learner moves to the next stage according to his own ability, and the site puts each learner in his or her way according to the level of learning and provides feedback on the errors that occurred, And work to provide a detailed explanation and support about the skill that he erred to correct, and the educational software consisted of a set of questions and each question builds a certain skill of the study unit and in case the correct answer is moved to the next question, In the case of the wrong answer, it is converted to a detailed explanation of the skill that he erred, so that the skill is built and given to the learner correctly and then the next skill is transferred, and the educational software is prepared based on a set of stages: analysis: determining what information, skills, and directions the educational software should contain. Design: Identify educational software goals, activities and examples, specifications, image and graphic and educational strategy. Development: By making the configuration of the site before extracting the final version of it. Use: By training learners to use it, collecting aggregate calendar data. Calendar: Determine the effectiveness of the educational code through the collected results. Achievement test: The researchers selected the plural and subtraction unit within the 999 number for the basic second grade students of the basic second grade, and after analyzing the content of this unit, a table of specifications was prepared, and the ratios for each lesson were developed taking into account the number of educational goals, and the number of quotas allocated to teaching each subject as described in the teacher's guide. The objectives included the levels of the cognitive field according to Bloom's classification: knowledge, understanding, assimilation, application, analysis, composition, and evaluation, and then the researchers prepared an achievement test to measure student achievement in mathematics, and the test consisted of a set of questions of the type of choice of multiple, numbered questions, and the test paragraphs were derived from the specific objectives of the educational content of the unit chosen for teaching. The test paragraphs were distributed as in Table 1.

Table 1
Distribution of Test Paragraphs

Topics	Number of paragraphs
Combine without regrouping	4
Combine with reassembly	4
Subtraction without regrouping	3
Subtraction with regrouping	4
Total	**15**

The test was presented to a group of 7 specialists from university professors, educational supervisors, mathematics teachers, and computer engineers, with the aim of ensuring the scientific wording of vocabulary, accuracy of measurement levels, and the suitability of vocabulary, in terms of language to the level of students of the second grade basic grade. Test stability: To

ensure test stability, test-retest was verified by applying the test, and reapplied two weeks later to an out-of-school group of 15 students, and Pearson's correlation coefficient was calculated between their estimates at 0.58. The stability factor was also calculated in the internal consistency method by the Coder Richardson-20 equation, at 0.67, and these values were considered appropriate for the purposes of this study. Test correction: Test scores are set by placing one score for the correct answer on each test paragraph to become the final score of the test 15 degrees, and the minimum score for the test is zero.

Test time: The appropriate time to answer the achievement test questions was determined by calculating the average time between the time it took the fastest learner and the time it took the slowest learner, and the appropriate time was 45 minutes. Difficulty and discrimination coefficients for testing: A survey sample of 15 primary second-graders was selected from outside the study sample from the School of Educational Excellence to apply the educational software to them, where their responses were analyzed to calculate the difficulty and discrimination coefficients of the test paragraphs, where the percentage of students who answered the wrong paragraph was adopted as a difficulty factor for each of the test paragraphs, while according to the coefficient of discrimination per paragraph the corrected paragraph with the total grade, the difficulty of the paragraphs was found to be between 0.40. 0.70, discrimination transactions ranged from 0.44 to 0.74, which are acceptable. A measure of direction was developed through a review of related literature and through previous studies such as a study (Al-Rifai, 2010; Al-Qaisi, 2015; Al-Da'abseh et al., 2018; Alshare et al., 2020), with 12 paragraphs. The validity of the trend: To verify the correctness of the trend manometer, the following indicators of authenticity were extracted: the measure was presented to a group of specialists to arbitrate and measure its sincerity, in terms of wording and linguistic integrity of the questions, the clarity of the test questions, and the addition or deletion of what they deem appropriate of paragraphs in addition to any other observations they deem appropriate.

Construction sincerity: To extract the evidence of the construction sincerity of the scale, the coefficients of correlation of the scale paragraphs with the total grade were extracted in a survey sample from outside the study sample consisting of 15 students, as the correlation coefficient here is a sign of sincerity for each paragraph in the form of a coefficient of correlation between each paragraph and the total grade, and the coefficients of the correlation of paragraphs with the tool as a whole ranged from 0.44-0.91, and Table 2 shows this.

Table 2
Correlation coefficients between paragraphs and the overall degree of the trend scale

Paragraph No.	The link coefficient with the tool	Paragraph No.	The link coefficient with the tool
1	0.78**	7	0.44*
2	0.91**	8	0.75**
3	0.71**	9	0.84**
4	0.68**	10	0.86**
5	0.87**	11	0.58*
6	0.91**	12	0.73**

**Sig. = 0.01

Table 2 shows that all correlation transactions were statistically acceptable and functioning, so none of these paragraphs was deleted. Trend gauge stability: To ensure the stability of the trend emery, the test method was verified and retested, mathematical averages and standard deviations were extracted, and to show the differences between the performance of the experimental and control group, test-retest was applied by applying the scale, and reapplied two weeks later to a group outside the study sample consisting of (15) students, and then calculated Pearson coefficient between their estimates at (0.89). The stability factor was also calculated in the internal consistency manner by the Cronbach Alpha equation, which was (0.81) and these values were considered appropriate for the purposes of this study. The results of the analysis showed that the level of indication of the variable was 0.569 and compared with the level of significance was greater, i.e. that there were no statistically significant differences between the average grades of the experimental group and the students of the study group in the previous information on the unit to be studied in this experiment, which confirmed the level of the two groups, and Table 3 shows this.

Table 3
Test (T) for independent samples to compare the arithmetic average and standard deviation

Group	Number	Average arithmetic	Standard deviation	Value (t)	Sig.	Indication of differences
Experimental	17	20.8	2.9	0.569	0.577	Non-function
Control	17	20.4	2.3			

Table 3 shows that there is no statistically significant difference, which means equal to the control and experimental study groups.

4. Discussion

The study aimed to find out the impact of using educational software based on the strategy of artificial intelligence on the achievement of second-class students in the basic subject of mathematics and their orientations towards it compared to the traditional method, by answering the study questions that were asked in order.

First: Results related to the first question: What impact does the use of AI-based educational software have on the achievement of second-grade students in mathematics? To answer this question, the mathematical averages and standard deviations of the grades of the experimental group and the students of the group in charge of the attainment test were extracted, as shown in Table 4.

Table 4
Computational averages and standard deviations

Group	Number	Tribal measurement		Telemetry	
		Arithmetic medium	Standard deviation	Arithmetic medium	Standard deviation
Experimental	17	11.71	1.490	15.00	.000
The officer	17	11.53	1.940	13.24	1.033
Total	34	11.62	1. 706	14.12	1.149

It is clear from Table 4 that there is a difference between the average scoring of students in the control and experimental groups on the numerical attainment test, and indicates that the arithmetic average of the student scores of the control group was 13.24 degrees, and a standard deviation of 1.03 3, while the average score of students in the experimental group on the trial on the test was 15.00, which means that there is an apparent difference between the average of the two calculations on the trial by 1.76 degrees. To see the significance of these differences, one-way ANOVA analysis was used on students' grades in the postgraduate attainment test, bearing in mind that the student tribal grades were a common variable, as in Table 5.

Table 5
Single contrast analysis (One way ANOVA)

Source of variance	Total squares	Degrees of freedom	Average T squares	Value P	p	Eta φ2 box
Tribal measurement	2.313	1	2.313	4.862	.035	.136
Group	25.584	1	25.584	53.783	.000	.634
The error	14.746	31	.476			
Total	43.529	33				

Table 5 shows statistically significant differences at the level of significance ($\alpha=0.05$) of the value (F) (53.783) related to the effect of the teaching method in the variation of the degrees of the census at the time of the achievement test with a statistical significance (Sig. = 0.000), a statistically significant value, indicating statistically significant differences in the pedestal test among primary second-graders, due to the teaching method, and the differences were in favor of the students of the experimental group studied through the AI strategy. To find the impact of the teaching variable, Eta Square was calculated at 0.136, which is 63.4% of the variation in the performance of the study sample students on the pedestal test due to the teaching method. To ascertain who the differences were attributed, adjusted arithmetic averages and standard errors were extracted according to the group (experimental, controlled), as shown in Table 6.

Table 6
Adjusted arithmetic averages and standard errors

Group	Adjusted average	Standard error
Experimental	14.986	.167
Control	13.249	.167

The results in Table 6 indicate that the differences were in favor of the experimental group who studied using a II strategy compared to members of the control group. This finding can be explained in the light of the positive impact of the AI strategy in teaching, and this has been clearly demonstrated in increased educational attainment among learners, which confirms that cognitive excellence and increased cognitive achievement increase and be more effective when using a strategy in which the learner is at the center of the educational process and has a more positive and active role. It was found that the results of the current study were in agreement with the results of some studies aimed at studying students' achievement in mathematics through the use of interactive educational programs and educational games such as (Ahmed, 2013; Jaman, 2016), and studies conducted to measure students' achievement and trends in mathematics through the use of computerized educational models and software (Al-Rifai, 2010; Al-Qaisi, 2015; Alwagfi et al., 2020). This finding is confirmed by the fact that the presence of educational computers in the field of education has brought about qualitative changes in the ability to interact with many techniques such as image, sound and movement, all of which are integrated into educational programs in a way that increases students' interaction with the subject, and many studies have demonstrated the importance of using educational computer software in the science of education (Abu Alim, 2005; Batayneh, 2006; Al-Barakat, 2006; & Al-Bataineh, 2008; Al-Jawarneh, 2016), which noted that increased achievement is based on the psychological and mental characteristics of early childhood pupils, the acquisition of scientific concepts and the development of the scientific skills of these children depends on the effectiveness of the teaching performance of the teacher in the use of different educational techniques, as an essential component of the educational system, especially since children in the early years do not realize the abstract things. Therefore, computers and their educational software are one of the best technologies to help overcome many of the problems facing the roads Therefore, computers and their educational software are one of the best techniques to help overcome many of the problems faced by the usual methods of teaching in general, and teaching scientific subjects in particular.

Second: Results related to the second question: What are the trends of second graders who studied using AI strategy? To answer this question, mathematical averages and standard deviations of the trends of primary second-graders who studied using an AI strategy were extracted, and Table 7 illustrates this. Usual teaching in general, and teaching scientific subjects in particular.

Table 7
Computational Averages and Standard Deviations

Rank	No.	Paragraphs	Average	SD	Direction
1	4	I hope to become a future math teacher to use computers in education.	4.65	.606	High
2	5	I think math is an easy subject through a computer.	4.59	.712	High
3	2	I enjoy learning math using a computer.	4.41	.795	High
4	6	You learn the system and the order when you learn math through a computer.	4.41	.870	High
5	12	I like learning math through computers.	4.41	1.004	High
6	1	I feel the importance of using computers in mathematics.	4.29	.588	High
7	3	I study mathematics in my spare time through a computer.	4.29	1.047	High
8	9	I participate with the teacher in computer based math classes	4.24	.752	High
9	*7	I find it hard learning math using a computer.	4.18	.728	High
10	10	I solve math-related duties through the computer on my own.	4.18	.809	High
11	8	I work hard to get the highest score in computer-based math tests.	4.12	.928	High
12	*11	I'm having some problems understanding math through the computer.	3.47	.717	Medium
		All degree	4.26	.247	High

*Negative paragraph reversed

Table 7 shows that the arithmetic averages ranged from 3.47 to 4.65, with paragraph 4 stating "I wish to become a future math teacher for computer use in education" in first place with a mathematical average of 4.65, with a high rating, and paragraph 1, which states, "I feel important". The use of computers in mathematics ranked sixth with a mathematical average of 4.29, with a high rating, while paragraph 11 read "I have some problems understanding mathematics through computer" in the last place with a mathematical average of 3.47, with an average rating of 4.26. This finding can be explained in the light of the impact of the AI strategy on teaching, and this has been clearly demonstrated in the development of the positive trend among learners, confirming that the improved performance of the experimental group indicates that they are enjoying mathematics, which is one of the indicators of a positive trend towards it. This can also be attributed to the fact that students with high achievement in an educational subject have positive attitudes towards that subject, as many studies have shown (Frank et al., 2006), which showed a direct (positive) relationship between student achievement and trends, as the higher the achievement of students, the higher the positive trends. This finding confirms the study's finding that there is a direct (positive) relationship between educational attainment and trends. In addition to the above, the use of educational software based on the Strategy of Artificial Intelligence in mathematics teaching has provided the opportunity for learners to get as many illustrations and detailed explanations as possible through the images and illustrations that the learner, especially the young one, like to deal with, in order to communicate and understand the information, and also allow access to as much exercise and issues as possible, compared with the classroom and the limited amount of examples and exercises due to the limited time of class.

5. Conclusions

Through the results of this study, it was concluded that there were statistically significant differences between the average scoring grades of the tribal and the dimension group in favor of the detest since the average score of students in the pith test was greater than their average score in the tribal test. Statistically significant differences between the average scores of the numerical attainment test between the students of the control group and the experimental group in favor of the experimental group since the average scores of students in the trial group's after test were higher than the average scores of students in the control group's after-test. A positive effect of the average scoring of the trial group.

6. The limits and limitations

The limits of the study were limited to: - spatial limits: students of the basic stage in the schools of convergence international in the Directorate of Education of Irbid. Time limits: This study was conducted in the first semester of the academic year (2019/2020). Objective limits: Examining the impact of the use of artificial intelligence on students' academic achievement and trends. - The study was limited to the unit of addition and subtraction within the number (999) of the content of the mathematics book for the second-grade base.

7. Recommendations

Based on the results, the study recommends: Encouraging teachers to use AI-based software to teach mathematics and scientific subjects to primary students due to their development of academic achievement. Encourage teachers to use AI strategies in teaching because of their impact on creating positive attitudes towards these subjects.

Proposals for future research: Based on the results of the research and in the light of the recommendations made, it can be suggested: studies on the impact of the use of ai-based educational software on the achievement of students with special needs. Conduct studies on the impact of the use of AI-based educational software on aspects other than achievement and direction such as the development of the ability to solve mathematical problems. Conduct studies to identify the training needs of

teachers in the use of artificial intelligence in education. Conduct studies similar to this study but deal with different aspects in terms of: (subject, class, study stage, module).

References

Abu Alim, N. (2005). The use of computerized software in the achievement of third grade students for basic scientific concepts. Unpublished Master Thesis, College of Education, Al Al-Bayt University, Mafraq.

Abu Ghanima, E. (2012). The effect of using a proposed model based on brain-compatible learning in developing scientific concepts, critical thinking skills and the trend towards science studies for middle school students. *Arab Studies in Education and Psychology, 3*(23), 67-84.

Abu Zina, F. (2010). *School mathematics curricula and teaching.* 2nd ed., Kuwait: Dar Al-Falah.

Ahmed, A. (2009). The effectiveness of using cross-teaching strategy in developing some language skills for second-year middle school students. Unpublished Master Thesis, Faculty of Education, Assiut University, Egypt.

Ahmed, K. (2013). The effectiveness of a proposed computerized interactive education program in addressing the poor achievement of fourth-graders Basic in mathematics at UNRWA schools in Gaza. Unpublished Master Thesis, College of Education, Islamic University, Gaza.

Al-Bakr, A., & Al-Shawa, H. (2014). The effect of using computerized software on developing mathematical thinking among fifth-grade primary students in Arar. *Saudi Arabia. Educational Science Studies, 41* (1), 154-157.

Al-Barakat, A., & Al-Bataineh, R. (2008). Jordanian student teachers use of computers to develop primary stage pupil's literacy skills. *International Journal of Education and Development using Information and Communication Technology, (IJEDICT), 4*(4), 64-87.

Al-Buwaihi, R., & Al-Masry, I., Majed, A., & Al-Raheem, M. (2018). The origins of contemporary education. Cairo: House of Knowledge and Faith for publication and distribution.

Al-Da'abseh, T., Aljawarneh, N., & Shwiyat, Z. (2018). Marketing mix strategies and its impact on organizational performance efficiency in the Jordanian company for investment and supply-safeway: An Empirical Study. *Invention Journal of Research Technology in Engineering & Management*, *2*(2), 14-23.

Al-Jawarneh, N. M. S (2016). Case study: Business management school at the Turkish republic of north Cyprus and how strategic thinking and planning can improve the performance of the organization to maintain stable between competitors.

Aljawarneh, N. M. S., & Atan, T. (2018). Linking tolerance to workplace incivility, service innovative, knowledge hiding, and job search behavior: The mediating role of employee cynicism. *Negotiation and Conflict Management Research*, *11*(4), 298-320.

Aljawarneh, N., & Al-Omari, Z. (2018). The role of enterprise resource planning systems ERP in improving customer relationship management CRM: An empirical study of Safeway company of Jordan. *International Journal of Business and Management*, *13*(8), 86-100.

Al-Omari, Z. S., Aljawarneh, N., Davut, S., & Salah, A. (2018). The impact of marketing mix elements on forming mental images about Islamic banks in Jordan: An Empirical Study. *OFFICIAL*, *12*, 54.

Al-Omari, Z., Alomari, K., & Aljawarneh, N. (2020). The role of empowerment in improving internal process, customer satisfaction, learning and growth. *Management Science Letters*, *10*(4), 841-848.

Al-Qasim, F. (2012). Introduction to artificial intelligence. Technical Compass website, retrieved 25 April 2019 from the source.

Al-Ratimi, M. (2012). Artificial intelligence in education (smart learning systems). April 7th University, Zawia, Libya. Retrieved April 27, 2019 from the source.

Al-Rifai, A. (2010). The effect of using computer software in engineering education on the achievement of seventh grade students and their attitudes towards engineering. Unpublished Master Thesis, College of Education, University of Jordan.

Alsalami, A. (2017). Artificial intelligence applications to retrieve information in Google. *Journal of Information Study, Saudi Library and Information Association 1*(19), 24-103.

Al-Sarhani, M. (2014). The effect of using the constructive learning model on the development of some mathematical thinking skills and the orientation towards mathematics among middle school students in the Kingdom of Saudi Arabia. *Mathematics Education Journal, 17*(2), 6-61.

Alshare, F., Aljawarneh, N., Alomari, K., Alomari, Z., Albdareen, R., AAlwagfi, A., & Alradaideh, A. (2020). Factors influencing cellular device purchase decisions in Jordan. *Management Science Letters, 10*(11), 2501-2506.

Al-Turki, O. (2010). Requirements for using e-learning in King Saud University colleges from the viewpoint of faculty members. *Journal of Educational and Psychological Sciences, 11*(1), 151-174.

Alwagfi, A. A., Aljawarneh, N. M., & Alomari, K. A (2020). Work Ethics and Social Responsibility: Actual and Aspiration. *Journal of Management Research,12*(1), 26-36.

Al-Waqfi, R. (2015). Theoretical and applied learning difficulties (4th ed.). Amman: Al Masirah House for Publishing and Distribution.

Awad, H. (2018). The positive trend towards mathematics reinforces excellence in it.

Al-Qaisi, T. (2015). The effect of training mathematics teachers on using a proposed model for effective learning in their acquisition of some teaching skills and the achievement and attitudes of their students towards mathematics. *International Specialist Educational Journal, 4*(3), 59-77.

Batayneh, N. (2006). The use of the educational computer in kindergarten. Irbid: Modern Book World for Publishing and Distribution.

Bayoumi, Y. (2011). The effect of using the teaching teaching strategy on achievement development, the trend towards mathematics, and the effect of learning among fourth grade students. Unpublished Master Thesis, Faculty of Education, Tanta University, Egypt.

Canbek, N. & Mutlu, M. (2016). On the track of artificial intelligence: Learning with intelligent personal assistants. *Journal of Human Sciences, 13*(1).

Christian, W. (2003). I-Weaver: Towards learning style-base e-learning in computer science education, proceedings of the Australian Computing Education Conference, 4-7 February 2003, Faculty of Education, Language and Community Studies RMIT University.

Frank, C., David, A. & Nina, H. (2006). Elementary reading attitude survey (ERAS) scores in academically talented students. *Roeper Review, 29*(2), 119-124.

Judah, M. (2017). Attitudes of students of basic education in Al-Aqsa University towards mathematics-related courses and their relationship to their attitudes towards mathematics education. *Al-Aqsa University Journal, 21*(1), 325 - 354.

Halaiya, G. (2016). Search for education. Mawada.com, retrieved 23 April 2019 from the source.

Hamdi, A. (2018). The use of artificial intelligence in education. Modeling site, retrieved 20 April 2019 from the source.

Hatlestad, S. (2007). Computer-Assisted Instruction in Literacy Skills for Kindergarten Students and Perceptions of Administrators and Teachers. University of North Texas.

Jamaan, M. (2016). The effect of using computerized educational games on the achievement of third grade students in mathematics in Jordan. Unpublished Master Thesis, College of Education, Al Al-Bayt University, Jordan.

Kamuka, I. A.-D. (2015). Artificial intelligence in programmed education. *Education World Journal, 49*(1), 84-96.

Kaplan, A. & Haenlein, M. (2019) Siri, Siri in my Hand, who's the Fairest in the Land? On the interpretations, illustrations and implications of artificial intelligence. *Business Horizons, 62*(1), 15-25

Kazim, A. (2012). *University research on artificial intelligence*. College of Information Technology, Imam Jaafar Al-Sadiq University, Baghdad, Iraq.

Mahafzah, A. G., Aljawarneh, N. M., Alomari, K. A. K., Altahat, S., & Alomari, Z. S. (2020). Impact of customer relationship management on food and beverage service quality: The mediating role of employees satisfaction. *Humanities & Social Sciences Reviews*, *8*(2), 222-230.

Mahmoud, T., & Attiyat, S. (2006). An introduction to artificial intelligence, Amman: Arab Society Library for Publishing and Distribution.

Osman, H., & Jamil, A. (2012). The possibility of using artificial intelligence techniques to control the quality of internal audit. The eleventh annual scientific conference, Al-Zaytoonah University, Amman, Jordan, 23-26 April 2012: 240-253.

Salama, A. H., & Attari, A. (2019). The effect of using electronic games in developing the intuitive English Language skills for basic first grade female pupils. *International Journal of Research in Education Science, 2*(2), 258-305.

Squirts, A. (2006). Learning Math Takes Attitude, Perseverance and courage. *Journal of Education, 18*(3), 120-129.

Al-Jazaeri, A. (2015). Artificial intelligence. Professor Adel Al-Jazaeri's website, retrieved 20 April 2019 from the source.

Bedouin, A. (2019). The importance of using e-learning to teach mathematics through the constructivist model. *International Journal of Research in Educational Sciences, 2*(1), 7-45.

Yesilyurt, M., Dogan, M., & Acar, S. (2019). The meta-analysis of the effect of computer aided instruction on student attitudes in science and mathematics. *Journal of Primary Education*, *1*(2), 57-69.

Yusuf, Z. (2018). Students attitudes towards mathematics. *Researcher Journal in the Humanities and Social Sciences, 33* (3), 907-922.