

The Rotation Model of Blended Learning Stations and Its Impact on Mathematical Intuition According to A Proposed Matrix

Hind Kadhim Tayyeh¹ and Areej Khuder Hassan²

Abstract

The current research aims to identify the effect of the rotation model on the integrated learning stations in kindergarten intuition among third-year middle school female students; a quasi-experimental design was adopted for two equal groups (the experimental group and the control group) with a post-test. The experiment was applied to a sample of (60) female third-year intermediate students, with (29) female students for the experimental group and (31) female students for the control group for the academic year 2023-2024. They were rewarded in (mathematical information test, intelligence test, mathematical intuition test). The results showed that the female students of the experimental group, who were taught according to the rotation model in the blended learning stations, outperformed the female students of the control group, who were taught according to the traditional method in mathematical intuition. The two researchers concluded that teaching female students according to the rotation model on blended learning stations contributed to increasing the mathematical intuition of the female students in the experimental research sample. The research came out with a number of recommendations, the most important of which are: conducting training courses for teachers of various educational levels on the use of the blended learning rotation model with its various models and the strategies emerging from it in teaching mathematics and paying attention to the variable of mathematical intuition in micro-learning programs for student teachers in various colleges of education. The research also presented a set of proposals, the most important of which is: developing a rotation model for blended learning stations in line with modern theories related to reducing the cognitive load among learners.

Keywords: *Blended Learning, Rotation Model, Blended Learning Stations, Intuition, Mathematical Intuition.*

INTRODUCTION

Based on the experiences of other countries seeking innovation and development in their educational institutions, Iraq witnessed reforms in the three educational stages, which included various educational curricula, teaching methods, and methods of evaluating and evaluating them. These changes represent an excellent opportunity to create a challenge by reconsidering the basic or fundamental nature of education. (Hassan, 2018, p. 65), The rapid changes and their events in the information revolution and developments in the world of technology led to change in various areas of life, which prompted modern educational systems to push towards keeping pace with the rapid changes and influences in the world of technology. This change was not limited to a specific aspect, but rather extended to all aspects of life, including the educational aspect. (Hammadi & others, 2023, p. 42), The recommendations of the Second International Educational Conference for Educational and Psychological Studies (ICOEPS, 2020) highlighted the necessity of improving digital learning systems, its various models and strategies, and how to use them in presenting scientific content within classrooms in light of the data of the technical age and its contemporary global trends. (ICOEPS, 2020, p. 9), locally, the thirteenth annual scientific conference of the General Directorate of Education of Baghdad Al-Karkh II (Science, Construction and Scientific Sobriety) recommended adopting the blended learning method and applying it widely in teaching scientific subjects. (Proceedings of the 13th Scientific Conference, 2024, p. 6), The importance of the rotation model on blended learning stations comes as it is one of the blended learning models that seeks to achieve interaction between the teacher and his students on the one hand and between the students themselves on the other hand to achieve and build experience and provide ways of creativity and practical practice for the learner, to make education more independent and thus enhance and support the educational process and make Education is more realistic and meaningful for students. (Walne, 2012, p12), Blended learning restructures the educational learning process, as it is a transition from the traditional

¹ University of Baghdad/ College of Education for Pure Sciences - Ibn al-Haytham, Email: hind.tayih2203m@ihcoedu.uobaghdad.edu.iq

² University of Baghdad/ College of Education for Pure Sciences - Ibn al-Haytham, Email: areej.k.h@ihcoedu.uobaghdad.edu.iq, (Corresponding Author)

educational process model to an education model that encourages creativity and critical thinking, as it combines social interaction and modern technologies, which makes the educational process more interactive and attractive. (Abbas, 2022, p. 239), Intuition is closely linked to achievement, which represents the extent to which the learner has achieved educational goals in a particular academic subject as a result of passing through educational experiences or situations. (Majeed & others, 2023, p. 206), The decline in a learner's achievement in one or more academic subjects occurs as a result of a variety of reasons, including those related to the learner himself, including those related to the school, and some related to the teacher. This may extend to the family or educational systems. (HASSAN & others, 2023, p. 106), Mathematical intuition has positive contributions for learners to the success of their numerical and life dealings. It increases understanding of possibilities, enhances problem-solving strategies, provides an important foundation for learning mathematics, whether before or after school, and increases learners' motivation and self-confidence. (Jawad & others, 2021, p. 171)

Intuition in mathematics is a fundamental and effective part of solving mathematical problems. When solving a mathematical problem, the solution may require time and mental effort, then suddenly the solution is reached through ideas that emerge quickly without realizing how they arrived, and all credit is attributed to intuition. (Yuni & others, 2019, p. 2)

Research Problem

Mathematics is the food for the mind, and through it various types of thinking skills are developed, and mathematical intuition is one of the most important of these types, given the inclusion of mathematical intuition in the mathematics book for the third intermediate grade and after discussing with some mathematics teachers and introducing them to the types of mathematical intuition and its skills. (Al-Mayouf et al., 2017, p. 5), A survey was organized for the opinions of mathematics teachers for the third intermediate grade, and (90%) of them confirmed that mathematical intuition enhances learners' self-confidence through their feeling of the ability to discover knowledge, Also, (80%) of them confirmed that mathematical intuition helps students solve mathematical problems more effectively, As for the extent of the relationship between mathematical intuition and achievement in mathematics, (75%) of them confirmed that one of the reasons for the low achievement among students is due to their lack of interest in mathematical intuition because they do not have prior expectations about the expected results.

Many studies have also confirmed, including the study (Ben-zeev & Star, 2002), the study (Al-Hamid and Al-Salouli, 2017), and the study (Al-Mayouf, 2021). Mathematical intuition is affected by the practices of educators that encourage or hinder its development, and thus students' products are reflected in the use of the appropriate intuitive method, Here, the two researchers see the necessity of reconsidering the teaching models and strategies used and searching for a model that provides an appropriate educational environment that is in line with the requirements of our current era on the one hand and teaching mathematics that On the other hand, mathematical intuition is one of its basic pillars. On this basis, the two researchers sought to experiment with one of the blended learning models that is being applied for the first time locally in teaching mathematics, in an attempt to determine its impact on the mathematical intuition of third-year middle school female students.

The research problem came to answer the following question:

"What is the effect of the rotation model on blended learning stations in mathematical intuition according to a proposed matrix?"

Research Objective

The current research aims to determine the effect of the rotation model on blended learning stations on mathematical intuition among third-year middle school female students.

Hypothesis

To achieve the research goal, the following hypothesis was developed:

Null hypothesis: There is no statistically significant difference at the significance level (0.05) between the average grades of the female students of the experimental group who studied using the rotation model on the blended

learning stations and the grades of the female students of the control group who studied using the rotation model on the blended learning stations, studied in the traditional way, In the mathematical intuition test.

$$H_0: \mu_1 = \mu_2$$

$$H_1: \mu_1 \neq \mu_2$$

Limits Of Research

The following limits have been set:

Third-year intermediate school students in middle and secondary day schools affiliated with the General Directorate of Education of Baghdad, Al-Karkh II.

The content of the first chapter (Relationships and Inequalities in Real Numbers), the second chapter (algebraic expressions), and the third chapter (equations) of the mathematics book for the third intermediate grade, revised fourth edition, written by a specialized team in the Ministry of Education/General Directorate of Curricula, seventh edition.

The first semester of the 2023-2024 academic year.

Rotation model for blended learning stations (teacher station, interaction and discussion station, external and internal circle station, interactive simulation station, evaluation station).

The matrix of mathematical intuition consisting of two dimensions: the horizontal relates to the skills of mathematical intuition (perceiving relationships, estimation, verification) and the vertical relates to the types of intuition (sensory intuition, inductive intuition, pure number intuition).

Defining Terms

Rotation Model for Blended Learning Stations

Define it (Staker & Horn, 2013): It is one of the forms of blended learning, also called classroom rotation. Students move within this model, When studying a specific topic between learning stations according to a pre-established schedule or according to the teacher's instructions, and there must be at least one of the learning stations provided through technology, While other stations include various activities such as discussion, teaching the class as a whole, groups to implement projects, teaching small groups, doing assignments, and others. (Staker & Horn, 2013, p. 78)

The Researcher Theoretically Adopts the Definition (Staker & Horn, 2013)

The rotation model for blended learning stations is defined procedurally as a teaching model in which the female students of the experimental group in the third intermediate grade move between the learning stations according to a pre-established schedule when studying the specific chapters of the mathematics book, There must be at least one learning station provided through technology, Other stations include various activities such as discussion, Teaching the class as a whole, groups to implement projects, and teaching small groups, The impact of which will be measured by testing the mathematical intuition that the researcher built.

Mathematical Intuition

Define it (Ben-zeev & Star, 2002): It is the acceptance of a specific solution or direct explanation without explicit or detailed justification, in which individuals demonstrate the ability to solve problems despite the lack of formal instructions. Ben-zeev & Star, 2002, p. 6)

The Researcher Theoretically Adopts the Definition (Ben-Zeev & Star, 2002)

Mathematical intuition is defined procedurally as a cognitive mental activity in which available information about a problem is observed, experimented with, processed, and embraced spontaneously and continuously until the female students of the experimental sample arrive at a sudden solution to the problem without the

presence of formal instructions. It can be measured by the grade that the female students of the third intermediate grade of the experimental sample obtain on a test. The mathematical intuition that was built based on the mathematical intuition matrix consisting of two dimensions. The horizontal relates to the skills of mathematical intuition (perceiving relationships, estimation, verification) and the vertical relates to the types of intuition (sensory intuition, inductive intuition, pure number intuition).

LITERATURE REVIEW

Rotation Model for Blended Learning Stations

Blended Learning Models

Due to the diversity and diversity of educational environments, specialists have found several styles of blended learning, in order to obtain flexibility that gives educators more contexts that suit their educational environment and the capabilities they possess. (Al-Rababa, 2019, p. 85), Blended learning is a natural development of traditional education. It combines traditional education and e-learning without eliminating either of them. It works to transform the two lines of education into a single line that merges the two lines in a non-dual mixture. (Al-Sayyab, 2023, p. 172), Over the past few years, some main models have been formed, from which several models have emerged, as follows: (Aziz, 2021, p. 22)

The Flex Model: This model works to replace teaching large groups of students with teaching using technology, that is, technology replaces the teacher in giving information and explanation, which allows the teacher the appropriate time to follow up and guide the students. (Staker & Horn, 2012, p12)

The Selective Model (A La Carte Model): A form of blended learning that allows the student the freedom to choose one of the study subjects, register it, and follow it via the Internet while studying other subjects through traditional methods, The most important characteristic of the selective model is giving the student freedom to choose the academic course he prefers to study via the Internet. It differs from e- learning in that the student studies one course via the Internet and is not deprived of the traditional learning environment in other courses. (Heather & Micheal, 2012, p. 7)

The Enhanced Virtual Model: The most important feature of this model is studying the specializations completely electronically and searching for a part that contains real experiences taught within the place of study or educational institution. It is a model that came to improve virtual e-learning in order to overcome most of its problems related to the psychological and social aspects and meet the demands of parents for the teacher to meet with the student face to face. (Johnson & Renner, 2012, p46).

Rotation Model: It is one of the most popular and widespread blended learning models that can be used in various academic subjects, as the students of the class rotate at the learning stations according to the schedule set by the teacher in advance. (Heather & Michael, 2012, p. 8)

In addition, (Graham & Gibbons, 2014) believe that this model integrates the advantages of traditional and electronic learning, allowing the learner to acquire knowledge in the subject of study and develop his skills. (Graham & others, 2014, p. 21):

(Walne, 2012) indicates that the rotation model is divided into four sub-models that can be summarized as follows:

Individual rotation model: in which the learner moves between learning stations individually, without specific groups. This transfer usually takes place within a pre-prepared schedule, taking into account what is appropriate to his capabilities, without it being necessary for him to go through all the existing stations.

The flipped classroom model: in which the student moves between classroom applications under the supervision of the teacher within the classroom at school, and learns via the Internet by transferring the content in one of the available ways to home.

Laboratory rotation model: in which the student moves between different locations within the school buildings according to a schedule set in advance, and does not move within stations in one classroom or home, as is the

case in previous models. It allows the teacher to use all the information that the students are able to collect during their stay in the laboratory and benefit from it. Including in the traditional lesson session. (Walne, 2012, p. 4)

Rotation model for blended learning stations: This model allows multi-faceted interaction for learners with the educational materials and the teacher and among themselves, as the model includes different learning stations, provided that one of these stations is electronic and equipped with multiple educational methods such as learning through small groups, or Whole class or project learning, or worksheets, homework, and other learning methods prepared in advance by the teacher, and learners move between those stations that are equipped with different digital and non-digital activities. (Staker & Horn, 2012, p. 6)

The (Kipp Empower Academy) in the United States of America is one of the most famous educational institutions that has adopted the rotation model on blended learning stations. It has adopted in its educational center in Los Angeles State classes consisting of 28 students, all of whom are distributed and move between the different stations according to a fixed schedule. In advance, all students move every day between the online learning station, the small group teaching station, the official learning station, the struggling students station (the supporting teacher station), the cooperative stations, and others. (Al-Sharman, 2015, p. 72)

The flexibility of the rotation model on blended learning stations makes it compatible with various educational systems, and it can also be applied to different professional systems, in addition to choosing it as one of the educational models that works to link the skill to work and apply what is learned on the ground, as it supports and develops the educational content. It is also a fertile field for deriving teaching strategies that fall within the model. (Dewi & others, 2018, p. 634)

The rotation model is fully suitable for education with special needs and represents one of the important solutions to the challenges faced by teachers who are distinguished by the diversity of their students. It constitutes the best description of differentiation in education through educational curricula and evaluation strategies that take into account the needs of each individual learner through modification in content, learning outcomes, and strategies. Teaching. (Abu Aita and Al-Fayez, 2019, p. 161)

The two researchers believe that the classroom environment is one of the external stimuli that the more attractive it becomes, the more active and facilitating the learning process becomes, as it excites the learner and attracts the learner's attention towards the lesson. Rotation of the stations is an effective learning environment that reflects positively on the learners' behaviors by preparing foundations for building positive attitudes by encouraging them. To experience different and stimulating educational activities, and the learners are in continuous movement within the class, which helps to release the negative energy of the learners with more energy to interact with the academic material.

Mathematical Intuition

Since the birth of man on the face of the earth, intuition has had an important role in his survival and development because it represents part of human intelligence and is one of the unique abilities that humans have in a world full of challenges and complex decisions. A highly valuable resource is relied upon to make the right decisions in the absence of evidence. Clear and precise analysis. It also represents the ability to make decisions indirectly and outwardly, based on a group of internal factors that include psychological and mental factors, previous experience and personal beliefs, in addition to external factors such as the environment, culture and previous experiences that the individual goes through. These factors interact together to form a type of It is indirect perception that can influence decisions and behavior without the need for justified thinking or careful analysis. (Sandewall, 1997, p. 1-6)

(Shirley & Fox, 2003) believe that intuition represents a mental, emotional, and cognitive process that is built in the individual as a result of many mental processes related to remembering, comprehending, abstracting, distinguishing, generalizing, inferring, comparing, etc., and psychological processes such as sensation, imagination, and perception, so that it is quick and immediate. (Shirley & fox, 2003, p. 208)

Scientists have differed in determining the direct meaning of intuition. Some of them link it to supernatural abilities, some of them link it to extra-sensory perception, and some of them consider it a mental faculty that few people possess, while some consider it to be knowledge of a thing without knowing how they knew it and cannot prove it. In the same context, some have pointed out that intuition represents direct, special knowledge, with theories differing in their interpretation. (Qatami and Al-Asha, 2007, p. 128)

Stages Of Learning Intuition

Intuition, like other mental processes, undergoes several internal processes that can be summarized as follows:

The first stage: the orientation stage: which includes creating mental representations or representations of the information that the learner is thinking about.

The second stage: the integrative stage: which is related to the entry of those mental perceptions or representations into awareness, and is linked to the accumulation of knowledge that the learner possesses, which was activated in the previous stage, and the products appear quickly and suddenly, and this is what we call a flash of intuition. (Zander & others, 2016: 6)

The Importance of Mathematical Intuition

Mathematical intuition has great importance in mathematics in general and school mathematics in particular. This importance can be summarized as follows:

Develops thinking and increases deep understanding of concepts and relationships between numbers and different shapes.

It is considered one of the most important sources of inspiration, especially for individuals who constantly think about finding effective solutions to mathematical problems.

Using intuition to reach acceptable solutions has a positive impact on the learner's mathematical performance.

Raises motivation to learn and find solutions to complex mathematical problems.

It enhances learners' abilities in the language of mathematics because it is linked to conceptual images or visual representation.

It contributes to developing one of the most important main goals of mathematics related to abstraction.

Learners gain mathematical insights by finding bridges between knowledge and the solution. (Mattheis, 2019, p. 104)

Types Of Mathematical Intuition

Al-Ketbi (1997) classified mathematical intuition into three types, one of which is sensory and the other two are rational intuition

Sensory intuition: It is based on and built upon the senses. It is the individual's ability to improve and use sensory information to understand the world around us. Despite its importance, it has uncertain consequences. A person may feel that a stationary body is moving and vice versa, as in the movement of the stars. Despite this, this type must involve education, conducting experiments, and finding solutions to problems, and it may even extend to changing a specific method or approach.

Inductive intuition: It is the process of drawing new conclusions from known facts or assumptions. Examples of it include using logic and the correct arrangement of information to reach correct conclusions. It is a mental intuition that adds to experience a general expectation through experience.

Pure number intuition: It is the important part of school mathematics that focuses on the numerical system of numbers and mathematical operations without the need to calculate them completely. Arithmetic represents the pure number intuition, and to it returns the principle of mathematical induction, represented by one of the most important methods of proving the validity of a particular proposition. The first type is The second type

cannot provide us with certainty, but no one can doubt the seriousness of the third type. Examples of it include that the sum of even numbers can be written as the sum of the squares of two integers, and all odd numbers can be written as the sum of one square and one integer. (Al-Ketbi, 1997, p. 115)

Mathematical Intuition Skills

Understanding relationships: It requires the ability to discover and understand mathematical relationships between things, and a good understanding of mathematical relationships helps facilitate problem solving and more accurate decision-making.

Estimation: It is the ability to predict results or estimate solutions based on available information without the need for accurate calculation. Sometimes an accurate solution is not necessary, and a person skilled in mathematical intuition can quickly estimate based on mathematical models and previous knowledge.

Verification: means verifying the validity of the solution or conclusion drawn by simply performing some simple calculations or using other methods for the solution (Efrain, 2002, p 32)

The two researchers believe that mathematical intuition is important in school mathematics, as it enhances the ability to find new and innovative solutions and enables the learner to focus and deeply understand concepts instead of focusing on precise mathematical steps. It also enhances self-confidence by arriving at solutions to mathematical problems in different ways and independently.

METHODOLOGY

Research Methodology and Design

The experimental method was adopted to verify the research hypotheses and strive to achieve the required goals. The experimental design was based on two equal groups (the experimental group and the control group) with posttests. The control group will study in the usual way and the experimental group will study according to the rotation model on the blended learning stations.

The Research Community

The current research population included all third-grade female students in middle and secondary schools for day studies affiliated with the General Directorate of Education of Baghdad/Al-Karkh II, whose number reached (21,198) students.

The Research Sample

The researchers intentionally chose one of the secondary schools after obtaining official approvals. Thus, the number of female students in the research sample reached (60) students distributed into two groups, with (31) female students in Section (A), which represents the control group, and (29) female students in Section (B), which represents the control group. Represents the experimental group.

Equivalence Procedures

Equivalence was conducted in the variables (prior knowledge - intelligence - mathematical intuition) as shown in the following table:

Table (1): Statistical description of the data of the two groups in (prior knowledge, intelligence, mathematical intuition)

VARIABLE	GROUP	DIVISION	NUMBER OF STUDENTS	ARITHMETIC AVERAGE	STANDARD DEVIATION	STANDARD ERROR OF THE ARITHMETIC MEAN	CONFIDENCE %95 INTERVAL IN ARITHMETIC MEAN	
							upper limit	lower limit
Previous knowledge	Experimental	B	29	6.448	2.835	0.526	1.666	- 1.156
	Control	A	31	6.193	2.625	0.461	1.670	- 1.160
Intelligence	Experimental	B	29	13.344	4.073	0.756	3.323	- 1.214
	Control	A	31	12.290	4.663	0.837	3.313	- 1.207
	Experimental	B	29	5.379	1.699	0.315	1.136	- 0.700

Mathematical intuition	Control	A	31	5.161	1.845	0.331	1.134	- 0.698
------------------------	---------	---	----	-------	-------	-------	-------	---------

Table(2): Results of the t-test for comparison between the two research groups in light of the variance and arithmetic mean parameters In (prior knowledge, intelligence, and mathematical intuition)

VARIABLE	LEVENE'S TEST		T – TEST		SIGNIFICANCE LEVEL	STATISTICAL SIGNIFICANCE AT THE 0.05 LEVEL
Previous knowledge	F	Indication	T	indication	58	Not statistically significant
	0.066	0.797	0.361	0.719		
Intelligence	F	indication	T	indication	58	Not statistically significant
	3.623	0.062	0.930	0.356		
Mathematical intuition	F	indication	T	indication	58	Not statistically significant
	0.088	0.768	0.457	0.637		

Construct A Mathematical Intuition Test

Since mathematical intuition is one of the dependent variables, it requires preparing a test according to the following steps:

Determine The Purpose of The Test

Preparing the proposed intuition matrix: The two researchers reviewed a group of literature and studies, as these studies dealt with the types of intuition and other studies that dealt with intuition skills at different educational stages, including in the middle stage and some in the preparatory stage, as these studies contributed to the crystallization of the two researchers' ideas of creating a matrix that combines Types of intuition and intuition skills were presented to a number of arbitrators and specialists in mathematics and its teaching methods, to express their opinions and suggestions about them. Small adjustments were made according to the arbitrators' observations, and an agreement rate of more than (80%) was approved. Thus, the matrix consisted of (9) regions from which it was possible to During which mathematical intuition is measured, as shown in the following table:

Table(3) : Mathematical intuition matrix

MATHEMATICAL INTUITION		MATHEMATICAL INTUITION SKILLS		
		Understanding relationships	Appreciation	Verification
Types of math emati	Sensory intuition	1.1	1.2	1.3
	Inductive intuition	2.1	2.2	2.3
	Pure number intuition	3.1	2.3	3.3

Determining the number of test items and distributing them among the measurement areas: Due to the lack of studies related to the subject and to ensure the identification of a number of items that cover the aforementioned measurement areas, and after consulting a number of arbitrators in mathematics and its teaching methods, to determine the total number of test items, the educational content subject to the experiment was analyzed according to For the prepared matrix, to represent it in a way that is consistent with its presence in the academic content, and after integrating all the corners of the test map represented by the relative importance of each chapter according to mathematical intuition, the relative weight of each cell, and determining the number of total test items, the test map for the mathematical intuition test was built, as shown in the following table:

Table(4) : Test map for the Mathematical Intuition Test

NO:	THE RELATIVE IMPORTANCE OF MATHEMATICAL INTUITION IN CONTENT	THE RELATIVE WEIGHT OF MATHEMATICAL INTUITION									NUMBER OF TEST ITEMS
		1.1 12 %	1.2 6 %	1.3 5 %	2.1 % 19	2.2 % 11	2.3 % 12	3.1 % 16	3.2 % 7	3.3 % 12	
1	% 28	1	1	1	2	1	1	2	1	1	11
2	% 31	1	1	1	2	1	1	2	1	1	11

3	% 41	2	1	1	3	2	2	2	1	2	16
Total	% 100	4	3	3	7	4	4	6	3	4	38

Formulating the test items: The test items were constructed so that they were consistent and appropriate with the measurement areas that were identified according to the matrix that was prepared. The test in its initial form consisted of (38) items, including (27) substantive items and (11) essay items, and the test items were presented in its original form. The priority was given to a group of arbitrators on mathematics and its teaching methods, in order to express their opinions and observations on the appropriateness of the test and its suitability for the research sample from a scientific and linguistic standpoint. Some minor modifications were made according to the arbitrators' observations, which consisted of modifying and rewording some paragraphs. The two researchers adopted an agreement rate of more than (80 %) for the test items.

Preparing test instructions, which include answer instructions and instructions related to correcting paragraphs.

The first exploratory application: The test was applied to the sample information to ensure that there were no ambiguous paragraphs, as well as to verify the time that had been set previously. Understandable for students in terms of wording or instructions, and the adequacy of the time that was previously allocated.

The second exploratory application: The test was applied to the second exploratory sample, which is the statistical analysis sample.

The answers for both groups were analyzed as follows:

Ease factor: The difficulty factor of the objective paragraphs was calculated according to its own equation, and it was found to range between (0.755-0.304). As for the essay justification paragraphs, the difficulty factor was calculated for them using the difficulty equation for the essay paragraphs, and it was found to range between (0.475-0.324), and thus all items of the achievement test are acceptable.

Discrimination coefficient: the discrimination equation was applied to the substantive items, it was found to range between (0.549-0.216), the equation was applied to the essay items, it was found to range between (0.431-0.225), and thus all the achievement test items are acceptable.

The effectiveness of the wrong alternatives: Based on the equation of the effectiveness of the wrong alternatives, the effectiveness of the wrong alternatives for each of the objective paragraphs was found, and it was found to range between (0.215)-(-0.058), and this indicates that all the alternatives are effective in distracting female students with low levels.

Validity of the test: To verify that the test is accurate in measuring what it was designed to do, it was done using two types of validity:

Virtual Honesty

Construct validity: The Pearson correlation coefficient was extracted between the scores of each item and the total test scores, The values of the correlation coefficient ranged between (0.183* -0.473**), which indicates that all items are statistically significant at a significance level of (0.05), and thus It is a good indicator of construct validity.

Reliability of the test: Based on the equation (Cronbach's alpha), the calculated reliability coefficient was (0.720). This indicates that the test has good reliability and can be relied upon.

The stability of the correction of essay paragraphs: It was confirmed through the stability of the correction over time and the stability of the correction with another corrector.

RESULTS & DISCUSSION

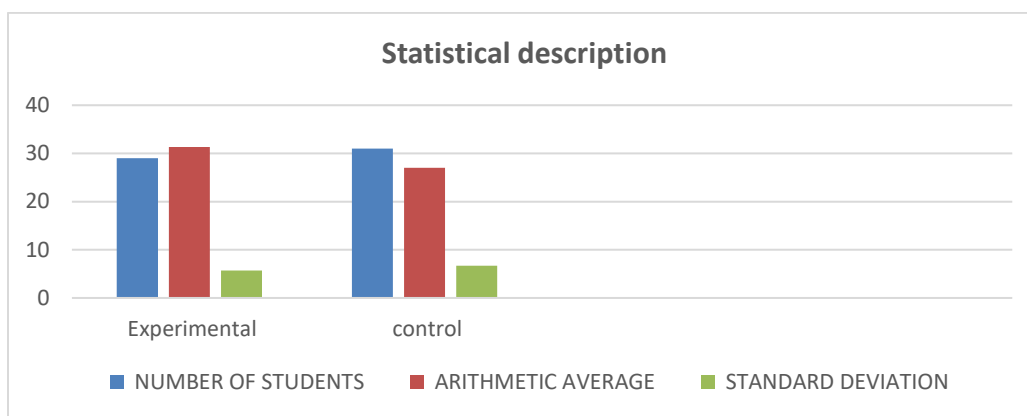
Show results:

There is no statistically significant difference at the significance level (0.05) between the average scores of the female students in the experimental group who studied using the rotation model on the blended learning stations and the scores of the female students in the control group who studied in the traditional way in the mathematical intuition test”.

The mathematical intuition test was applied and the grades of the female students of the two groups were corrected. The researchers used the statistical program (SPSS-V28) to obtain a statistical description of the raw data for the two research groups. It was found that the arithmetic mean of the grades of the female students of the experimental group was (31.3448) with a standard deviation of (5.70886) in While the arithmetic mean of the grades of the control group students was (27.0000) with a standard deviation of (6.67832), as shown in the table:

Table (5): Statistical description of the two research groups on the mathematical intuition variable

GROUP	DIVISION	NUMBER OF STUDENTS	ARITHMETIC AVERAGE	STANDARD DEVIATION	STANDARD ERROR OF THE ARITHMETIC MEAN	CONFIDENCE %95 INTERVAL IN THE ARITHMETIC MEAN	
						upper limit	lower limit
Experimental	B	29	31.3448	5.70886	1.06011	7.56611	1.12354
control	A	31	27.0000	6.67832	1.19946	7.54970	1.13996



To identify the significance of the difference between the variance of the scores of the students of the two research groups, the (Levene's Test) test was applied, and the (F) was (0.601) at a significance level of (0.441), which is greater than the approved significance level of (0.05), which indicates that the two research groups are homogeneous in the variable mathematical intuition, To determine the significance of the difference between the average scores of the students of the two groups, the t-test was applied for two independent, unequal samples. The value of t was (2.700) at the significance level (0.009), which is smaller than the approved significance level of (0.05) and the degree of freedom (58), Which indicates the superiority of the female students of the experimental research group who studied according to the rotation model in the blended learning stations over the female students of the control research group who studied according to the normal method. As shown in the following table:

Table(6) :The value of (F) and (t) for the experimental and control groups in the mathematical intuition variable

LEVENE'S TEST		T - TEST		SIGNIFICANCE LEVEL	STATISTICAL SIGNIFICANCE AT THE 0.05 LEVEL
F	indication	T	indication		
0.601	0.441	2.700	0.009	58	statistically significant

Thus, the null research hypothesis was rejected and the alternative research hypothesis regarding the mathematical intuition variable was accepted.

Interpretation of the Results

The results of the mathematical intuition test showed that the female students of the experimental research group outperformed the female students of the control research group in the mathematical intuition test, which explains that the rotation model on the blended learning stations focused on highlighting some mathematical intuition skills through the following:

Working in a flexible environment that allows students to demonstrate freedom of thinking and creativity, overcoming the limits of logic in dealing with mathematical problems.

Providing group activities that work to learn about the ideas of others and increase students' intellectual awareness.

Expanding students' understanding of finding solutions to mathematical problems using interactive simulations that allow learners to find solutions to mathematical problems based on previous problems that have been studied.

Exposure to scientific tasks that require higher levels of thinking, which made them challenge their thinking by taking advantage of their previous experiences and knowledge.

Exposure to tasks in which female students with weak inclinations to think about mathematics participate, and other tasks in which female students with high inclinations to think in mathematics participate.

This result is consistent with the results of previous studies related to the effectiveness of modern strategies and models in highlighting intuition skills in mathematics, represented by the study (Al-Hasani et al., 2014), the study (Al-Mayouf, 2021), the study (Al-Sayed et al., 2022), and the study (Kurniawati & others, 2020). 22) And based on From the above it becomes clear to us that the model of rotation in blended learning stations has proven more effective than the usual teaching method with regard to mathematical intuition.

CONCLUSIONS

Based on the results and their interpretation, the two researchers concluded that teaching female students according to the rotation model in blended learning stations contributed to:

The rotation model stations (teacher station, discussion and interaction, inner and outer circle, interactive simulation, relearning, and expansion) led to better interaction and cooperation between the female students of the experimental group than the female students of the experimental group who studied in the normal way.

The model worked to increase the motivation of the experimental group students towards the academic subject.

The way of thinking among the female students of the experimental research sample developed significantly.

Using the rotation model on the blended learning stations had an impact in raising the level of mathematical intuition among the female students in the experimental group more than the female students in the control group, and this is by linking mathematics to daily life.

Creating bridges to link the scientific material in content with the students' previous experiences.

Releasing the freedom of thinking among female students, overcoming the restrictions imposed by the usual teaching method, as the process of linking theoretical information with practical application became easier for the female students in the experimental sample of the research.

Recommendations

Conducting training courses by the preparation and training departments in the General Directorates of Education targeting mathematics teachers at various levels to use the blended learning rotation model with its various models and strategies emerging from it in teaching mathematics.

Paying attention to the variable of mathematical intuition in micro-education programs for student teachers in various colleges of education (mathematics departments)

Proposals

Knowing the effectiveness of the rotation model in blended learning stations in lateral thinking among middle school students.

Knowing the effect of the rotation model on blended learning stations in reducing the cognitive load among middle school students.

Knowing the effect of the rotation model on blended learning stations in reducing learning loss among middle school students.

REFERENCES

- Abbas, Rana Fadel (2022): The effectiveness of blended learning in teaching from the point of view of university professors, published research, *Al-Ustad Journal for Human Sciences*, University of Baghdad, Part (61), Part (3).
- Abu Aita, Jawhara Darwish Ali, Al-Fayez, Mona Qatifan Irshaid (2020): The impact of the blended learning rotation station model on mathematics achievement and motivation to learn among students with learning difficulties in Al-Hassad schools in the city of Amman, published research, *Journal of Educational Sciences*, Amman. M (2), A (23).
- Al-Hamid, Manayer Abdel-Rahman and Al-Salouli, Misfer bin Saud (2017): Teaching practices among mathematics teachers for the upper primary grades to develop mathematical intuition skills, published research, *Arabian Gulf Message*, Arab Education Bureau for the Gulf States, Riyadh. M (39), A (147).
- Al-Hassani, Ghazi Khamis and Al-Nasser, Hazem Suleiman and Aliwi, Ali Hussein (2014): The effectiveness of the brainstorming strategy in developing mathematical intuition among first-year intermediate students, published research, *Al-Qadisiyah Journal of Arts and Educational Sciences*, Al-Qadisiyah University, Iraq, Part (2) , p. (14).
- Al-Ketbi, Salim Hassan (1997): *Scientific Research Methodology in Mathematics (Thinking Method)*, National Library of Iraq, Baghdad.
- Al-Kubaisi, Abdul Wahed Hamid and Al-Khatib, Haider Hamid (2015): *Cognitive and intuitive speed and levels of thinking*, first edition, Arab Society Library for Printing, Publishing and Distribution, Amman.
- Al-Madinah International University (2020): *Education and modern developments*, Proceedings of the Twelfth International Scientific Conference for Educational and Psychological Studies, Al-Madinah International University, Malaysia.
- Al-Mayouf, Rafid Bahr Ahmad and Nejad, Buthaina and Hassan, Areej Khader (2017): The effect of an educational design based on the strategy of teaching for understanding on mathematics achievement among fifth-grade female students, published research, *Journal of Educational and Psychological Research*, Center for Educational and Psychological Research, University of Baghdad, A. 54, p. p. 1-22.
- Al-Mayouf, Rafid Bahr Ahmed (2021): The effectiveness of an educational program based on TRIZ theory in developing multidimensional thinking and mathematical intuition among sixth-grade science students, published research, *Iraqi University Journal*, Iraqi University, Baghdad. M (50), P (1).
- Al-Rababah, Nevin Khalil Abdul Qader (2019): The impact of applying the blended learning strategy on academic achievement of the Arabic language curriculum for the seventh grade in schools in the capital, Amman, published research, *Journal of Educational and Psychological Research*, Center for Educational and Psychological Research, University of Baghdad, issue (16) , p. (63).
- Al-Sayyab, Azhar Muhammad Majeed (2023): Blended learning and its relationship to effective student participation among university students in light of the Corona pandemic 2020-2021, published research, *Journal of the College of Arts*, University of Baghdad, Part (2), Issue (144).
- Al-Sayyid, Sherine Muhammad Muhammad and Kafafi, Wafa Mustafa and Abu Al-Qasim, Jalila Mahmoud (2022): A proposed program based on educational stimuli and its effectiveness in developing intuition skills in mathematics among pre-school children, published research, *International Journal of Curriculum and Technological Education*, Cairo University, Egypt.
- Al-Sharman, Atef Abu Hamid (2015): *Blended and Flipped Learning*, first edition, Dar Al-Masirah for Publishing, Distribution and Printing, Amman.
- Aziz, Alia Talib (2021): An analytical study of the reality of blended learning with volleyball in colleges and departments of physical education and sports sciences in Baghdad, published research, *Contemporary Sports Journal*, College of Physical Education and Sports Sciences for Girls, University of Baghdad, M (20), A (4).
- Ben-Zeev, Talia & star, Jon (2002): *Intuitive Mathematics: Theoretical and Educational Implications*, Brown University, Rhode island, united states of America.
- Dewi, Kadek cahya & Surjono, Herman Dwi & Ciptayani, putu indah & Priyanto (2018): learning result management on vocational blended learning implementation, international conference of science and technology, Indonesia, V (1) , n (2).
- Efraim, Fischbein (2002): *Intuition in science and mathematics*, Kluwer Academic Publishers, springer.

The Rotation Model of Blended Learning Stations and Its Impact on Mathematical Intuition According to A Proposed Matrix

- General Directorate of Education of Baghdad Al-Karkh II (2024): Proceedings of the Thirteenth Scientific Conference (Science, Construction, and Scientific Sobriety), Dar Al-Sadiq Cultural Foundation, Babylon.
- Graham, C.R & Henrie, C.R & Gibbons, A.S (2014): Developing models and theory for blended learning, Research perspectives, new york, V (2), n (3).
- Gordillo-Rodriguez, M. T., Pineda, A., & Gómez, J. D. F. (2023). Brand Community and Symbolic Interactionism: A Literature Review. *Review of Communication Research*, Vol.11, pp.1-32.
- Hassan, Areej Khadr (2018): The effect of the Fink model of active learning on lateral thinking and the achievement of students in the Computer Department in mathematics, published research, Al-Ustad Journal for Humanities and Social Sciences, University of Baghdad, issue (3), p. (224), p. p. 63-88.
- Hassan, Areej Khuder & Hammadi, Sabah Saeed Majeed & Ban Hassan & (2023): The Impact of a Scenario-Based Learning Model in Mathematics Achievement and Mental Motivation for High School Students, Published research, International Journal of Emerging Technologies in Learning, v(18), n(7).
<https://doi.org/10.3991/ijet.v18i07.39263>
- Hammadi, Sabah Saeed Majeed & Ban Hassan & Hassan, Areej Khuder (2023): Impact of Deep Learning Strategy in Mathematics Achievement and Practical Intelligence among High School Students, Published research, International Journal of Emerging Technologies in Learning, v(18), n(6).
<https://doi.org/10.3991/ijet.v18i06.38615>
- Heather, S. & Michael B.H (2012): Blended. Using Dis- Ruptive innovation to improve school, Jossey- bass, san Francisco, new york.
- Johnson, L.W. & Renner, J.D. (2012): Effect of the flipped classroom model on a secondary computer applications course, student and teacher perceptions, questions and student achievement, unpublished Doctoral dissertation, University of Louisville, U.S.A.
- Jawad, Lina Fouad & Majeed, Ban Hassan & ALRikabi, Haider Th. Salim (2021): The Impact of Teaching by Using STEM Approach in The Development of Creative Thinking and Mathematical Achievement Among the Students of The Fourth Scientific Class, Published research, International Journal of Interactive Mobile Technologies, V(15), n(13).
<https://doi.org/10.3991/ijim.v15i13.24185>
- Kurniawati, L. & Farhana, I.S. & Miftah, R (2022): Improving students' mathematical intuitive thinking ability using analogy learning model, *Journal of physics, Conference series*, v (2157), n (2).
- Majeed , Ban Hassan & Hassan, Areej Khuder, Hammadi, Sabah Saeed (2023): The Effect of Cognitive Modeling in Mathematics Achievement and Creative Intelligence for High School Students, Published research, International Journal of Emerging Technologies in Learning, v(18), n(9).
<https://doi.org/10.3991/ijet.v18i09.39413>
- Qatami, Youssef and Al-Asha, Intisar (2007): Intuitive Thinking for the Basic Stage, Debono Center for Printing, Publishing and Distribution, Amman.
- Sandewall Erlk (1997): Electronic newsletter on reasoning about actions and change, united states of America.
- Shirly, D. & Fox-Landan, J (2003): the nature and measurement of intuition: Cognitive and Behavioral interests, Personality, and Experiences, *Creativity Research Journal*, v (15) n (32).
- Staker ,H. & Horn, M.B (2012): Blended learning in the K-12 Education Sector in A,G picciano, C.D Dziuban & C.R Graham (EDS), blended learning, London.
- Staker, H. & Horn, M.(2013): Blended : Using Disruptive Innovation to Improve Schools, Bass Publications, San Francisco, U.S.A.
- Walne, M. B (2012): Emerging Blended learning models and school profiles, Greater Houston, united states of America.
- Yuni, Y. & Alghadri .F & Wulandari .A (2019): Gender reviewed mathematical, *journal of physics conference series*, v (1315), n (1) .
- Zander, T. & Ollinger, M. & Volz, K. G. (2016): Intuition and insight: Two processes that build on each other or fundamentally differ, *Frontiers in Psychology*, v (7), n (1).