



IMPACT OF ASSURE MODEL ON MATHEMATICAL CORRELATION AND ACHIEVEMENT IN MATHEMATICS

Muayad Kadhim Raheem Al-Haydary

General Directorate of Education, Baghdad Karkh / Second, Baghdad, Iraq,
moayedkadem@gmail.com

Ban Hassan Majeed

University of Baghdad, College of Education for Pure Sciences / Ibn Al-Haitham, Computer Science Dep., Baghdad,
Iraq,

ban.h.m@ihcoedu.uobaghdad.edu.iq

Article history:	Abstract:
Received: 15 th November 2021 Accepted: 20 th November 2021 Published: 30 th November 2021	Educators are continuously seeking new and innovation methods to refine and improve classroom instructions. In recent years, integrating technology has enhanced classrooms instruction. The "ASSURE" lesson plan model provides assistance in achieving this goal. So the objective of this articles to know the impact of ASSURE in mathematical correlation and achievement in math. for "fourth" class science students. Experimental method & the sub-experimental design for two equal groups is done for this research where one of them is an experimental taught by the ASSURE, other is a control taught by traditional. We selected samples of (68) students who deliberately ensured that they were rewarded. The researchers applied teaching experiment on two groups in the first semester of the academic year (2021/2020). Finally as a results of the research, are given in detail in the results section.

Keywords: ASSURE Model, Mathematical Correlation, Students.

1. INTRODUCTION

Researchers recorded that although teachers are preparing and planning lessons by the organization of mathematics besides asking questions during the class, It is noticeable in public schools that students perform poorly in mathematics [1,2]. This defect in students' performance may be because of using traditional teaching methods and the weak effort of teachers. Therefore, researchers chose the ASSURE model for the design of education in organizing the educational material, organizing the teaching, knowing the characteristics of teachers, and then giving the appropriate means to students. Students study mathematics to increase their ability to solve mathematical problems and assist them in applying life situations. In addition, it enables them to master basic skills and develop their abilities to link between different mathematical ideas and other academic subjects.

To achieve the required objectives, researchers need to pay attention to the mathematical correlation skills of the students and strive to acquire them [3,4].

2 LIMITATIONS, IMPORTANCE, AND ASSUMPTIONS

This research chose a school affiliated with the Directorate of Education, "Karkh/2", morning study as a sample for our project. Moreover, we determined the students from the fourth scientific class to join our study. The second and third chapters of the mathematics textbook for (2020-2021) were an example of this research in the first semester of ((2020-2021)). The research derives its theoretical and applied importance from the scarcity of studies that, which were conducted using the ASSURE model of educational design and its impact on mathematical Correlation. Realizing the importance of modern education models and teaching methods may help develop thinking and possibly employ them educationally to achieve the desired goals. This research may draw researchers' attention to teaching methods to improve the classroom environment and increase its effectiveness, thus raising mathematicalCorrelation and achievement. There is a persistent need to acquire the educational field in Iraq in particular and the Arab world in general to apply new learning methods that suit the students of the current century and their orientations. The research seeks to verify the hypotheses, first is "there is no statistically significant difference at the level (0.05) between the average scores of the experimental group students and the average scores of the control group students in the mathematical correlation test. Also, "No statistically significant difference between average scores of two groups students at achievement".

2.1. Most essential search terms:

The "ASSURE" is an instructional design model that has the goal of producing more effective teaching and learning. "ASSURE" is an acronym that stands for the various steps in the model: A in "ANALYZE LEARNER CHARACTERISTICS", S in "STATE OBJECTIVE", S in "SELECT, MODIFY, Or DESIGN MATERIALS", U in "UTILIZE MATERIALS", R in "REQUIRE LEARNER RESPONSE", E in "EVALUATION" [5,6]. The procedural definition is a blueprint for organizing and directing students' educational activities towards mathematics, including using different educational aids within six steps. These steps include the analysis of students' characteristics, setting goals, choosing methods, means, and tools for using them in teaching and evaluation. Mathematical Correlation is a network of intellectual construction that builds ideas on one another. It is linked together by relationships and laws, not a set of different skills from each other [7,8]. The procedural definition is connecting mathematical ideas and realizing their usefulness and interdependence through laws and logical methods. Their activities in serving each other or other sciences or various life activities can be measured by students' total score through a skills test. The achievement is the total score obtained by students in the achievement test. It is measured by the score obtained in a test to determine the success of the teacher's strategy to achieve goals and the knowledge that the learner reaches, which is translated into degrees" [9,10]. The procedural definition calculates the degree representing the students' mathematical knowledge of sample research due to their teaching the first three chapters of the prescribed mathematics book.

3 THEORETICAL BACKGROUND, PREVIOUS STUDIES

3.1. ASSURE Model

This model was developed by [11-13] in 1982, that is, each letter of the model's name is the beginning of each task, including:

1. (A) refers to first of "ANALYZE Learners "; which means "ANALYZE general characteristics".
2. (S) is beginning of "STATE objectives", means "Learning Outcome Assessment".
3. (S) refers to "SELECT methods, media, materials". It means "Selecting an instructional material".
4. (U) is first of (UTILIZE media, materials), which means "prepare environment".
5. (R) refers to the "REQUIRE learner participation", meaning "discussion, formative assessment".
6. (E) is beginning of "EVALUATE& revise", meaning "evaluation, revision". [14,15].

The crucial importance of the ASSURE Model for lesson planning is that planning lessons according to the Assyrian model leads to helping the teacher face the educational materials with confidence and high morale. It also strengthens its positive aspects and clarifies the vision for the teacher, especially concerning defining educational objectives, the content of objectives, appropriate activities, and procedures, and choosing the proper evaluation methods and the right time easily and efficiently [16].

Hence, this model differs from other regular models of education planning in that the teacher alone uses it to plan his teaching activities in the classroom. In contrast, the different models need a group of specialists to design other matters related to all educational systems [17,18].

3.2. Mathematical Correlation

Because of the importance of mathematics in our lives and its close connection in all areas of life, the National Council for Teachers of Mathematics (NCTM, 2000) mentioned the Mathematical Correlation Standard. Modern trends in the teaching and learning of mathematics are in excellent agreement with what the constructivist thought and the contemporary direction of mathematical knowledge for its role in applying a better understanding of the subject [19]. The skills of mathematical correlation are the identification and use of the relationships and links between mathematical ideas, and it is considered a distinguishing feature of understanding mathematics. The learner can explore and apply the connections and links between mathematical thoughts through the curriculum for a specific stage. Among the indicators of its achievement is identifying the previous knowledge related to the new knowledge and its use in solving current mathematical problems. The NCTM emphasized that interdependence enables learners to build further information based on their understanding [20,21]. The mathematic is a single and consistent intellectual construction to connect the mathematical ideas to produce an integrated and interconnected product for completion of the teaching of subjects, and therefore must be integrated with the learning of mathematics [22,23]. One of the indicators of achieving this skill is the integration and correlation between concepts and procedures. And correlation within mathematical topics (numbers, operations, geometry, measurement, problem-solving)[24]. There is an introduction to mathematics and its applications in a context outside mathematics. In all branches, mathematics is of great importance in the daily life of society, arranging their affairs and solving the matters that occur between them that need accounting. Many fields and branches of mathematics link to life, and among the indicators of achieving this skill are the applications of mathematics in daily life and mathematics in other sciences. In making the appropriate decisions related to our everyday lives, we see mathematics involved in all fields, from body care and health to engineering drawing [25,26].

3.3 Previous Studies

The two researchers did not find any study similar to this research, so they decided to divide the axis of previous studies into two axes (the axis of the ASSURE model and the axis of mathematical Correlation) as follows:

1-Studies related to the ASSURE model

	Name of the researcher year country	Target	Educational level	Sample size gender	Research method	Research tools	Results
1	Sultan 2019 Iraq	Knowing impact using ASURE MODEL on achievement in History Department / College of Basic Education, University of Mosul in the subject of history and their self-concept	College of Basic Education, third stage, Department of History	60 Students female & male	experimental	Constructing an achievement test in contemporary history, consisting of 23 items	Building a scale of self-concept commensurate with the individuals of the research sample. Experimental group was superior in achievement and subjective scale tests compared to the control group
2	Al-Hanaki and Al-Arfaj 2020 Saudi Arabia	Identifying the effect of ASSURE on motivation to learn the computer course	first intermediate	24 female students	experimental	Building a scale of motivation towards learning a computer course	motivation towards learning a computer course in exper.

2-Studies related to the Mathematical Correlation

	Name of research year country	Goal	Educational Level	Sample size gender	Research method	Research Tools	Results
1	Khasim 2018 Iraq	Recognizing the impact of the reflected learning strategy on achievement and mathematical coherence skills among fourth-grade	Fourth grade science	77 Male student	experimental	Building an achievement test in mathematics consisting of 30 items Building a test of mathematical coherence skills that consisted of 16 items	Experimental group excelled in both tests.

		students in mathematics					
2	Khalili 2018 Palestine	The effectiveness of using an interactive computer unit in developing the mathematical coherence skills of the eighth grade female students in Gaza is known.	Eighth grade primary	84 female students	experimental	The researcher used an objective test in mathematical coherence consisting of 30 items.	In the mathematical correlation skills test, the experimental group outperformed

4 RESEARCH METHODOLOGY

4.1. The choice of the experimental design is one of the first significant steps taken by the researcher in experimental research to reach the answer to the hypotheses he set to reach the objectives of his research, and the design of the two experimental and control groups was adopted. The current research community consists of students of daily government schools for secondary and high school for boys in "Baghdad Governorate" of General Directorate of Karkh Education/second. While both researcher intentionally select the Mahmudiyah preparatory school / boys; represent research sample to experiment, after defining the school, the researchers chose two divisions using a simple random drawing method out of three divisions of fourth class students. After making sure that the two divisions are equal, Division (B) was chosen randomly to be "experimental group" which is taught by "ASSURE" model, Division (C) to be "control", which according to the traditional method has taught. The number of sample members in the two divisions is (68) students. Before starting the applied experiment, the researchers conducted equivalence between students in research groups at some var. may affect research results. furthermore, they worked to adjust the variables that might affect the dependent variable and the experiment results. Check scientific material is essential for starting experiment because preparation of behavioral objectives and the construction of the achievement test for the study occurs in the light of the scientific material that will teach for students from the mathematics book, the chapter two: Equations, Inequalities, and Root, while chapter three includes the foundations. Then formulate behavioral objectives as prepared by researchers (141) behavioral purpose under the general objectives of teaching fourth mathematics grade scientific and the contents of chapters scheduled teaching of depending on Bloom's Taxonomy of the objectives of cognitive and six levels, these purposes offered to a group of arbitrators specialists to demonstrate their views and comments on their suitability And the safety of its formulation, and accordingly some of the purposes were modified to take the final version. Finally, daily teaching plans were prepared. This research required two tools to measure its dependent variables (the test of mathematical correlation skills and the achievement test):

1-Mathematical Correlation Test: One of the requirements of the research experiment is to conduct a mathematical Correlation test. Given the existence of a test for mathematical Correlation skills, which was prepared by [27] for fourth-class students, the researchers will adopt the test after adapting it to the research sample. Thus the test is ready to be applied to the sample.

2-Achievement Test: The researchers were prepared the test for collection in mathematics for fourth class science in subjects specific chapters of the textbook has been built testing and in line with the content and purposes of behavioral material educational [28,30], and baptized researchers to be paragraphs of the choice of two first multiple-choice four alternatives by (30) sections.

4.2. Research results

1-To verify the "no difference between average scores of two group students at test of math. correlation", see table 1*. There is a difference between averages at favor of experimental group, thus reject the null hypothesis.
 2-To verify the second hypothesis, researchers see a difference at averages and in favor of experimental. See table 1*. It is clear that experimental group's mean scores higher, thus rejecting the null hypothesis.

Table 1.

Table 1.	Groups	N	Average	St. Dev.	calculated	tabular	degree of freedom	statistical level
Test1*	Experimental	35	41.5	9.323	0.098	2	66	0.05
	Control	33	38	0.042				
Test2**	Exp.	35	36.5	6.30	4.667			
	Con.	33	31	3.41				

* Mathematical Correlation Test

** Achievement Test

5 CONCLUSION

Rejection of the null hypotheses means superiority of the students in the experimental set who have studied according to "Model of ASSURE" on the students in the control group in the mathematical correlation test and achievement test. This is a logical result, the fact that the use of a specimen of ASSURE to teach is more appropriate to the nature of mathematics and then closer to Students' minds, attracting their attention and motivating them better than the usual method of teaching as a result of the nature of the principles and procedures on which this model is based. Their ideas are represented by what he deems appropriate and transferred to other life situations, which increases the student's flexibility in dealing with different images of that topic. In addition, it allows students to develop their cognitive abilities.

6 RECOMMENDATIONS

- 1-The use of the ASSURE model affects the level of mathematical correlation and achievement in mathematics for students of the fourth scientific grade to a better degree than the usual teaching method.
- 2-Using the model effectively sets the problem for students in the fourth scientific class from the standard approach in teaching.
- 3-Using the "ASSURE MODEL" contributes to raising the students' educational level, increasing their understanding of the subject, and then fixing it in their minds.
- 4-The use of the "ASSURE" model requires the teacher of the subject to plan in advance and accurately in line with the requirements and objectives of the lesson.

7 SUGGESTIONS

- 1-Conducting similar research in other subjects and at different stages in boys and girls schools To determine the extent of benefit from the ASSURE model.
- 2-Conducting studies examining the impact of "ASSURE MODEL" on other variables such as productive thinking, concept acquisition.
- 3-Conducting comparative studies between using the model and other modern teaching methods for teaching mathematical subjects.
- 4-Studying the practices of mathematics teachers to determine the extent of their interest in mathematical interdependence and the opportunities they provide for their students to create mathematical connections and identify different mathematical relationships.

REFERENCES

1. Stephenson ,Chris; et al. (2011). Examining the Use of the ASSURE Model by K–12 Teachers. *CSTA Voice*. 7 (2), 3–4. "CT is a problem solving process..." Cite uses = deprecated parameter |coauthors=
2. Majeed, B.H. , Jawad, L.F., AlRikabi, H.TH.Salim (2021) .Tactical Thinking and its Relationship with Solving Mathematical problems Among Mathematics Department Students. *IJET*, 16(09).247-262.
3. Daesang Kim &Steve Downey (2016). Examining the Use of the ASSURE Model by K–12 Teachers, 38(6), 153-168. Retrieved from <https://doi.org/10.1080/07380569.2016.1203208>
4. Olayinka, T. A., Jumoke, T. F., &Oyebamiji, M. T. (2018). Reengineering the ASSURE Model to curbing problems of technology integration in Nigerian learning institutions. *Research in Learning Technology*, 26.
5. Majeed, B.H. (2020). The relationship of conceptual knowledge and procedural knowledge among students of the Mathematics Department at the Faculty of Education for Pure Sciences / Ibn Al-Haitham; University of Baghdad. *IJICC*. 12(4). 333-346.

6. Sami Hameed Kadhim Al-Khattat et al (2019). An ASSURE-Model Instructional Design Based on Active Learning Strategies and its Effect for 1st Intermediate Student's Higher Order Thinking Skills in Teaching Science Text Book, *Psihologija*, Volume 52, Issue 5, 339-349.
7. Jawad, L.F. , Majeed, B.H., AlRikabi, H.TH.Salim (2021). The impact of CATs on Mathematical thinking and Logical Thinking Among Fourth-Class Scientific Students. *IJET*, 16(10). 194-211. <https://doi.org/10.3991/ijet.v16i10.22515>
8. Majeed, B.H. (2017). Procedural knowledge for the, Mathematics Departments Students, College of Education for Pure Sciences / Ibn Al-Haytham, University of Baghdad. *Arab Studies in Education & Psychology (ASEP)*. 85(2). 393-402.
9. Jawad, L.F. , Majeed, B.H., AlRikabi, H.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. *IJIM*, 15(13). 172-188. <https://doi.org/10.3991/ijim.v15i13.24185>
10. Bajracharya, J. R. (2019). Instructional Design and Models: ASSURE and Kemp. *Journal of Education and Research*, 9(2), 1-9.
11. B. H. Majeed, "The skill of taking a decision and its relationship of academic achievement among students of colleges of education in the province of Baghdad," *International Journal of Recent Contributions from Engineering, Science & IT (IJES)*, vol. 9, no. 4, 2021.
12. N. A. jasim, H. Alrikabi, and Mansour S. Farhan, "Design and Implementation of Smart City Applications Based on the Internet of Things," *IJIM*, vol. 15, no. 3, 2021.
13. Russell James, J. D. ,Ph. D. , Clinical Assistant Professor in the Technology Leadership and Innovation Department at Purdue University's Polytechnic Institute.
14. H. Salim, B. Majeed, and Z. Abass, "The influence E-Learning platforms of Undergraduate Education in Iraq," *International Journal of Recent Contributions from Engineering, Science & IT (IJES)*, vol. 9, no. 4, 2021
15. Jawad, L.F., Raheem, M K. , Majeed, B.H. (2021). The Effectiveness of educational Pillars Based on Vygotsky's theory in Achievement and Information Processing Among First Intermediate Class Students. *IJET*, 16(12). 246-262. <https://doi.org/10.3991/ijet.v16i12.23181>
16. Majeed, B.H. , Hussain, A. KH. (2021). The Impact Of Reflexive Learning Strategy On Mathematics Achievement By First Intermediate Class Students And Their Attitudes Towards E-Learning. *Turkish Journal of Computer and Mathematics Education*. 12(7). 3271-3277.
17. Jawad, L.F. (2021). The Impact Of Innovative Matrix Strategy And The Problem Tree Strategy On The Mathematical Proficiency Of Intermediate Grade Female Students. *Turkish Journal of Computer and Mathematics Education*, 12 (7). 3296-3305.
18. 3296-3305.
19. Alrikabi, H. (2021). Enhanced Data Security of Communication System using Combined Encryption and Steganography, *International Journal of Interactive Mobile Technologies*, vol. 15, no. 16, 144-157.
20. Majeed, B.H. , Al-Maauef, R.B. . (2014). Mathematical Logical Intelligence and its Relationship with Achievement among College of Education Students in Baghdad Governorate. *Nasaq*, 1(2).
21. Rusbult, C. (2009). Thinking Skills In Education, Analytical Comparison of Four Frameworks.
22. Y Kristianti, S Prabawanto and S Suhendra (2017). Critical Thinking Skills of Students through Mathematics Learning with ASSURE Model Assisted by Software Autograph. *Journal of Physics: Conference Series*. Vo. 895, (ICMSce), Bandung, Indonesia.
23. Ventura, M., Lai, E., & DiCerbo, K. (2017). Skills for today: What we know about teaching and assessing critical thinking [White paper]. Retrieved March 29, 2018, from Partnership for 21st Century Learning.
24. Zuhrita Ariefiani, Djoko Kustono, SyaadPathmantara (2016). Module development with project-based learning approach and assure development model.
25. Jatuporn N., Maitree I., Narumon Ch. (2021). Synthesis of Research on Mathematical Thinking Development under the Lesson Study and Open Approach Context. *Randwick International of Educational and Linguistics Science Journal*, 2 (3), 296-306.
26. Hua Ran, Nam Ju Kim, Walter G Secada (2021). A meta-analysis on the effects of technology's functions and roles on student's mathematics achievement in K-12 classrooms. *Journal of Computer Assisted Learning*.
27. DS Ayunani, D Indriati (2020). Analyzing mathematical connectin skill in solving a contetual problem. *Journal of Physics: Conference Series*.
28. Obaid, Qassem Mesir Ziyarah (2018). The effect of the reflected learning strategy on achievement and mathematical coherence skills among fourth-grade students in mathematics. Unpublished master's thesis. College of Education for Pure Sciences Ibn Al-Haytham, University of Baghdad, Baghdad.
29. Alaidi, A. , Yahya, O. , Alrikabi, H. (2020). Using Modern Education Technique in Wasit University. *International Journal of Interactive Mobile Technologie.*, vol. 14, no. 6, 82-94.
30. Jasim, N. A. , Alrikabi, H. T. Salim, Farhan, M. S. (.2021). Internet of Things (IoT) application in the assessment of learning process. in *IOP Conference Series: Materials Science and Engineering*, vol. 1184, no. 1, 012002: IOP Publishing

31. Abdul-Rahman Al-Malah, D. (2020). The Interactive Role Using the Mozabook Digital Education Application and its Effect on Enhancing the Performance of eLearning. *International Journal of Emerging Technologies in Learning (IJET)*, vol. 15, no. 20, 21-41.