International Education and Culture Studies
E-ISSN 2766-6778
Vol. 2, No. 1, 2022
Published by STSL Press

Original Paper

A Future Vision of Mathematics Teacher Preparation Program at the Universities

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Abstract

The current research aims to evaluate the Mathematics teacher preparation program by identifying the views of the fourth stage students / College of Education - Department of Mathematics at the University of Baghdad towards the accompanying teaching methods and comparing them with the views Education College students - Department of Mathematics at Al-Mustansiriya University. Then identifying the reasons for the different points of view between the students of the two universities and proposing a future vision for the development of Mathematics teacher preparation programs in the faculties of education. The descriptive-analytical approach and the comparative approach were used. To achieve its goals, a scale was built to evaluate the reality of the Mathematics teacher preparation program from the students' point of view. The scale consisted of (24) items, which were applied after completing the period of practical application on a sample of (100) students from the mathematics departments - fourth stage, divided equally between College of Education for pure science / Ibn Al-Haitham, University of Baghdad, and College of Education, Al-Mustansiriya University. The search results were summarized, accordingly, the researchers presented a set of recommendations and suggestions that would benefit from the research and its results.

Keywords: Future vision, Mathematics Teacher Preparation Program.

1. Introduction

Teacher preparation programs are very necessary for the formation of the cognitive, skill, and emotional aspects of the student in the faculties of education. It is the main axis that allows him to try everything theoretical by dealing with students during his study and after his graduation when exercising his role as a successful and effective teacher (Sasson, Yehuda, Miedijensky, & Malkinson, 2021; Kaiser, 2020). Because of the changing security conditions, Iraq has witnessed. In addition, because of the unstable conditions in all areas of life, especially the educational sector, many educational systems and curricula that were prevalent in educational institutions, including universities, differed (Majeed, Jawad, & Alrikabi, 2021; Al-Sarry, 2020).

The course of practical education, for example, or the teacher preparation program in the faculties of education is no longer the same as in the previous years. Some changes have taken place in it to be more suitable for the current Iraqi environment, as its applications differed from one university to another. According to personal judgments sometimes, and this matter may create confusion in the educational process. Therefore, educators and specialists in teaching methods were very interested in the field of curricula and courses of the faculties of education as well as the practical education program through their research and many proposals and ideas, but we did not see any of them that cares about the students' point of view themselves with the teaching methods prevailing in the faculties of education, which prepare teachers of mathematics, what is the difference between them and other universities and determine the reasons for this difference, if any (Al-Malah & Salim, 2020; Hussein,

2021; Chew & Cerbin, 2021). Many educational studies have revealed the ability of the curricula of colleges of education and their clear teaching methods in developing the basic teaching skills of the student-teacher and providing him with the knowledge necessary to perform his teaching tasks inside and outside the classroom. As evaluation is an integral part of the teaching and learning process, it continues as long as the educational process continues, and it aims, in the end, to develop the learner in all respects (Alrikabi, 2021; Adshead, Thacker, Fuldauer, & Hall, 2019; Gaba, 2004). It also shows the adequacy of strategies and methods to achieve the goals in addition to being a comprehensive cooperative process involving all parties to the educational process (Krammer, Ratzka, Klieme, Lipowsky, Pauli, & Reusser, 2006). Through the experience of the researchers in training and supervising students of practical education in the faculties of education-the departments of mathematics, they confirmed the existence of a noticeable decline in the level of performance of applied students in the period of field training in secondary schools. This may be due to the inefficiency of the teaching methods and strategies accompanying the preparation program and the adoption of traditional methods and simulation models that made the applied student in faculties of education just a passive and non-participant recipient who is not proficient in any knowledge or skill role in the educational process and his teaching skills are almost limited as he faces many obstacles that limit his skills, This was confirmed by many studies (Ruppert, McMurtrie, Coleman, Senn, & Ellyson, n.d.; Jawad, Raheem, & Majeed, 2021; Alaidi, Yahya, & Alrikabi, 2020).

1.1 A Future Vision of Mathematics Teacher Preparation Program

The procedural definition of the future vision is an activity carried out by the researchers to present several steps and procedures that contribute to the development of the program for preparing mathematics teachers and solving problems that may face it, which was represented in achieving the third objective of the research (Cai & Hwang, 2020; Majeed, 2014).

Teacher training program is teacher training and education programs that must contain the teaching skills that every teacher should possess, in addition to training them on how to employ them in classroom situations (Hussein Muhammad & Jabbar Faris, 2021; Petroli, 2021; Jawad, Majeed, & Haider Alrikabi, 2021). The procedural definition of the Mathematics Teachers Preparation Program is an integrated system of theoretical and practical programs adopted by the faculties of education at the universities of Baghdad and Al-Mustansiriya aimed at providing the student during his four educational stages with educational and mathematical knowledge and classroom teaching skills by following a set of strategies and methods of teaching by university professors.

Based on the role of education in the challenges of the twenty-first century and its application of the principle of mutual learning. The educational institutions are linked to produce institutions that corresponding to the type of education that is provided in these institutions to integrate what is theoretical and what is practical.

Therefore, the theoretical and practical significance of this research is summarized in keeping pace with modern trends in the educational process, which requires the evaluation of educational institutions and the adoption of an effective critical vision. developing a future vision for the programs of preparing mathematics teachers. Teaching strategies and methods accompanying the programs for preparing mathematics teachers because of their role in providing them with basic skills in the teaching process. The possibility of benefiting from the search tool in evaluating mathematics teacher preparation programs in other colleges of education and teacher preparation institutes, as well as in training courses for mathematics teachers. The possibility that the research sheds light on other researches that reach the possibility of applying the future vision of the mathematics teacher preparation program.

1.2 Theoretical Background and Previous Studies

The role of education in the challenges of the twenty-first century and its application of the principle of mutual learning is very important, where educational institutions are linked to production institutions corresponding to the type of education that is pro-vided in these institutions to integrate what is theoretical or what is practical (Tall, 2002). Also, due to the recent changes in the political systems and the instability of the security situation, different interpretations emerged according to the visions and ideas of educators those in charge of educational institutions, which generated a difference in teacher

preparation programs and the accompanying teaching methods. Including preparing the mathematics teacher in light of the new Iraqi experience, which always needs evaluation for improvement and development (Jawad, Majeed, & Salim, 2021; Salim & Jasim, 2021; Guner & Akyuz, 2020).

Most of the results of international researches indicate the importance of giving the mathematics teacher an effective role in the education process and transforming the learner into an active participant in the classroom, as mathematics education is the most scientific material that makes good citizens of the after-school community, and the difficulties that the learner can face in teaching mathematics are limiting from this active participation (Majeed, 2020; Goloshumova, Ershova, Salakhova, Kidinov, Nalichaeva, & Yanysheva, 2019).

Serious strategic work in any field includes a clear and specific goal, desire and determination to achieve the goal, as well as successive moves to reach the goal, mental flexibility represented in the availability of alternatives for each move, and finally, experience in setting priorities, in addition to a relentless pursuit with the most possible guarantees to reach the goal (Harb, 2019; Al Khaza'leh, 2021). Accordingly, the process of training in the university and preparing an able teacher requires a professional university professor teaching process whose purpose is to move the different senses to play their role in observing the reality and monitoring what surrounds the student accurately and objectively and practicing selection and creative addition in the light of specific criteria (Abass, Salim ALRikabi, Al-Malah, & Majeed, 2021; Al-Sarry, 2019). It is a very difficult process for those who appreciate the meaning of university teaching, as it is a complex profession that requires its owner to update and renew his style and strategies, not every day, but in every lecture, to provide his students with educational experiences and situations through which they access information subjectively to discuss each other in their ideas, develop their skills and discover their mistakes, Thus, they correct these errors according to international scientific standards (Hussein & Faris, 2021; Muhammed & Faris, 2021). In the United States, for example, some find it difficult, or even impossible, to determine precisely, clearly, and consistently how mathematics teachers are learning in the preparation period. Questions are usually asked such as - Who teaches mathematics teachers in the preparation period? - What is Mathematics and the methods that they teach? - What is the way that mathematics teachers should study in the preparatory period (Ijirana & Supriadi, 2018)?

1.3 Previous Studies

In Majeed (2021), the authors aimed to evaluate mathematics courses and their teaching strategies in the College of Education at Al-Aqsa University in Gaza and their role in preparing the mathematics teacher in the primary stage. The researchers used the descriptive analytical approach, where they prepared two questionnaires that were applied to a random sample of 154 male and female students in primary education. The statistical package (spss) was used to obtain the most important results, as it generally confirmed the availability of quality standards in mathematics curricula and strategies for teaching them in the College of Education. In [33], they aimed to identify contemporary trends in teacher preparation in the Kingdom of Saudi Arabia and the justification for working on finding new programs that the program graduates can provide in the service of the labor market, national development plans, and scientific research. He then drew up a proposed strategy to develop the mathematics parameter in the light of contemporary trends in the 21st century. The study followed the analytical descriptive methodology of teacher preparation programs in beginning preparation for the development of a proposed program in the light of the theoretical framework, studies, and past experiences and the current reality of preparing the teacher in Saudi Arabia and taking advantage of contemporary trends in drawing up the proposed strategy. It presented a vision of a proposed strategy to develop the preparation of mathematics teachers at Prince Sattam bin Abdul Aziz University - College of Education for girls in Dalm - in the Kingdom of Saudi Arabia. In Majeed (2021), the study proved that in-service teachers' training in mathematics shall be provided, with due attention to developing conceptual understanding, procedural knowledge, problem-solving, and practical reasoning skills. The objective of the study was to explore the opinion of the teachers about the content of the mathematics courses in teacher training programs. The research question was: what are the impact of job category (Primary, Middle, and Secondary) and gender on the total score of teachers' satisfaction about the content of mathematics courses in teacher training programs? The sample for the study was the mathematics teachers who have a mathematics background and have taken mathematics as a subject in

the teacher training programs. A questionnaire was developed on a five-point Likert scale for knowing the opinion of the teachers. ANOVA was used for finding the impact of job category and gender on teachers' satisfaction with the content of mathematics courses in the teacher training programs.

From the above-mentioned studies, the researchers benefited from knowing the appropriate research methodology and selecting the items of scales that fit the objectivity of our research.

2. Methods

2.1 The researchers used the comparative research method and the analytical descriptive method for their relevance to the subject of the research in terms of comparing the data of the phenomenon, describing it, analyzing it, explaining its causes, and developing a future vision for it. The original community consisted of all the students of the fourth stage of Mathematics Department-Education College at Baghdad University, which numbered 128 male and female students, and all students of the fourth stage of Mathematics Department-Education College at Al-Mustansiriya University, whose number was 153 male and female. Thus, the total community became 281 male and female students in the fourth stage of the two universities.

The exploratory sample: To verify the stability of the research tool, it was applied to a sample of (30) students from the fourth stage of Mathematics Department-Education College at Al-Mustansiriya University. The original research sample: The original research sample consisted of 100 male and female students from the two universities, which represents (35.6%) of the total population of 281 male and female students, as it was divided into 50 male and female students who were randomly selected from the fourth stage of Mathematics Department-Education College at University of Baghdad, and (50) male and female students were randomly selected from the fourth stage of Mathematics Department-Education College at Al-Mustansiriya University.

2.2 Research Tools, after reviewing the educational literature, research, and previous studies, a questionnaire was built to evaluate the teaching strategies and methods accompanying the mathematics teacher preparation program from the students' point of view in both the Colleges of Education at the University of Baghdad and Al-Mustansiriya University. The items of the questionnaire consisted of (24) items and four alternatives (available to a large extent, available to a moderate extent, available to a small extent, not available). The authenticity of the tool, the validity of the arbitrators: The questionnaire was presented to 10 arbitrators from the specialization of curricula and methods of teaching mathematics and science in the Department of Mathematics and Educational and Psychological Sciences in both Baghdad University and Al-Mustansiriya University to express their observations and amendments about the validity of the paragraphs and their readiness for application.

Tool stability: The questionnaire's stability was calculated on the members of the previous exploratory sample of 30 male and female students from the Mathematics Department at the College of Education, Al-Mustansiriya University, using the Alpha-Cronbach method, and the half-segmentation method.

The researchers used the Alpha-Cronbach method to calculate the reliability of the questionnaire, and the total reliability coefficient reached (0.899), which indicates that the questionnaire has a high degree of stability. The researchers also used the mid-term segmentation method to calculate the reliability coefficient through the scores of the exploratory sample and then modified it with the Spearman-Brown equation, where it reached (0.858) and the stability coefficient is considered high, which increases the reassurance of the researchers in applying the questionnaire to the research sample. Statistical Means, so to obtain the results of the field research, the researchers applied frequencies, arithmetic averages, percentages, and t-test for two independent samples to calculate the differences between them.

Final Application of The Tool: By the work of the first and the second re-searchers in the field of supervising students of practical education in the departments of mathematics in the two mentioned universities, each of them applied the research tool to its students after the end of the period of practical field application in secondary schools to know their views on strategies and the methods accompanying the program to prepare them as teachers of mathematics.

3. Presentation and Discussion of Results

It includes analyzing and presenting the results according to the point of view of the students of Education College in each university, then comparing those results with each other, as follows:

3.1 First Goal-related Results and the Sub-questions from It

1. What is the point of view of the students of Education College at Baghdad University towards the teaching strategies and methods accompanying the mathematics teacher preparation program?

To answer this question, the researchers used frequencies, averages, and percentages, and to interpret the results:

- 80% or more: a very high degree
- 70%-79.9%: a high degree
- 60%-69.9%: a medium degree
- 50%-59.9%: a weak degree
- less than 50%: Very weak (non-existent) degree.

Table 1. Frequencies, Arithmetic Averages, Standard Deviations, and Percentages from the Perspectives of the Students of Education College at the University of Baghdad

Clause No.	Clauses	Repetitions	Arith. Average	St. Dev.	Relative Weight	Ranking
1	Providing him with knowledge of teaching and learning theories	177	3.54	0.645	88.5	6
2	Training him to plan his lesson and explain the importance of it	182	3.64	0.631	91	3
3	Prepare for him an introduction by telling him the teaching objectives	180	3.6	0.728	90	4
4	Prepare an introduction for him by recalling the previous information and linking it to the new	177	3.54	0.676	88.5	8
5	Training him to analyze the content of the lesson into its types of knowledge (concepts - generalizations - skills - problems)	188	3.76	0.687	94	1
6	Train him on appropriate strategies for teaching the mathematical content	175	3.5	0.646	87.5	9
7	Training him to diagnose the mistakes of his students and how to treat them	173	3.46	0.813	86.5	10
8	Gives him the opportunity to watch model lessons	141	2.96	1.511	70.5	20
9	Providing him a private school nearby to watch the model lessons	137	2.74	1.084	68.5	21
10	Provide a laboratory for training in a	83	1.66	0.917	41.5	24

	micro-teaching style					
11	Orientate him to the manufacture of some educational aids and methods of use	116	2.92	0.899	58	23
12	It gives him the opportunity to practice some basic teaching skills (asking questions - reinforcement - feedback ----)	172	3.44	0.76	86	12
13	Directing him to view textbooks and analyze their content	184	3.68	0.712	92	2
14	Training him to use modern strategies (cooperative learning - learning by games - brainstorming - problem solving -)	166	3.32	0.767	83	15
15	Take into account individual differences among learners	178	3.56	0.732	89	5
16	Allows him to use different learning resources (books, magazines, and modern electronic means of communication)	148	2.96	1.068	74	19
17	Develops for him research methods, experimentation, creativity and innovation	162	3.42	0.784	85.5	13
18	It provides him with opportunities to link the lesson experiences to his life and the lives of his students	154	3.08	0.853	77	18
19	Allows him to summarize his lesson for training on the skill of information processing	173	3.46	0.787	86.5	11
20	Develops the ability to use higher-order thinking skills, including decision-making skills	171	3.42	0.784	85.5	14
21	Develop mathematical communication skills (writing - reading - speaking - listening)	177	3.54	0.734	88.5	7
22	Employing the principles of educational psychology in the classroom environment	164	3.28	0.881	82	16
23	Train him to design achievement tests according to the levels of his students	163	3.26	0.828	81.5	17
24	Provide opportunities for scientific research and the use of statistical methods	130	2.6	1.195	65	22

It is clear that most of the strategies and methods accompanying the preparation program were represented by the paragraphs: (2) Training him to plan his lesson and explain the importance of it; (5) Training him to analyze the content of the lesson into its types of knowledge (concepts - generalizations - skills - problems); (13) Directing him to view textbooks and analyze their content. Thus the least

strategies the methods accompanying the preparation program were represented in paragraphs (10) Provide a laboratory for training in a micro-teaching style (almost non-existed); (11) Orientate him to the manufacture of some educational aids and methods of use; (24) Provide opportunities for scientific research and the use of statistical methods.

2. What is the point of view of the students of Education College at Al-Mustansiriya University towards the teaching strategies and methods accompanying the mathematics teacher preparation program?

Table 2. Frequencies, Arithmetic Averages, Standard Deviations, and Percentages from the Perspectives of the Students of Education College at Al-Mustansiriya University

Clause No.	Clauses	Repetitions	Average	Std. Dev.	Relative Weight	Ranking
1	Providing him with knowledge of teaching and learning theories	156	3.12	0.593	78	3
2	Training him to plan his lesson and explain the importance of it	158	3.16	0.71	79	1
3	Prepare for him an introduction by telling him the teaching objectives	155	3.1	0.788	77.5	4
4	Prepare an introduction for him by recalling the previous information and linking it to the new	158	3.16	0.817	79	2
5	Training him to analyze the content of the lesson into its types of knowledge (concepts - generalizations - skills - problems)	151	3.02	0.868	75.5	6
6	Train him on appropriate strategies for teaching the mathematical content	138	2.76	0.846	69	12
7	Training him to diagnose the mistakes of his students and how to treat them	153	3.06	0.766	76.5	5
8	Gives him the opportunity to watch model lessons	124	2.44	1.072	62	20
9	Providing him a private school nearby to watch the model lessons	86	1.72	0.99	43	24
10	Provide a laboratory for training in a micro-teaching style	101	1.84	0.997	50.5	23
11	Orientate him to the manufacture of some educational aids and methods of use	120	2.4	0.88	60	22
12	It gives him the opportunity to practice some basic teaching skills (asking questions - reinforcement - feedback ----)	144	2.88	0.824	72	9
13	Directing him to view textbooks and analyze their	125	2.5	1.035	62.5	19

	content					
14	Training him to use modern strategies (cooperative learning - learning by games - brainstorming - problem solving -)	135	2.7	0.909	67.5	15
15	Take into account individual differences among learners	142	2.84	0.997	71	10
16	Allows him to use different learning resources (books, magazines, and modern electronic means of communication)	120	2.4	1.069	60	21
17	Develops for him research methods, experimentation, creativity and innovation	130	2.6	0.989	65	18
18	It provides him with opportunities to link the lesson experiences to his life and the lives of his students	145	2.9	1.035	72.5	8
19	Gives him the opportunity to summarize his lesson for training on the skill of information processing	140	2.8	0.947	70	11
20	Develops the ability to use higher-order thinking skills, including decision-making skills	132	2.66	1.099	66	17
21	Develop mathematical communication skills (writing - reading - speaking - listening)	148	2.96	0.879	74	7
22	Employing the principles of educational psychology in the classroom environment	134	2.68	0.957	67	16
23	Train him to design achievement tests according to the levels of his students	135	2.7	0.886	67.5	14
24	Provide opportunities for scientific research and the use of statistical methods	137	2.74	0.964	68.5	13

It is clear from the previous table that most of the strategies and methods accompanying the preparation program were represented by the paragraphs: (1) Providing him with knowledge of teaching and learning theories. (2) Training him to plan his lesson and explain the importance of it. (4) Prepare an introduction for him by recalling the previous information and linking it to the new. Thus the least strategies the methods accompanying the preparation program were represented in the paragraphs: (9) Providing him a private school nearby to watch the model lessons (al-most non-existed). (10) Provide a laboratory for training in a micro-teaching style. (11) Orientate him to the manufacture of some educational aids and methods of use.

3. Are there statistically significant differences in the views of the students of Education College at the University of Baghdad and the students of Education College at Al-Mustansiriya University towards the teaching strategies and methods accompanying the mathematics teacher preparation program?

Table 3. Averages, Standard Deviations, and the Calculated (T) Value of the Views of Students of the Faculties of Education in the Two Universities

University	The Sample	Arith. Average	Std. Dev.	Degree of Freedom	T-Value		Significance At 0.05 Level
					Calculated	Tabulated	
Baghdad	50	78.14	11.788	98	69.106	1.660	Statistic
Al-Mustansiriya	50	65.3	11.716				

The views of the students of Education collages in Mathematics department in the two universities differ in most of the paragraphs, and the most different is the following cases: (7) Training him to diagnose the mistakes of his students and how to treat them. (13) Directing him to view textbooks and analyze their content. (24) Provide opportunities for scientific research and the use of statistical methods. Thus they are very similar in specific paragraphs such as: (2) Training him to plan his lesson and explain the importance of it. (9) Providing him a private school nearby to watch the model lessons. (10) Provide a laboratory for training in a micro-teaching style.

3.2 Second Goal-related Results

The reasons for the difference of views are due to several factors, including; the difference between the two programs in the subject of observation in the cooperating schools, as it is implemented at the University of Baghdad, while it is not implemented at the Al-Mustansiriya University. The lack of interest of most academic supervisors in applying for the observation card accurately and only one visit that may cover one class or not. Therefore, the estimates and judgments appear to be subjective and depend on the personal relationships between the trainee student and the supervisor and for both universities. The discrepancy in the payment of supervision wages to academic supervisors during the field application period, as there were no other means of encouragement by the administration of the faculties of education, such as books of thanks and appreciation. Variation and difference in the availability of cooperating schools between the two universities, and the formal organizing manner for training students - those applying, not adopting an official cooperative formula that adopts the training period, also not adopting an administrative mechanism that helps encourage these schools to cooperate in communication such as letters of thanks and appreciation or any other privileges. Choosing schools in the second semester based on their proximity or distance from the student's residence, or based on personal relationships that link the student with their departments, not based on their cooperation. The difference in the cooperation of the cooperating teacher in schools and his exploitation of the student without doing his duty or vice versa his lack of confidence in him and his adherence to all lessons, and this may be due to his lack of awareness of the importance of his role in the stage of watching and participating. The distance between the implementation schools, the tense security situation in some areas, the lack of time for the supervising professor, and the increase in the burden of teaching hours led to a decrease in the number of visits and the failure to perform his roles in developing the applied student's skills to both universities, in varying proportions.

3.3 Third Goal-related Results

The reasons for the difference of views are due to several factors; including; the difference between the two programs in the subject of observation in the cooperating schools, as it is implemented at the University of Baghdad, while it is not implemented at the Al-Mustansiriya University. The lack of interest of most academic supervisors in applying for the observation card accurately and only one visit that may cover one class or not; therefore, the estimates and judgments appear to be subjective and depend on the personal relationships between the trainee student and the supervisor and for both universities. The discrepancy in the payment of supervision wages to academic supervisors during the field application period, as there were no other means of encouragement by the administration of the faculties of education, such as certificates of appreciation and letters of thanks. Variation and difference in the availability of cooperating schools between the two universities, and the formal organizing manner for training students - those applying, not adopting an official cooperative formula that adopts the training period, also not adopting an administrative mechanism that helps encourage these schools

to cooperate in communication such as letters of thanks and appreciation or any other privileges. Choosing schools in the second semester based on their proximity or distance from the student's residence, or based on personal relationships that link the student with their departments, not based on their cooperation. The difference in the cooperation of the cooperating teacher in schools and his exploitation of the student without doing his duty or vice versa his lack of confidence in him and his adherence to all lessons, and this may be due to his lack of awareness of the importance of his role in the stage of watching and participating. The distance between the implementation schools, the tense security situation in some areas, the lack of time for the supervising professor, and the increase in the burden of teaching hours led to a decrease in the number of visits and the failure to perform his roles in developing the applied student's skills to both universities, in varying proportions.

References

Abass, A. Z., Salim ALRikabi, H. TH., Al-Malah, D., & Majeed, B. H. (2021). The influence E-Learning platforms of Undergraduate Education in Iraq. *International Journal of Recent Contributions from Engineering, Science & IT (iJES)*, 2021.

Adshead, D., Thacker, S., Fuldauer, L. I., & Hall, J. W. (2019). Delivering on the Sustainable Development Goals through long-term infrastructure planning. *Global Environmental Change*, *59*, 101975.

Al Khaza'leh, M. S. (2021). A Perceived Suggestion to Improve the Educational Outcomes of Colleges of Education at Jordanian Universities. *Multicultural Education*, *7*(2).

Alaidi, A., Yahya, O., & Alrikabi, H. (2020). Using Modern Education Technique in Wasit University. *International Journal of Interactive Mobile Technologies*, *14*(6), 82-94.

Al-Malah, D., & Salim, H. (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)*, *15*(20), 21-41.

Alrikabi, H. (2021). Enhanced Data Security of Communication System using Combined Encryption and Steganography. *International Journal of Interactive Mobile Technologies*, *15*(16), 144-157.

Al-Sarry, M. J. S. (2019). Investigating the Performance Skolls Of Mathematics student-Teacher. *Opcion*, *35*(19), 2366-2387.

Al-Sarry, M. J. S. (2020). The Effect of Multiple Representations in Teaching Mathematical Concepts in Mathematics Literacy among Intermediate Level Students. *PalArch's Journal of Archaeology of Egypt/Egyptology*, *17*(10), 734-749.

Cai, J., & Hwang, S. (2020). Learning to teach through mathematical problem posing: Theoretical considerations, methodology, and directions for future research. *International Journal of Educational Research*, *102*, 101391.

Chew, S. L., & Cerbin, W. J. (2021). The cognitive challenges of effective teaching. *The Journal of Economic Education*, *52*(1), 17-40.

Gaba, D. M. (2004). The future vision of simulation in health care. *BMJ Quality Safety*, *13*(suppl 1), i2-i10.

Goloshumova, G. S., Ershova, O. V., Salakhova, V. B., Kidinov, A. V., Nalichaeva, S. A., & Yanysheva, V. A. (2019). Information and educational environment of higher school as a factor of the formation of coping strategies in the structure of students' personality (ecological and psychological aspect). *Eurasian journal of biosciences*, *13*(2), 1867-1874.

Guner, P., & Akyuz, D. (2020). Noticing student mathematical thinking within the context of lesson study. *Journal of Teacher Education*, *71*(5), 568-583.

Harb, S. A. (2019). The Effectiveness of synchronous collaborative learning (Electronic/Blended) on Achievement and Developing Skills of Employing Active Learning among Al-Aqsa University

Students of College of Education. *International Journal of Research in Educational Sciences*, *2*(2), 307-342.

Hussein Muhammad, M. S., & Jabbar Faris, A. D. I. (2021). Mathematical Connections and Their Relationship to Strategic Intelligence Among Students of Mathematics Department in The Colleges of Education. *Journal of Contemporary Issues in Business Government*, *27*(3), 2193-2199.

Hussein, A. (2021). An Analysis Of Six Scientific-Grade Book Content According To High Order Thinking Skills. *Turkish Journal of Computer Mathematics Education*, *12*(13), 4445-4450.

Hussein, A. D., & Faris, I. J. (2021). An Analysis Of Six Scientific-Grade Book Content According To High Order Thinking Skills. *Turkish Journal of Computer and Mathematics Education*, *12*(13), 4445-4450.

Ijirana, I., & Supriadi, S. (2018). Metacognitive skill profiles of chemistry education students in solving problem at low ability level. *Jurnal Pendidikan IPA Indonesia*, *7*(2), 239-245.

Jawad, L. F., Majeed, B. H., & Haider Alrikabi. (2021). The impact of teaching by using STEM approach in the Development of Creative Thinking and Mathemati-cal Achievement Among the Students of the Fourth Sci-entific Class. *International Journal of Interactive Mobile Technologies (iJIM)*, *15*(13), 172-188.

Jawad, L. F., Majeed, B. H., & Salim, H. (2021). The Impact of CATs on Mathematical Thinking and Logical Thinking Among Fourth-Class Scientific Students. *International Journal of Emerging Technologies in Learning (iJET)*, *16*(10), 194-211.

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. *International Journal of Emerging Technologies in Learning (iJET)*, *16*(12), 246-262.

Kaiser, G. (2020). Mathematical modeling and applications in education. *Encyclopedia of mathematics education*, 553-561.

Krammer, K., Ratzka, N., Klieme, E., Lipowsky, F., Pauli, C., & Reusser, K. (2006). Learning with classroom videos: Conception and first results of an online teacher-training program. *ZDM*, *38*(5), 422-432.

Majeed, B. H. (2014). Mathematical Logical Intelligence and its Relationship with Achievement among College of Education Students in Baghdad Governorate. *Nasaq*, *1*(2).

Majeed, B. H. (2020). The Relationship Between Conceptual Knowledge and Procedual Knowledge among Students of the Mathematics Department at the Faculty of Education for Pure Science/ Ibn Al- Haithem. *International Journal of Innovation, Creativity and Change (ijicc)*, *12*(4), 333-346.

Majeed, B. H. (2021). The skill of decision-making and its relationship to academic achievement among students. *International Journal of Recent Contributions from Engineering, Science & IT (iJES)*, 2021.

Majeed, B. H., Jawad, L. F., & Haider Alrikabi. (2021). Tactical Thinking and its Relationship with Solving Mathematical Problems Among Mathematics Department Students. *International Journal of Emerging Technologies in Learning (iJET)*, *16*(9), 247-262.

Muhammed, Sh. H., & Faris, A. M. I. J. (2021). Mathematical Connections and their relationship to strategic intelligence among students of mathematics department in the college if education. *Journal of Contemporary Issues in Business and Government*, *27*(3).

Petroli, M. A. (2021). Toward a Modern Civic Monumentality: Arches, Vaults, and Domes in Postwar American Architecture. *Illinois Institute of Technology*.

Ruppert, N. B., McMurtrie, D., Coleman, B. K., Senn, G. J., & Ellyson, S. (n.d.). Current Issues in Middle Level Education. *Education*, *25*(1), 4.

Salim, H. T., & Jasim, N. A. (2021). Design and Implementation of Smart City Applications Based on the Internet of Things. *International Journal of Interactive Mobile Technologies (iJIM)*, *15*(13), 4-15.

Sasson, I., Yehuda, I., Miedijensky, S., & Malkinson, N. (2021). Designing new learning environments: An innovative pedagogical perspective. *The Curriculum Journal*.

Tall, D. (2002). The psychology of advanced mathematical thinking. In *Advanced mathematical thinking*: Springer, 2002, pp. 3-21.