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# **A Proposed Training Program According To The Skills Of Knowledge Economy And Its Impact On Lateral Thinking Of Students Teachers And Their Trends Towards The Profession Of Teaching Mathematics**

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## **Abstract**

The present research aims to study the impact of an independent variable, the proposed training program that has been prepared according to the steps of preparing educational programs with special content, namely the skills of knowledge economy in its five fields. The proposed program was applied to a sample of students teachers who are students of the fourth stage in the Department of Mathematics. Those who are subjected to the program of practical education scheduled for fifteen weeks, the program was implemented for 7 weeks by 3 hours per week, including the theoretical side with workshops and video presentations and watch math lessons in schools where the education is carried out electronically. The experimental group led 46 students of the fourth stage students in the Department of Mathematics, and the same number was the number of members of the control group and after the completion of the application of the program students were subjected to a test in lateral thinking and a measure of trends towards the profession of mathematics teaching have been specially prepared for this research according to the steps of preparing tests and standards The results indicated that the experimental research sample was superior to the control sample studied according to the usual program. Thus, the two hypotheses that were set to achieve the research objective were rejected.

## **Un Programa De Capacitación Propuesto De Acuerdo Con Las Habilidades De La Economía Del Conocimiento Y Su Impacto En El Pensamiento Lateral De Los Estudiantes Docentes Y Sus Tendencias Hacia La Profesión De La Enseñanza De Las Matemáticas.**

### Resumen:

La presente investigación tiene como objetivo estudiar el impacto de una variable independiente, el programa de capacitación propuesto que se ha preparado de acuerdo con los pasos de preparación de programas educativos con contenido especial, a saber, las habilidades de la economía del conocimiento en sus cinco campos. El programa propuesto se aplicó a una muestra de alumnos docentes que son alumnos de la cuarta etapa del Departamento de Matemáticas. Aquellos que están sujetos al programa de educación práctica programado para quince semanas, el programa se implementó durante 7 semanas por 3 horas por semana, incluyendo el lado teórico con talleres y presentaciones en video y viendo lecciones de matemáticas en las escuelas donde la educación se lleva a cabo electrónicamente. El grupo experimental condujo a 46 estudiantes de la cuarta etapa del Departamento de Matemáticas, y el mismo número fue el número de miembros del grupo de control y después de completar la aplicación del programa, los estudiantes fueron sometidos a una prueba de pensamiento lateral y Una medida de las tendencias hacia la profesión de la enseñanza de las matemáticas se ha preparado especialmente para esta investigación de acuerdo con los pasos de preparación de pruebas y estándares. Los resultados indicaron que la muestra de investigación experimental fue superior a la muestra de control estudiada según el programa habitual. Por lo tanto, las dos hipótesis que se establecieron para lograr el objetivo de investigación fueron rechazadas.

### Introduction :

The end of the twentieth century witnessed major developments that changed many of the infrastructure of societies in the various fields of life and technology became the basis of these structures, where one of the important revolutions at this time is the information revolution, which was the computer tool. Because the knowledge sector provides a solid foundation for this progress, if these societies succeed in participating in the

knowledge race and catching up to reach it, they will translate it into a better life for their children. Acquiring and investing knowledge effectively and efficiently is through combining skills with cutting-edge technology that ensures this shift towards a knowledge-based economy.

The knowledge economy is intended to use and employ technologies in order to reach a sophisticated life at all levels and to benefit from the services of these types of technologies such as the Internet and information processing. Therefore, a matrix of correlations between the skills of the knowledge economy and the elements of the educational process is represented by the teacher, student and school curriculum. It is a relatively new concept based on the development of the human mind and creativity, and benefit from the amount of information provided by the development of knowledge in communication and contemporary technology and here highlights the role of education in its general composition and the educational system in its own capacity (Al-Khalayleh, 2007: 213). This means that the knowledge becomes an expected result of the educational process. This result can be achieved if the rapid transformation of the knowledge required for economic performance is translated into special laws. And for teaching, either the second: it is that the teacher should be the active ingredient in the educational process, and this requires him to develop rapidly and patterns of knowledge by a specialist on the one hand, and be eligible to teach the other. (Bonal & Ramba, 2003: 11)

It is not clear from everyone the leading role of the faculties of education with the most important objective, which is to prepare the teacher of the stages of general education. It has become important to keep up with these preparation programs and educational innovations that have emerged strongly in the educational arena through the emergence of the concepts of total quality and sustainable development and the great need for e-learning. Towards a knowledge economy based on specialized knowledge by emphasizing continuing education and calling for teamwork and the use of communication and information technologies during the development of scientific thinking and problem solving skills and the development of positive attitudes towards teaching Their competencies.

The practical education program trains the teachers students who are students of the fourth stage with an important set of teaching skills and skills of knowledge analysis and organization in addition to training them on the use of technology and other educational techniques in the sense that it integrates the theoretical side with the practical side and can diagnose the problem of insufficient time to train teacher students on all skills Neces-

sary to prepare professionally, which develops negative attitudes towards the teaching profession in general and teaching mathematics in particular because of the specificity of this science related to the quality of abstract concepts and the degree of relevance to reality and the need for technology Taught. In Iraq, as part of the strategy for the development of professional teachers launched by the Ministry of Education with UNESCO in 2013, this problem was referred to as “practical training in the faculties of education is insufficient and ineffective.” The teacher after graduating from the faculties of education through the development of pre-service preparation programs (UNESCO, 2013: 30) A good training can develop positive attitudes and real wishes of the teacher students towards their profession, which is teaching mathematics to students of general or university education.

Research problem: From the results of a number of researches aimed at diagnosing the possession of students of the fourth stage teachers some important features such as thinking and intelligence and trends towards the use of technology and the tendency towards mathematics it turned out that they have a weakness in some thinking skills, especially in the skills of information processing and this is what the study concluded (Karim The results of the study (Noor, 2018) and to confirm this diagnosis and to confirm the weakness in knowledge and thinking and the direction towards the teaching profession and teaching mathematics in particular because of the specificity of mathematics has been implemented. Ttalain by the researchers, one of the students of mathematics departments in the faculties of education in Baghdad and ensure that questions were directed to them, including:

- Does the content of scientific and educational materials include contemporary and modern living terms and concepts?
  - Have you been exposed to activities that encourage self-learning?
  - Did you practice using problem-solving strategies to solve your scientific and life problems?
  - Have you been guided to the effective way in the use of electronic resources and scientific references?
  - Did the educational content encourage you to develop positive attitudes towards the use of technology?
  - Do you know what are the skills of sports communication?
  - Can you summarize four-page content by half a page?
  - I give you political news and you explain it to me. Do you have this skill?
- The second survey was for a number of teaching staff of the Faculty of

Education / Department of Mathematics in the scientific and educational materials included questions that were directed to them, including:

- What are your students' tendencies towards participatory teamwork?

Have you used self-learning strategies with your students?

- Did you discover when one of your students creativity?

- Have you touched when your students think high?

Do you think you are developing a positive attitude towards teaching math?

The results of these surveys crystallized the problem of the current research is the existence of weakness in the information of students teachers skills of knowledge economy and their lateral thinking and the experience of researchers in the field of teaching this sample for many years it became clear to them that there is a decline in their attitudes towards the profession of mathematics teaching due to many influential reasons and felt to address this decline Teacher students are trained to use skills and competencies to develop these attitudes and develop their thinking.

research importance :

Our modern world is characterized by the age of science and technology due to the large number of scientific discoveries and technological innovations in the means of production, services, communication and information, and the accelerated rates of discovery in unbalanced societies. Knowledge, productivity, education and intellectual capital were seen as secondary factors. As a measure of the power and control of nations (Al-Khudairi, 2001: 55).

Training is an essential approach to the development of human resources and a key pillar of good management and self-development necessitated by the successive developments in the educational arena, as the accelerated knowledge flow, information revolution and scientific and technological progress, which makes the knowledge, skills and experiences experienced by the teacher during its preparation ineffective after a period This requires teacher training to raise the level of skills and production efficiency in line with scientific progress, knowledge and technology, especially since the basis of progress in our modern world is education, and the teacher is the cornerstone of (Yassin, 2009: 32) So training can be of great importance to any organization of any kind, size, scope, level, or type of product it offers (Abu El Nasr, 2017: 22).

Due to the development and diversity of services in the information and communication age and the increasing importance of the work of educational institutions in business development, information and experiences have become a creative subject related to the method of information organ-

ization and the analytical mind that is constantly learning. How to learn, as the learner or trainee becomes a teacher and a trainer for himself constantly. (Sakarna, 2011: 12) The educational system is the most affected by many economic, social and political factors, where the concept of knowledge economy is one of the contemporary products of the knowledge revolution and one of the most important alternatives and solutions proposed to cope with the changes emerging economically and cognitive, and it is a key source of knowledge production and employment, assuming The human mind is the focus of development and investment and the most capable of production and development, which prompted decision makers to pay attention to what is produced by man and considered as a key to any development project (David, 2010: 1) and as a result of the shift towards the knowledge economy, the type of skills The required learning has changed as it focuses on thinking skills, problem solving, dealing with technology, rapid developments, behavioral and social skills, and special professional preparation, so the challenge faced by the application of knowledge economy is the compatibility between the curriculum and the requirements of the labor market and building stronger relationships between Educational institutions and employers (Saadi and Dosari, 2012: 32). This means that the education system should pay due attention, through the flexibility of the educational system to implement the strategy of transition to knowledge economy, and develop education policies to ensure that all students have the ability to deal with knowledge and communication technology, and qualify teachers without exception on computer skills, and provide them with the necessary equipment All of them develop their abilities and skills in the field of knowledge and communication technology (judges, 2004: 15), and (Mo'tamen, 2003: 67).

The importance of research shows both theoretical and practical aspects: First: theoretical importance: The importance of training in the skills of knowledge economy lies in the following reasons:

- 1- The continuous increase of investment in the field of education necessitated the formation of knowledge capital, which is the basis for scientific and professional innovation.
- 2 - The wide spread of projects and institutions working in the field of generating and developing knowledge and then evaluated in the light of the overall quality standards of institutions
- 3 - The focus of specialized institutions to prepare teachers on the most important areas in the field of public education and in the light of the current situation and the trend towards e-learning with all its requirements.



Second: Applied importance

1- Mathematics departments need this training program to train their cadres in the skills of knowledge economy.

2 - provides a basis for those who wish to complete the study of this topic because it is the first research in Iraq, which provides a training program for students of the Department of Mathematics teachers according to customary economics (to the knowledge of researchers).

3- Provides a test that measures lateral thinking among students of mathematics departments.

4. Provides a measure of trends in teaching mathematics.

Research Objective: The present research aims to propose a training program in accordance with the skills of knowledge economy and study its impact on the attitudes of students of the Department of Mathematics teachers towards the profession of teaching mathematics and in their lateral thinking.

We have assumed hypotheses that we verify in the procedural aspect of the research.

search limits:

The research was determined by the students teachers who are students of the fourth stage in the Department of Mathematics College of Education for Pure Sciences / Ibn Al-Haytham / morning study for the academic year (2018-2019)

Terms and Procedural Definitions:

First: The Training Program:

- (Abu Shira and others, 2007) as "a set of procedures, activities and methods chosen by the coach and plans to follow one after the other and sequentially using the available resources to help the trainees master." (Abu Shaira et al., 2007: 344)

- (Sayed and Abbas, 2012) as "a planned activity with specific objectives crystallized in the accurate picture of the actual needs of the trainees in order to make changes in the trainees in terms of their knowledge, experience, skills, performance, work methods and organizational behavior are used scientific methods in an atmosphere that helps professional and self-development and encourages Cooperative Education and Individual Learning for Trainees. (Sayed & Abbas, 2012, 15)

From the two definitions above it is clear that the training program is a set of procedures and activities based on the needs of the trainees in order to change their knowledge and behavior and may be collective or individual training.

Procedural definition of the training program: A set of procedures and activities planned to train students of the research sample (experimental group) on the skills of knowledge economy, which was prepared for this purpose.

Second: Knowledge Economy (Dimmock & Goh, 2011): It is an educational system whose aim is to enable individuals to acquire, share, produce and adopt knowledge in order to improve the quality of human life. (Dimmock & Goh, 2011: 219)

(Al-Hashimi, 2009): “An educational system based on technical means and scientific research to utilize the capabilities of individuals of different ages as an effective economic wealth to enable functional cognitive empowerment to develop national and human life by acquiring, using and producing knowledge.” (Al-Hashimi, 2009: 40)

Some of the sources that we have learned about the knowledge economy are as follows:

- The knowledge economy has many names, including electronic economy, digital economy and virtual economy. These names show that it is the economy that calls for the use of technology and information network, information and communication in obtaining productive employment based on product creativity and creative problem-solving.

First: the cognitive aspect

- 1- Presenting new and contemporary concepts
- 2- Linking the content to the student's reality
- 3- Presenting examples and educational activities that encourage students to generate new ideas
- 4- Presenting examples and activities that train students to use self-learning skills
5. Use of math terms in Arabic and English
6. Direct students to view and use different sources of knowledge
7. Direct students to invest their time by training on the requirements of living in a globalized world
- 8 - put forward activities and training urges research and thinking of all kinds
- 9 - Introducing applications that require the use of knowledge to solve realistic and unfamiliar problems

10 - Show examples and exercises require answering using the skills of flexibility and fluency.

Second: the technological field

Develop positive attitudes towards modern technologies.

2. Encourage access to knowledge and gather information using the Internet.

3 - Guidance for students on the most important websites in the field of specialization

4. Encourages students to use technology to present their ideas such as the use of maps and charts

5 - Encourages students to publish their achievements in scientific sites

6 - directs students on the serious and useful use of social networking sites and scientific

Third: the field of communication

1- Encouraging students to use sports communication skills

2 - Encourage students to use the skills of questioning and observation

3. Encourages students to engage in dialogue.

4 - develops the student sound trends such as respect for the speaker and interaction with him

5 - training students to reach the general idea of his lesson

6. Develops students' information processing skills such as summary and interpretation

Develops students' skills of negotiation and persuasion.

8. Encourages students to take responsibility

Fourth: the field of mental development:

1. Encourages students to constructively criticize, make judgments and make decisions

2. Encourages the use of problem-solving by addressing any problem encountered

3. Develops students' higher-order thinking skills

4 - Encourages his students to ask past questions

Fifth: Social Field:

1. Develops among its students the principle of social justice

2 - develops upon the students to deal with the principle of solidarity and solidarity among members of society

3 - Offering activities and training urging the safety, cleanliness and beauty of the environment

4 - Offering activities and training to develop their initiative to maintain a clean environment inside and outside the school

5. Develops students' work in a team spirit

6 - put forward activities and training urges collective learning cooperative

7. Introduce activities and trainings that encourage voluntary work

Trends

He defined it (tendency, 2003) as tendencies that enable the individual to respond to specific behavioral patterns towards certain people, ideas, incidents, situations or things and form a complex system in which a wide range of variables interact. (Al-Hailah, Muhammad Mahmoud, 2003, p. 367)

He identifies him (Shehata and Zeinab, 2003) as a relatively well-established position, whether opinion, interest, or purpose associated with preparedness for an appropriate response. (Shehata and Zeinab, 2003, p. 16)

The Oxford Electronic Dictionary defined it: "The way a person views and evaluates something or someone. Attitudes determine whether people love or hate things - and thus how they behave towards them." <https://www.oxfordreference.com>

From what has been seen on the subject of trends, they are acquired or educated and are not innate and can remain or extinguished by the use of reinforcers can be measured and predicted.

Trends towards the profession of teaching mathematics

The responses of students of the research sample positive and negative on the scale prepared for this purpose

Fourth: lateral thinking and defined by:

De Bono 1998 as "the kind of thinking that requires problem solving in unconventional or illogical ways (De Bono, 1998, 3)

Kubaisi 2013 as "thinking characterized by research and go freely in multiple directions and angles instead of walking in one direction to solve a problem or clarify a particular situation

(Kubaisi, 2013, 107)

During what has been seen, lateral thinking can be the same serious innovation, which is the opposite of logical thinking, a thinking that uses all the possibilities available and alternatives to solve problems.

Procedural Definition of Lateral Thinking: It is the grades obtained by the research sample on the test prepared for this purpose

Fifth: the definition of procedural teachers students:

They are students of the fourth stage of the Department of Mathematics at the Faculty of Education for Pure Sciences - Ibn Al-Haytham subject to the course of practical education during the first and second semesters, which aims to prepare them to be teachers of mathematics in the secondary stage and practice the actual teaching in secondary schools in the individual application phase under the supervision and guidance of professors specialized in teaching methods Mathematics.

Search procedures :

## Build the training program

After reviewing many sources and literature related to building training programs and educational designs (Al-Zind, 2018), (Sakarna, 2011) and (Al-Haila, 1999), the training program was built according to the following steps:

The first stage: the planning stage

First: Analysis

1- Analysis of trainees characteristics

Through the experience of researchers in the field of teaching in the Department of Mathematics, we have identified the characteristics of the students of the research sample who are students of the fourth stage applied the most important:

Their age is somewhat close.

B - their courses are standardized for scientific subjects where they have undergone courses in the competence of mathematics 4 years according to the annual quarterly system.

C - very special educational courses in their numbers as teachers is the curriculum and methods of teaching mathematics in the third stage and the program of practical education in the fourth stage.

D - subjected to all educational lessons are (psychology and the foundations of education and educational management and measurement and evaluation).

C - during the equivalence procedures found that they are equal in their previous achievement in the teaching methods.

F- They did not participate in a training program during their studies in the third stage.

It is shown above that they are homogeneous with their scientific and educational characteristics.

2- Training Needs Analysis:

The aim of the training is to provide the needs of the trainees through the content after it has been determined in advance and the content of the training program includes multiple exercises and activities, and the survey of the views of some of the students sample research and some of the teachers of mathematics in schools of good attraction were identified the following needs:

- Training in self-learning skills.

- Training on the use of educational techniques and technology effectively

- Utilization of electronic search engines and educational platforms in teaching

- Training in information processing skills.

- Training on successful dialogue management skills.

3 - Analysis of training content: The skills of knowledge economy were limited to a questionnaire and presented to a number of specialists in the methods of teaching mathematics and educational technology and curriculum. This measure identified the final skills that were trained by the students applying the research sample, which was previously identified within the definition of theoretical knowledge economy.

4 - Analysis of the training environment: The place of implementation of the program is the halls of the Department of Mathematics in the Faculty of Education for Pure Sciences / Ibn Al-Haitham within the program of practical education by 3 hours per week for 7 weeks.

Second: Design

1- Defining the objectives of the program:

Providing trainees with information on the skills of knowledge economy combined with the skills of teaching mathematics approved by the practical education program.

Encourage trainees to engage in cooperative training activities and participate in dialogues held in the program sessions.

Expanding the trainees' areas of expertise on integrating knowledge economy skills with mathematics teaching skills.

2 - Defining the content of the program: The content of the program has been prepared including the definition and explanation of the skills of knowledge economy in its five areas (cognitive including 10 sub-areas and technology including 6 sub-areas and communication area including 8 sub-areas and the field of mental development including 4 sub-areas and social area including 7 sub-areas) With exercises on how to use these skills in mathematics teaching combined with mathematics teaching skills.

3 - Validity of the content of the training program: Two sessions of the content of the program were presented to a number of specialists in the field of training and the field of teaching mathematics have made some observations have been taken.

4 - Building research tools and will be presented later

Phase II: Implementation

Sessions started from the beginning of the application of practical education program where the skills of knowledge economy combined with the teaching skills of teaching mathematics in theory and activities during the workshops include the presentation of video films for electronic lessons and visit schools using e-learning in teaching mathematics.

A preliminary evaluation was conducted to determine the previous knowledge and behaviors of the knowledge economy skills available to the students of the research sample. It was found that they possess the basics of some of his cognitive skills such as the use of terms in the field of specialization and the skills of the technological field such as the use of websites, search engines and social networking sites. The structural evaluation accompanied the training sessions. The final evaluation was using the lateral thinking test and the measure of the attitude towards the profession of teaching mathematics. It will be presented later in the paragraph of preparing research tools.

Research Methodology: The research methodology is illustrated in the chart (1)

Groups		In depend variable	Depend variable
Experimental group	Equivalence between two gropes in some variables	Proposed training program	-lateral thinking -Trends towards the profession of teaching mathematics
Control group		Normal program	

Scheme (1) Research design

Research Community: Consists of the total morning and evening students studying in the Department of Mathematics (fourth stage) in the academic year (2018--2019) at the Faculty of Education for Pure Sciences - Ibn Al-Haytham.

Table (1) Research Community

Type of study	Number of students
Morning Study	100
Evening study	74
Total	174

The research sample consists of morning study students studying in the Department of Mathematics (fourth stage) in the academic year (2018--2019) at the College of Education for Pure Sciences - Ibn Al-Haytham.

Groups	Number of students	Number of sample members	Male	Female
Experimental group	50	46	16	30
Control group	50	46	22	24
Total	100	92	38	54

Table (2) Research Sample

Adjusting the variables: The previous achievement variable in the curriculum and methods of teaching mathematics in the academic year (2017-2018) was set between the two research groups by obtaining them from the Department of Mathematics, as their subjects form the theoretical basis for the practical education program.

Table (3): Statistical description of groups in the equivalence variable

Groups	N	Mean	Std. Deviation	Std. Error Mean
Experimental group	45	69.4000	10.54730	1.57230
Control group	44	66.1364	10.54468	1.58967



Table (4) Indication of the difference between the research groups in the equivalence variable

	Levene's Test for Equality of Variance s		t-test for Equality of Means						
	F	Sign	t	Df.	Sgn. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	.030	.863	1.460	87	.148	3.26364	2.23589	1.1804-4	--7.70771
Equal variances not assumed			1.460	86.956	.148	3.26364	2.23588	1.1804-5	-7.7077371

The results in Table (3) and Table (4) showed that the value of f when calculated using the Levin test was (0.030 at the level of significance (.863), which is greater than the level adopted (0.05), which means that the two groups are homogeneous and using the T test of two independent samples is not equal It was found that there is no statistically significant difference because t equals (1.460) at the level of significance (.148), which is greater than the adopted significance level (0.05) .This means that there is no statistically significant difference at the degree of freedom (87) between the two groups in the previous collection. In other words, equivalence is available in this variable.

To ensure the external integrity of the experimental design, the following was done:

1. The two groups were taught by two researchers.
2. The duration of the experiment was equal for the two groups, where it took (7) weeks in the first semester and by 3 hours per group per week.

3. Measuring instruments were applied simultaneously to the two groups.
4. No experimental extinction occurred during the duration of the program and tests.

Research tools: First: the lateral thinking test where it was prepared by the following steps

A- Review the previous literature and studies in this field

2 - The objective of the test is to measure lateral thinking among students research sample.

3. The procedural definition of lateral thinking has been defined and the paragraphs are prepared accordingly.

4 - developed test instructions and instructions for correction and typical answers where paragraphs essay with a short answer be the degree of correction (0,1). Thus, the total score of the test (10) because it consists of (10) paragraphs

5 - presented paragraphs of the test with instructions to a number of specialists in the field of mathematics and teaching and made observations on them.

6 - The test was applied to a sample of the research community, the number of its members (50) of the students of the fourth stage, evening study to determine psychometric characteristics. To find the stability coefficient of the test has been the way to re-apply the test on this sample two weeks after the time of the first application was 88%, which is a good stability coefficient. Below is one paragraph of this test:

- Can you correct what you see in front of you without changing the numbers or position ( $8 + 8 = 91$ ) .. The answer is to rotate the examination paper 360 degrees

Second: the measure of the trend towards the profession of teaching mathematics.

The lack of a ready scale to measure the trend towards the teaching profession and the specificity of mathematics.

1. Review the previous literature and studies in the field of preparing standards, especially measures of attitudes towards the teaching profession.

2. The formulation of 32 paragraphs measuring the purpose of the scale, one negative and the other positive and identified the answer three alternatives (OK, somewhat agree, disagree) and weights (2, 1, 0).

3. The paragraphs were presented to the arbitrators in the field of psychology, measurement, evaluation and methods of teaching mathematics. They

expressed their observations on them and two paragraphs were deleted on the basis of their incompatibility with the characteristics of the research sample.

4. The application of the scale on a survey sample of students of the research community reached 8 students The aim of this application is to determine the instructions of the scale and the necessary time and was (10-15) minutes.

5. The application of the scale to a survey sample of students of the research community reached 50 students and the goal of the second application is to find the coefficient of stability on the scale and using the equation Alpha-Kronbach was the coefficient of stability 79%, which is a good stability coefficient. After this stage, the meter is ready for implementation.

Below are some of the paragraphs of the scale

Statistical Methods: Using the SPSS statistical package, the appropriate methods for analyzing the data were identified, including: Pearson correlation coefficient, Levin F test, t test, alpha-crockbach equation.

View and interpret the results: To answer the first research question: What is the effect of using the proposed training program in the light of the skills of knowledge economy in lateral thinking among the students of the research sample? The following hypothesis was developed:

1 - There is no statistically significant difference at the significance level (0.05) between the mean scores of the experimental group students studying according to the proposed training program and the control group students studying according to the regular program on the lateral thinking test.

After calculating the scores of the experimental and control groups on the lateral thinking test, calculating the total score of the results and calculating the arithmetic and standard deviations and using the t-test for two independent samples, the results were as in Table (5) and Table (6).

Table (5) Statistical Description of Lateral Thinking Test Scores

Groups	N	Mean	Std. Deviation	Std. Error Mean
Experimental group	46	5.6522	2.11048	.31117
Control group	46	4.8696	1.64126	.24199

Table (6)

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sgn.	T	Df.	Sgn. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	2.216	.140	1.985	90	.000	.78261	.39419	-.00052	1.56574
Equal variances not assumed			1.985	84.853	.000	.78261	.39419	-.00117	1.56639

The results in Table (5) and Table (6) showed that the value of f when calculated using the Levin test was (2.216) at the level of significance (140), which is greater than the level adopted (0.05), which means that the two groups are homogeneous and using the T test of two independent samples. It was found that there is a statistically significant difference because t is equal to (1.985) at a level of (0.00) which is smaller than the adopted significance level (0.05). This means that there is a statistically significant difference at the degree of freedom (90) between the two groups in lateral thinking for the benefit of the experimental group.

To answer the second research question: What is the impact of using the proposed training program in the light of knowledge economy skills in the attitudes of students sample research towards the profession of teaching mathematics? The following hypothesis was developed:

1 - There is no statistically significant difference at the level of significance (0.05) between the average grades of the experimental group students studying according to the proposed training program and the grades of the control group students studying according to the regular program on the scale of attitudes towards the profession of teaching mathematics. After calculating the scores of the experimental and control groups on the scale and calculating the total score of the results and calculating the arithmetic and standard deviations and using t test for two independent samples, the results were as in Table (7) and Table (8).

Table (7) Statistical description of the grades of attitudes towards the profession of teaching mathematics

Groups	N	Mean	Std. Deviation	Std. Error Mean
Experimental	46	69.6522	12.11100	1.78567
Control	46	57.6087	14.82712	2.18614

Table (8) Alfa| and T value and the significance of the difference to measure trends towards the profession of teaching mathematics

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	3.691	.058	4.267	90	.000	12.04348	2.82273	6.43563	17.65133
Equal variances not assumed			4.267	86.551	.000	12.04348	2.82273	6.43258	17.65438

The results in Table (7) and Table (8) showed that the value of f when calculated using the Levin test was (3.691) at the level of significance (.058),

which is greater than the level adopted (0.05), which means that the two groups are homogeneous and using the T test of two independent samples. It was found that there is a statistically significant difference because the value of t is equal to (4.267) at the significance level (0.00) which is smaller than the adopted significance level (0.05). And for the benefit of the experimental group.

Conclusions:

1- Through the presentation of the results, it is clear that there is an impact of the proposed training program in lateral thinking of the students of the research sample and their attitudes towards the profession of teaching mathematics.

2. The students of the research sample whose members underwent the training program have met some of their training needs:

- During the workshops and in coordination with the computer lab in the department was training on the use of technological techniques and access to some educational programs and math manuals.

- During the organization of students' belonging to educational platforms and some of the communication groups in social networking sites were trained in the skills of safe access to information available on the Internet and the use of information processing skills and were provided with the most important websites that develop from theoretical and practical preparation and through effective training on the use of educational techniques. In the presentation of their ideas such as the use of graphs and forms available in statistical programs.

- The training sessions and through the workshops included in the development and refinement of the capabilities of students sample research in the field of dialogue and group discussions.

- Students developed a research sample during training on self-learning skills a great desire to use these skills in learning mathematics

- The students of the research sample showed the great desire that mathematics be an area and method for thinking in solving problems.

- The results of this training in the school application stage were clear, which formed a positive trend towards mathematics teaching.

- To provide the content of the proposed program and other training programs, including the usual program, it is better to increase the number of hours scheduled for the program of practical education.

We can justify these positive results that emerged by the following justifications:

1. The program has taken into account all aspects of students research sam-

ple related to the latest developments in the cognitive and technological aspect which is in fact very close to themselves and their desires.

2. The adoption of cooperative and group teaching in small groups gave students the research sample who have undergone the training program the opportunity to interact, participate, dialogue and discussion in the field of mathematics and problem-solving, which is the ultimate goal in the process of education and this worked on the formation of renewable energies have a great desire in themselves to be teachers This has led to the development of positive attitudes towards the profession of teaching mathematics.

3 - The skills of knowledge economy imposed itself strongly as an influential factor in the thinking of the students sample research has already shown this in the impact of the program on lateral thinking, which is inherently different from other types of thinking.

#### Recommendations

1. Benefit from the experiences and workshops included in the proposed program to enrich the content of the usual practical education program.

2 - to provide the contents of scientific and educational materials in a manner consistent with recent developments in the educational arena, in particular the use of skills of knowledge economy in problem-solving would develop positive trends towards the profession of teaching mathematics.

3. Increasing the number of hours of practical education program in order to integrate the usual program content with the proposed programs, especially that the skills of knowledge economy need the availability of computer labs, educational techniques and halls suitable for teamwork and conducting dialogues, discussion and training requires real and effective workshops.

4 - the need to pay attention to the development of thinking types and side in particular among students of the Department of Mathematics.

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