إستخدام إطار TPACK في الجامعات السعودية بين الواقع والتطلعات

The Use of TPACK Framework at Saudi Universities Reality and Aspirations

إعداد

Prepared by

الدكتورة . سعاد جعفر عمر محمد

Dr.Suad Gaafer Omer Mohammed

Associate Prof. of Curriculum &Instruction – College of Education

استاذ مشارك المناهج وطرق التدريس – كلية التربية

Najran University– K.S.A

جامعة نجران ـ المملكة العربية السعودية

Email: sgomer@.nu.edu.sa

المستخلص

مع التطور الحالي والمتجدد الذي لازم هذا العصر في المعرفة العلمية والتكنولوجيا وعلاوة على ذلك، الرؤية الطموحة للمملكة العربية السعودية 20-30، والتي تطمح المملكة من خلال تنفيذها إلى تزويد الفرد بمهارات المستقبل وتحقيق التعليم من أجل التنمية المستدامة. بالإضافة إلى ما اشتهر به إطار TPACK بدمج المعارف الأساسية التي تشمل المعرفة التقنية، والتربوية، ومعرفة المحتوى العلمي – لتحقيق تعليم فعّال وتعلم حقيقي. يصبح من الضروري السؤال عن جاهزية الكادر التربوي بما في ذلك أعضاء هيئة التدريس بالجامعات حول مدى استخدامهم لهذا الإطار في ممارساتهم التدريسية. ومن هنا كان هدف البحث الحالي التعرف على واقع استخدام أعضاء هيئة التدريس بالجامعات السعودية إطار TPACK في ممارساتهم التدريسية والذي يتمثل في سؤال البحث ا الرئيس التالي: إلى أي مدى يستخدم أعضاء هيئة التدريس بالجامعات السعودية إطار TPACK في ممارساتهم التدريسية؟ وقد تفرعت من هذا السؤال الرئيس ثلاثة أسئلة فرعية. منهج الدراسة وصفي تحليلي، و أما أداة الدراسة فكانت الاستبانة. أكدت النتائج التي تمّ التوصل إليها أن أعضاء هيئة التدريس في الجامعات السعودية يستخدمون إطار TPACK في ممارساتهم التدريسية بمستوى عالٍ. اختتمت الدراسة بتقديم عدد من التوصيات والمقترحات.

الكلمات المفتاحية: إطار TPACK – ممارسات التدريس – الواقع – الطموحات.

Abstract

With the current and renewed development that included this era in scientific knowledge and technology. Moreover, with the ambitious vision of the Saudi Kingdom 20-30, which aspires to achieve its application in the education aspect to provide the individual with future skills and achieve education for sustainable development, in addition to what the TPACK framework is famous for integrating Technology, Pedagogy and Content Knowledge into education to achieve effective teaching and real learning. It becomes necessary to ask about the readiness of educational personnel including the universities' faculty members on the extent to which they use this framework in their teaching practices. Hence, the research aimed to identify the problem represented in the following main question: To what extent do Saudi universities' faculty members use TPACK framework in their teaching practices? From it, three sub-questions emerged. The study methodology is descriptive. The tool is the questionnaire. The results confirmed Faculty members in Saudi universities use the TPACK framework in their teaching practices with high performance level. A number of recommendations and proposals presented.

Key words: TPACK framework- Teaching practices- Reality - Aspirations

Introduction

The TPACK framework considered a modern organizational framework for professional development programs for teachers. It was developed by Mishra and Koehler from Schumann's thought (1986) [1], who indicated that: successful teaching is related to the teacher's application of educational methods that fit the topics of the course in his field of specialization. That is, mixing content knowledge with pedagogical knowledge and with teacher's experiences to teach the subjects of the specialty (pedagogical content knowledge -PCK). Schumann considered technology as teaching aids that support effective teaching in various contexts. It became difficult, with development in the field of technology to ignore it. Or consider it as materials that only facilitate teaching; That what prompted both; Koehler and Mishra to add technological knowledge, (TK), as one of the main areas that must be added to competencies of teachers to be professionalized and well qualified to keep pace with the trends of now a days and its requirements. Thus, they came out with the integrated framework, TPACK, [2].

The TPACK Framework includes knowledge bases or competencies, each of equal importance, in developing expertise in the ability to integrate technology in Education. This Model concerned with the integration and overlap between the three main axes of teachers' knowledge. The three main knowledge bases are: knowledge of curriculum content (CK), knowledge of pedagogy (PK), and knowledge of technology (TK), which Kohler and Mishra said (TK is in a state of continuous renewal and evolving, and this affects many aspects of the TPACK framework, and that makes it pointless to define (TK) now). Equally the interaction between (CK, PK and TK), that leads to the creation of four types of knowledge as follows: The Technological Content Knowledge (TCK).The Technological pedagogical knowledge (TPK).Pedagogical content knowledge (PCK), beside the broader field of Technological Pedagogical Content Knowledge (TPACK). Which is considered as a form of knowledge that transcends all its six components and is considered the basis of effective teaching in which integration of technology in teaching is basic [3]. The TPACK framework also considered one of the dynamic models used to describe the knowledge that teachers should rely on in designing, implementing, and assessing their teaching activities and teaching outcomes of their students. The understanding of Technological Pedagogical Content Knowledge (TPACK) stems from an understanding of the interactions between its components. Implementation of (TPACK) framework undoubtedly leads to a real and deeply meaningful teaching in which all these components are interrelated and merge to lead to an education that conforms to the requirements of the modern era [4]. The overlap and interaction between TPACK components differs completely from the application of each

component separately. This what makes the application of the TPACK framework basic for effective teaching linked with technology, [5].

The figures (1) & (2) illustrate the different contexts of the (TPACK) model. https://shms.sa/authoring/122629.AC-tpack/view.
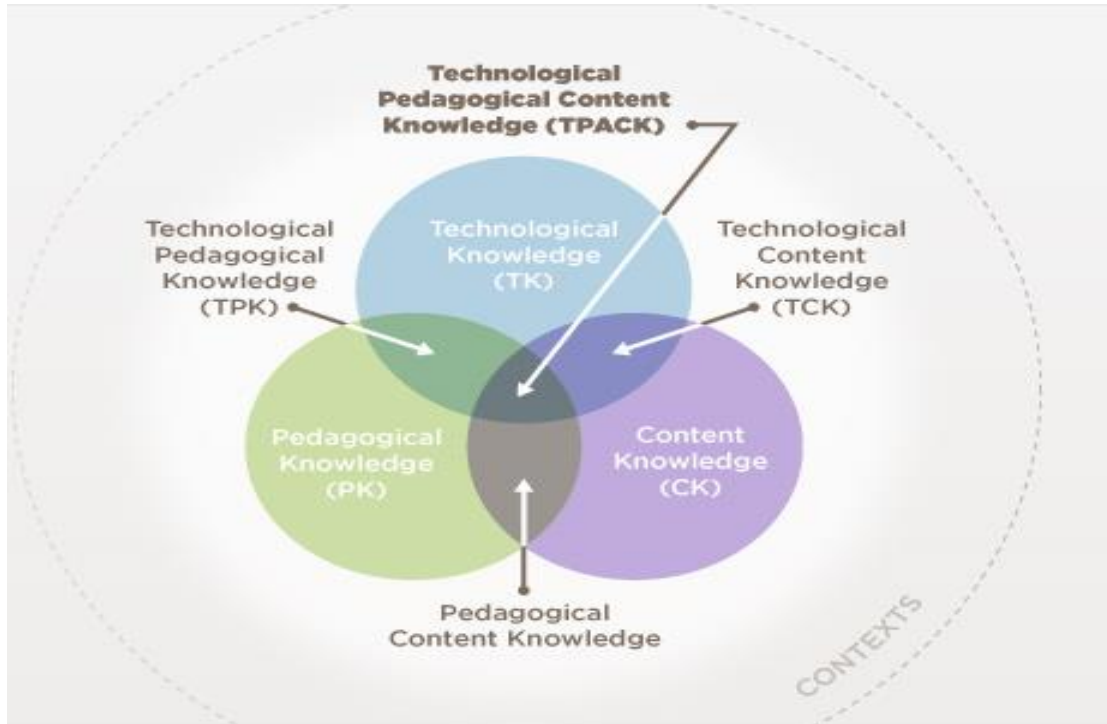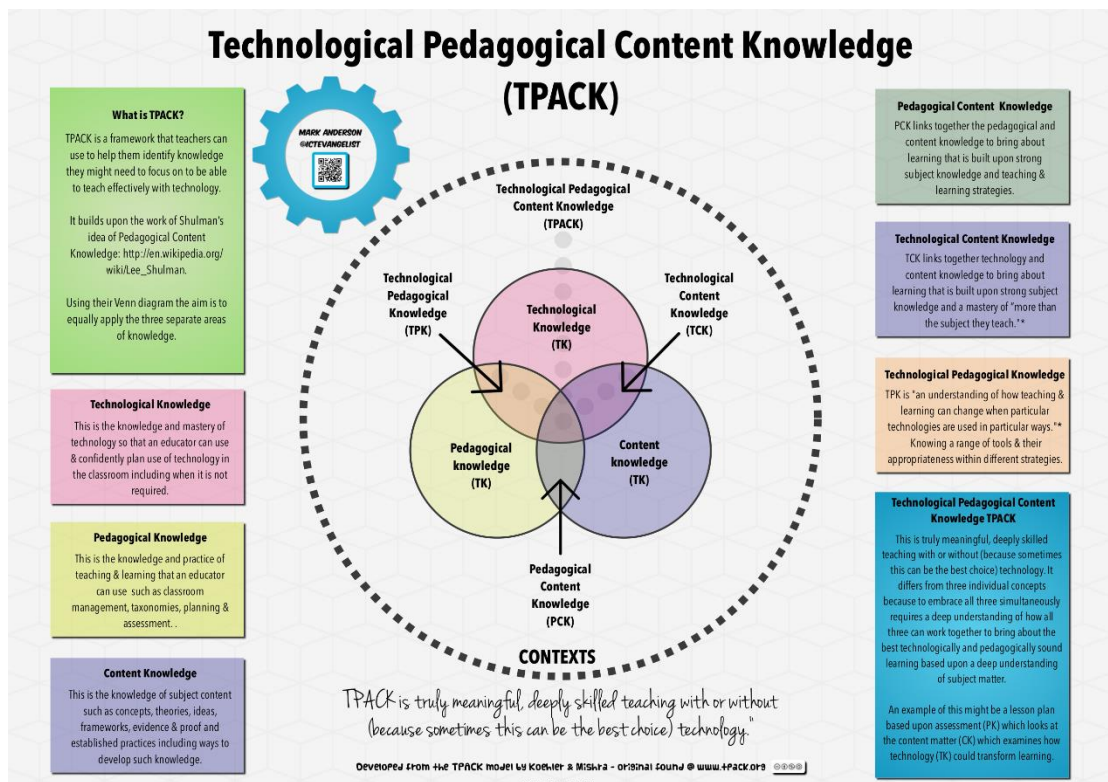
Figure (1)

Figure (2)

Due to the importance of TPACK framework in making use of modern technologies and employing them in higher education, whether in teaching, or in scientific research, Adams [6]. Indicated that: In recent years, the extent of using technology in teaching, and in scientific research has been relied upon as one of the criteria that must be taken into account when evaluating the intellectual and scientific achievement of faculty members, or when they are appointed or promoted to higher degrees. Through studies and research in the field, the importance of TPACK framework can be determined as follows:

- Transforming theoretical ideas into practical applications that serve the specialization in the relevant field.
- Improving the educational practices of teachers while teaching in various disciplines.
- Develop teachers' technological competencies, improve their skills, and raise their abilities to use technological applications and innovations.
- Helping teachers choose the best methods and strategies to facilitate their students' learning and achieve targeted outcomes.
- Improving teachers' self-efficacy and professional self-efficacy, which supports the concepts of sustainable professional development for teachers.
- Improving the level of teachers' knowledge in the field of TPACK, so that they can achieve the goals of the changing and renewable teaching profession with the renewal of knowledge in accordance with the developments of the current era.
- Activating the learner's role and involving him in the educational process in a positive way, considering that the activity and participation of the learner in educational situations and making him the focus of attention is one of the most important modern educational trends.
- Develop both teachers' and students' research capabilities.

TPACK framework has been used in many studies, both locally and internationally, to achieve various goals, including:

- Studies adopted TPACK as reference on which to measure the educational technological content knowledge of teachers.
- Studies adopted its application as basis for effective teaching to achieve the desired learning outcomes or as an evaluative framework (reference) for pre-service and in-service teachers' preparation and training programs.

- Studies and research aimed at investigating its impact and determine its importance in the professional development of teachers in various disciplines

Among the Studies adopted TPACK as framework for measuring the educational technological content knowledge of teachers is Abu Diya's study [7], which aimed to measure the effectiveness of a proposed training program based on TPACK Model to enhance some competencies for the student teachers of Basic Education Major-at the University College of Applied Sciences in Gaza-Palestine. The Researcher adopted the one-group quasi-experimental method. Tools are cognitive test, observation card, and a proposed training program. The results showed that there were significant statistical differences between the averages scores of the study sample in the pre and post cognitive test and in the observation of teaching performances in favor of the posttest and observation. The study concluded that the Training Program based on TPACK Model had achieved effectiveness in testing cognitive competences and in teaching performances. Alemeri. [8] Also conducted a study aimed at building a proposed vision for development of the Technological Pedagogical Content Knowledge (TPACK) among science teachers in Riyadh-Saudi Arabia. The study method is descriptive. The researcher built two tools, the first aimed at determining the availability of TPACK knowledge among the sample members. Based on the results of the first tool, the researcher designed the second tool. Concerned with the developing TPACK knowledge .It consists of (71) items that were presented to arbitrators with experience and competence in the field .The tool is the base of the proposed vision for development of technological Pedagogical Content Knowledge (TPACK).It was divided into five stages: the preparation stage, the technological knowledge development stage TK. The stage of developing educational technological knowledge (TPK), the stage of technological knowledge associated with the educational content (TCK), and finally the stage related to the development of technological Pedagogical Content Knowledge (TPACK). Hoofer &Grand. [8] In the Mid-Atlantic region in the United States of America, conducted a study aimed at identifying the extent of development in the Technological Pedagogical Content Knowledge (TPACK) of pre-service teachers. It was clear from the results that there was a significant improvement in the Technological Pedagogical knowledge (TPK) in particular and in Technological Pedagogical Content Knowledge (TPACK) in general. However, on the other hand, there was a limited improvement in Technological Content Knowledge (TCK) for the members of the research sample. In his study, Jimoyiannis [9] highlights the development of the TPACK framework to achieve the following: Teaching science curricula. Development of teacher preparation courses in Greece, to integrate information and communication technology into

science classes. Enhance teachers' skills and knowledge to integrate technology into their science teaching. Determine the obstacles facing teacher preparation programs, and prevent them from applying the TPACK framework in their teaching practices. The results showed that developing the level of TPACK requires teachers to have continuous and original learning experiences to provide opportunities to teach in the classrooms follow up on thinking and give feedback. Participation in teacher preparation programs also contributed to enhancing teachers' TPACK levels. The most important obstacles facing teachers represented in the restrictions imposed on practices in scientific texts, and not having enough time to prepare and implement the learning activities that their students need. Gauzy & Roehrig's [10] study also aimed to examine the level of TPACK development among secondary school teachers participating in a professional development program centered on integrating technology into teaching, and to support science teaching and learning. The results showed that teachers' participation in the program had a positive impact in developing the level of TPACK among teachers and in enhancing their level of understanding about how to integrate Technology in Education.

On the sides of Studies adopted the application of TPACK as basis for achieving the desired learning outcomes Al-Shehri [11] conducted a study aimed at identifying the Influence of Mathematics Teachers' Knowledge in Technological Pedagogical Content Knowledge (TPACK) on their Teaching Effectiveness in Saudi public schools. It was clear from the results of the study that the teachers rated the level of knowledge of (TPACK) at a high-level .The teachers also explained that their professional preparation programs enabled them to use technology in their learning environments in a better way compared to professional development programs and workshops given to them as in-service training. The results also showed that there were no statistically significant differences between teachers' estimation and school principals' estimations about the level of Teachers' knowledge of (TPACK). As pointed out by Nies et al. [12] in their study about the importance of determining the impact of the TPACK framework based on the use of the Internet in teaching science and mathematics on the professional growth experiences of teachers. The results of the study confirmed the effectiveness of using the TPACK framework in improving the level of professional growth of teachers. Srisawasdi [13] presented his study, which explored successful and promising practices of preparing science teachers at the secondary schools level in Thailand and illustrated the extent of benefit from pre-service teacher preparation courses based on the lab-computing environment based on the TPACK framework in science education. The results indicated that the TPACK framework possesses the basic characteristics of knowledge for highly qualified teachers in the twenty-

first century, and considered useful in preparing and developing the skills of pre and in-service teachers professionally and enable them to integrate Technology in Education. Abdu-Asalam [14] also conduct a study aimed to identify the impact of a proposed training program based on Technological Pedagogical Content Knowledge (TPACK) framework on developing the teaching performance of social studies teachers in the primary education stage. The Researcher adopted the one-group quasi-experimental method. Tools: observation card, and a proposed training program. The results showed that there were significant statistical differences between the averages scores of the study sample in the observation of teaching performances in favor of the post observation. The results revealed the effectiveness of the proposed training program in achieving the desired outcomes. The study concluded that the Training Program based on TPACK Model had achieved the desired effectiveness.

Examples of studies and research aimed at investigating TPACK framework impact and determining its importance in the professional development of teachers in various disciplines; Durdu &Dag [15] aimed to investigate the effect of using the TPACK model in developing the pedagogical and technological knowledge of pre-service mathematics teachers by designing a computer program in mathematics based on the TPACK model. The program applied to a sample of 71 pre-service teachers. The results confirmed the existence of significant differences before and after the implementation of the program in favor of the post-implementation. This result indicates the effectiveness of the program in improving the level of teachers' application of technology and methods of teaching mathematical subjects. The study recommended the necessity of training teachers before and during service on TPACK model areas with activating technology in their teaching environments and in different learning situations while teaching. Baran &Uygun [16] conducted study aimed at investigating: The effect of in-service science teacher training in the seven areas of TPACK on developing their technological concepts and competence. The application carried out through 14 sessions for the participating teachers, n= (10). The results confirmed the effectiveness of the program in achieving its objectives and developing the technological competence of teachers in teaching their subject matter. The study of Ndongfack [17] also emphasized the importance of using the TPACK model in the professional development of primary school teachers and updating their knowledge of technology, educational sciences, the content of the subject matter and the TPACK model through a professional development program based on the components of the model. The program implemented in 10 weeks on a sample of 52 teachers from four different schools. The results indicated a significant improvement in the TPACK knowledge among the sample members who participated in the program.

Comments on previous studies:

The current research agreed with some previous studies on some points and disagreed with others. Some of the points of convergence and agreement: The research methodology represented in the descriptive analytical approach and the tool represented in a questioner, where the research agreed with the study of: Almery [8], Jimoyannis [9], Alshehri [11], Nies [12], and Srisawasdi [13]. The current research differed with some others in the methodology and tools, which were represented in the quasi-experimental method and its tools, such as the study of: Abu Deyaa [7], Guzey [10], Abdu Asalam [14], Durdu,L., & Dag, F. [15], Baran, E. & Uygun. E. [16], Ndongfack, M. [17], it also differed with Augustin study [18]. Who used in-depth interviews as a tool for the study? The present study distinguished from all other studies mentioned in the field of research where the TPACK framework application in teaching at the university level. Some of the mentioned studies focused on designing proposed training programs based on the TPACK framework, such as the study conducted by: Abu Deyaa [7], Almere [8], Abdu Asalam [14]. The current study, and all previous studies, agree in: shedding light on the Pedagogical technological Content knowledge (TPACK) framework. Its critical importance in improving the teaching performance. Develop teachers' technological competencies. Improve teachers' skills, and raise their abilities to use technological applications and innovations. Determining TPACK framework importance in the professional development of teachers in various disciplines. Thus, achieving the targeted learning outcomes that keep pace with the spirit and requirements of the current era.

The knowledge of those who teach about the comprehensive framework that links teachers' knowledge in the three aspects of technology, pedagogy and the content of the subject matter is considered very important, but rather an urgent necessity under all circumstances, especially after the Corona pandemic (COVID-19) to which the world was exposed and still suffering . This event led to the sudden transformation in the educational system from the traditional system to the distance learning system enhanced by the Internet. At that time, the need for teachers to possess skills that would enable them to use technical innovations and integrate them into their teaching in order to enable them to have effective communication that compensates for the direct presence in the learning environment became very clear [19].

Research Procedure

Based on the foregoing, and to achieve the objectives of the research, its problem identified, and its implementation procedures followed, starting with identifying the problem as follow:

Problem of the Study

The problem of the current study is to identify the reality of the use of the TPACK framework by faculty members at the Saudi Universities and to judge whether it suit Saudi kingdom aspiration and its ambitious Vision 20-30 or not.

To address this problem, the Study attempts to answer the following main question:

To what extent do faculty members at Saudi Universities use the TPACK framework in their teaching practices?

The following sub-questions derived from the main question:

1. To what extent do faculty members at Saudi Universities use the TPACK framework in their teaching practices in the planning stage?
2. To what extent do faculty members at Saudi Universities use the TPACK framework in their teaching in the implementation stage?
3. To what extent do faculty members at Saudi Universities use the TPACK framework in their teaching practices in the assessment stage?

Limitations of the Study

The study was limited to faculty members working at Najran University in the Preparatory College - College of Sciences and Arts - College of Education - College of Applied Medical Sciences. It was conducted in the second semester of the Academic year - 1442 H.

Terminology of study

TPACK Framework

It procedurally defined in this study as (a methodological framework based on the integration of technological, pedagogical, and content knowledge, and the practice of which gives teachers a set of knowledge and skills that enhance their teaching practices in their field of specialization.)

Teaching practices

It procedurally defined in this study as (a set of performances and procedures that the university faculty members perform during teaching.)

The Reality

It procedurally defined in this study as (what actually happening and what members practice in their teaching to their students at the time of conducting this study.)

The Aspirations

It procedurally defined in this study as (what intended to be through extrapolation of lived reality.)

Study Questions

The Study attempts to answer the following main question:

To what extent do faculty members at Saudi Universities use the TPACK framework in their teaching practices?

The following sub-questions derived from the main question:

1. To what extent do faculty members at Saudi Universities use the TPACK framework in the planning stage of teaching?
2. To what extent do faculty members at Saudi Universities use the TPACK framework in the implementation stage of teaching?
3. To what extent do faculty members at Saudi Universities use the TPACK framework in the assessment stage of teaching?

Objectives of the study

The study aims at revealing the reality of the practices of faculty members by revealing their use of the TPACK framework in the teaching process in its three stages:

1. The extent to which they use TPACK in the planning stage.

2. The extent to which they use TPACK in the implementation stage.

3. The extent to which they use TPACK in assessing their students' learning achievement.

Importance of study

Through the results of the study, it is possible to identify:

1. The reality of the teaching practices of faculty members, near or far from the goals of the Saudi Universities.
2. The strengths and weaknesses in the teaching practices at the Saudi Universities, and thus enhance the strengths and address the weaknesses and shortcomings.
3. The results of the study may benefit those in charge of training at the Saudi Universities in providing training programs based on the TPACK framework, which is best known as an effective organizational framework for professional development programs for teachers at all levels.

4. The results of the study may serve the university faculties concerned with teacher's preparation, e.g. (Colleges of Education) in adopting the TPACK framework within the basic preparation programs.
5. The study is an assessment of the reality that serves in the field of quality and academic accreditation.
6. The goal of the current study corresponds to the priorities of research in Saudi Kingdom, where attention paid to university education and its quality. Also to verify the progress in accordance with the vision of 2030.

Methodology of study

The study adopted the descriptive approach to survey previous studies and the literature related to its variables and in collecting data. The research sample selected from specific colleges, taking into account the following aspects: The College of Education is the college concerned with teachers' preparation. The College of Science and Arts combines theoretical studies in the arts and applied studies in science. The preparatory college is of a preparatory nature, and its teaching members expected to use the TPACK framework because it suits its mission. Faculties of Applied Medical Sciences, Its mission is to teach applied knowledge in the fields of medicine, and it expected to use technology and technological innovations in teaching its courses. The selection of the research sample randomly done within the specified colleges mentioned and the description of the sample is in Table (1).

Table (1) Description of the study sample

	College	Qualifications		N	%
		Master	Ph.D.		
1	Education	6	24	30	25%
2	Science & Arts	8	32	40	33.33
3	Applied Medical Sciences	5	25	30	25%
4	Preparatory	8	12	20	16.67
5	Total	27	93	120	100%
		22,5%	77.5%	100%	

The questionnaire used as a tool for collecting data on the extent to which faculty members at the sample use the TPACK framework in their teaching performance. The questionnaire administered online, it consists of three axes, each of which concerned with a stage of the basic teaching stages, namely:

1/Preparation stage. 2/Implementation stage. 3/Evaluation stage.

Planning for teaching based on TPACK Framework Table (3)

	Performance indicators	Level of performance		
		Always(3)	Neutral (2)	Sometimes(1)
1	Designing flexible interactive participatory plans that allow adding or deleting materials or elements without violating the topic.			
2	Determine perfectly and clearly the intended learning outcomes.			
3	Determine appropriate teaching methods and strategies for the content			
4	Provide appropriate means and media for teaching according to the nature of the subject.			
5	Selecting appropriate media to display content such as still images , charts, animations ,interactive videos ,etc.			
6	Identify interactive educational activities that support and enhance positive participation in educational situations.			
7	Choose tools that support asynchronous communication in case of need, such as e-mail, discussion boards, forums or chat rooms.			
8	Determine the evaluation tools that achieve the real measurements of the required outputs according to the stage of			

It is clear from Table (3) that the planning stage for teaching based on the TPACK framework contains (8) performance indicators (according to this study). It combined technical knowledge, pedagogical knowledge, and academic content knowledge in a variety of contexts. Sometimes in a

context, we find combination between technical and academic content knowledge TCK, and in another context, it combined content and pedagogy PCK, and in a third, it combined between technology and pedagogy TPK, or in a comprehensive overall context, combines all of them in TPACK framework context.

Implementation of teaching based on TPACK Framework Table (4)

	Performance indicators	Always(3)	Neutral(2)	Sometimes(1)
1	Provide students with full detailed definition of the course, its objectives, content, activities, assignments, and methods			
2	Using a variety of teaching strategies, and teaching methods that suit the topic and ensure response to students' learning styles and			
3	Using diverse resources efficiently and effectively in the presentation of the content to achieve desired			
4	Include in the presentation of the content enrichment means such as external online links - infographics -			
5	Communicate relevant information effectively, beside concepts and ideas using diverse and effective			
6	Applying digital tools and resources to support students' collaboration in creating documents or tasks relating to content such as			
7	Encouraging students to generate new ideas.			
8	Using digital tools and resources to promote creative and innovative			
9	Encouraging students to build authentic achievements and comment			

		Always	Neutral	Sometimes
10	Using digital tools and resources to encourage students find solutions to problems under consideration e.g. (Search			
11	Using digital tools and resources to develop students' understanding of content knowledge and concepts (such as the			
12	Encouraging students to use collaborative tools that help detect their creativity (e.g. photo and video editing software Photoshop			
13	Developing research capabilities of students by encouraging them to research as individuals or as work teams and assigning them research activities related to the topics of the course guiding them to use			

Table (4) concern with the planning stage for teaching based on the TPACK framework. It contains (13) performance indicators, (according to this study).It combines in its diverse contexts, the well-known types of TPACK knowledge, which are the, TCK, and PCK, TPK, or in a comprehensive overall context, combines all of them in TPACK framework context.

Table (5) Assessment based on TPACK Framework

	Performance indicators	Level of use		
		Always(3)	Nutral(2)	Sometimes(1)
1	Use a variety of evaluation strategies, methods and techniques that well planned and well prepared.			
2	Correlate between the evaluation methods and techniques used and the outputs to evaluate.			
3	Applying all types of evaluation, pre or diagnostic, formative, and			

	summative.			
4	Provide immediate feedback following any assessment to students to help them make self-evaluation and know about their learning situation.			
5	Assigning students to perform tasks that are meaningful and valuable to them and that appear to be learning activities in which students practice higher-order thinking skills.			
6	Use short electronic questions (quizzes), assignments, and in-class discussions to evaluate performance and tasks sequentially.			
7	Apply different and unconventional tools and assessment methods such as designing mind maps and concept maps, creative evaluation using paper clips as posters, graphics, videos, audio files and electronic media.			
8	Determine the evaluation tools that achieve the real measurements of the required outputs according to the stage of evaluation pre, formative, or summative.			
9	Apply traditional tests, taking into account the diversity of questions between objective, short, and long essays that measure all levels of knowledge, away from focusing on the level of memorization.			
10	Prepare electronic question banks from which equivalent tests carried out.			
11	Use Portfolio-based assessment to evaluate academic work e.g. Assignments, lab results, writing			

	samples, speeches, student –created films or art projects,			
12	Taking into account the quality standards in evaluating the course learning outcomes and keep in line with the learning outcomes of the program.			

Table (5) concerned with the assessment stage for teaching based on TPACK framework. It contains (12) performance indicators, (according to this study).It combines in its diverse contexts each of which belong to the well-known types of TPACK framework, which are the, TCK, PCK, and TPK, or in a comprehensive overall context, combines all of them in TPACK framework context.

After preparing the questionnaire in its initial form, it presented it to a group of arbitrators recognized for their experience and competence, with the aim of benefiting from their observations to verify the apparent reliability of the questionnaire and its effectiveness in achieving the research objectives. In light of the referees' observations, the questionnaire modified in its final form, which was used to collect the required data.

Table (6) Criteria for judging the responses of the sample members

The Mean	Usage level
from 2.33 to 3.0	High
From 1,67 to 2.33	Neutral
from 1.00 to 1.67	Low

The validity of the questionnaire was verified using statistical methods as shown in the following tables (7) & (8):

Table (7) values of correlation coefficient for each axis with the total score of the questionnaire

The axis	correlation coefficient	Level of Significance
Planning to teach according to TPACK framework	.927 **	significant at 0.01 level
Implementation according to TPACK framework	.929 **	significant at 0.01 level
Assessment according to TPACK framework	.930 **	significant at 0.01 level

It is clear from Table (7) that all the correlation coefficients in each domain in the total degree of the axis to which it belongs were positive and statistically significant at the significance level (0 ,01), which indicates the validity of the tool.

To verify the stability of the Questioner, (Cronbach's alpha) coefficient was applied, and the result, as shown in Table (8), was high values that exceeded (0,9 +). This value indicates that the Questioner has the required degree of stability and that it is suitable for the application of what it was designed for.

Table (8) Cronbach's alpha coefficient for Questioner stability

The axis	Cronbach's alpha
Planning to teach according to TPACK framework	0.942
Implementation according to TPACK framework	0.946
Assessment according to TPACK framework	0.955
Accumulate average of Cronbach's alpha coefficient for all axes	0.947

The statistical analysis of Data

After completing the data collection, it was classified and treated statistically using the SPSS program. The mean, standard deviation, and correlation coefficients (Pearson correlation) used to achieve the desired objectives.

Discussion and interpretation of the results

The answers to the sub-questions of the study will lead logically to the answer to the main question. Therefore, the answers to the sub-questions will be reviewed first, and from them we deduce the answer to the main question.

To answer the sub-questions (1), (2) and (3), we will start with sub-question(1) stated as follow:

1. To what extent do faculty members at Najran University use the TPACK framework in the planning stage of teaching?

Table (9) level of use of the TPACK framework in the planning stage

Performance indicator	Sample Percentage	Mean	S.d.	Performance level
planning stage	95%	2.87	1.8	High

Sub-question (2):

To what extent do faculty members at Najran University use the TPACK framework in the Implementation stage of teaching?

Table (10) level of use of the TPACK framework in the Implementation stage

Performance indicator	Sample	Mean	S.d.	Performance level
Implementation stage	93%	2.76	1.6	High

Sub-question (3):

To what extent do faculty members at Najran University use the TPACK framework in the Assessment stage of teaching?

Table (11) level of use of the TPACK framework in the Assessment stage

Performance indicator	sample	Mean	S.d.	Performance level
Assessment stage	97%	2.88	1.4	High

The main question of the study

To what extent do faculty members at Najran University use the TPACK framework in their teaching practices?

Table (12) level of use of the TPACK framework by faculty members in their teaching practices

Teaching stage	Performance level
planning stage	High
Implementation stage	High
Assessment stage	High

Analysis of data as shown in Tables (9), (10), (11) and (12) revealed the following:

It is clear from the results that more than 90% of faculty members practice teaching according to the TPACK framework, in all its aspects, planning,

implementation and evaluation where the average accumulative mean of performance indicators reached 2.87, 2,76 and 2,88 for planning, implementation and evaluation successively which indicate a high level of performance in all aspects-table (12)

This result (high level of performance according to the TPACK framework) is not surprising for the following reasons:

- Saudi Universities used to provide training programs for their employees constantly and according to the latest developments in the field of teaching, learning and innovations in educational technology.
- In every Saudi University, there is a deanships specialized in developing skills, raising professional capabilities, and applying comprehensive quality standards in academic performance.
- Most Saudi universities look forward to accredit all their programs. Among the most important requirements for academic accreditation is the application of quality standards, which could be achieved by applying TPACK framework.
- Saudi universities, through the Deanship of Scientific Research in each university, support and finance research activity. Studies have proven the effectiveness of the TPACK framework in developing scientific research skills.
- The application of TPACK framework go in line with, and support the education policy Vision 2030. The Ministry of education mentioned: The education policy looks forward to develop educational process and will support the educational process by providing distinguished quality education that supports the skills of the second millennium, introduce the most important modern technologies, and raise the efficiency of male and female teachers by relying on the strongest intensive professional training programs. Developing special capabilities and raising the efficiency of university faculty members and university leaders. Raising the ranking of some Saudi universities to be among the top 100 universities in the world. (https://www.moe.gov.sa/ar/Pages/default.aspx)
- The 2030 Vision included in university education: (The application of modern technologies and appropriate and useful technological development in the presentation of scientific knowledge, and scientific research in universities.) Here, the importance of applying the TPAC framework becomes clear.
- We cannot deny that the Corona pandemic and the rapid transition to distance education enhanced by the Internet as a strategic solution had a role in increasing the need to raise the efficiency of faculty members. Moreover, to develop teachers' technological

competencies, improve their skills, and raise their abilities to use technological applications and innovations.

In conclusion, in the application of the TPACK framework, everything helps to achieve the ambitious future vision 2030. Therefore, the result of this study considered positive in achieving the aspiration, and at the same time it agrees with all the studies that demonstrated the effectiveness of TPACK framework, whether in preparing teachers through preparation programs, or in training programs based on this framework to train teachers before, or in- service. Examples of studies that this study agree with: Abu Deyaa [7], Guzey [10], Abdu Asalam [14], Durdu, L. & Dag, F. [15], Baran, E. &.Uygun ,E. [16], Ndongfack, M. [17]. This study also agree with Almery [8], Alshehri [11], and Jang, s. & Chang, Y. [20], in revealing the reality of application and of knowledge of TPACK framework.

Recommendations and Suggestions

In light of the results of the study, the following recommendations and suggestions could be presented:

- Ensure training for faculty members according to the latest developments in the field of technological pedagogical and content knowledge.
- Establishing partnerships with distinguished international universities and with international expertise bodies in the field of training
- Exchange visits and experiences to ensure links with world-leading universities.
- Motivate the university members financially and morally by granting certificates of academic and research excellence.
- Continuous follow-up by the concerned authorities to ensure the quality of what provided.

References:

1. Abdu Alsalam, Hanan Omer. (2018). The impact of a proposed training program based on Technological Pedagogical Content Knowledge (TPACK) framework on developing the teaching performance of social studies teachers in the primary education stage. Faculty of Education-Ain-Shams.
2. Abu Deyaa ,Hana Khamees(2021).The effectiveness of a suggested Training Programme Based on TPACK Model to enhance some Competences for the Student Teachers of Basic Education Major-at the University College of Applied Sciences in Gaza. The International Journal of research in: Education, Human Sciences, Arts and languages, vol (2) Issue (04):15-4-2010.pp 174-209.
3. Adams.J. (2004) Assisting Faculty Performance for Merit: An Academic Accomplishments Index. Journalism & Mass communication Educator .Vol.58.No,31,24-250.
4. Alkhooli, Mohammed Ali. (2011).Integration of content, pedagogy and technology. Dar Falah, Jordan,
5. Almery, Khayria Ali Saleh (2019). Development of Technological Pedagogical Content Knowledge (TPACK) for females Science Teachers in Alriadh Secondary Schools, K.S.A.(proposed vision). Specialized International Educational Journal, Volume (8). Issue (1)-2019, pp 103-116.
6. Alshehri, K, A. (2012). The Influence of Mathematics Teachers' Knowledge in Technology, Pedagogy, and Content (TPACK) on their Teaching Effectiveness in Saudi Public Schools. Thesis submitted for the degree of PhD. University of Kansas.U.S.A.
7. Augustin.R.R., Liliasari, S. Sinaga, P.,& Rochintaniawati, D.(2019) Assessing pre-service Science Teachers' TPACK on Kinetics ,plant tissues and daily life used materials . Journal of Physics Conference Series, pp .1-5.
8. Baran , E.&.Uygun ,E .(2016). Putting Technological, Pedagogical and content Knowledge (TPACK) in action : An Integrated. TPACK-design-based learning (DBL) approach. Australasian Journal of Educational Technology,2016,32(2),47-63.
9. Durdu, L. & Dag, F. (2017.) The effect of using the TPACK model in developing the pedagogical and technological knowledge of pre-service mathematics teachers by designing a computer program in mathematics based on the TPACK model.
10. Guzey,S.S. & Roehring,G.H.(2009).Teaching Science with Technology: Case Study of Science Teachers' Development of Technology Pedagogy, and Content Knowledge. Contemporary Issues in Technology and Teacher Education, 9(1),25-45.

11. Jang,s.& Chang,Y.(2016) Exploring the Technological, Pedagogical and content Knowledge (TPACK) of Taiwanese university physics instructors .Australian Journal of Educational Technology, 32(1), 107-122.

12. Jimoyannis, a. (2010). Developing Technological Pedagogical Content Knowledge Framework for Science Education Implication of Teacher Trainers' Preparation Program. Proceedings of Informing Science & IT Education Conference (In SITE).

13. Journal of Multilingual and Multicultural Development 7(5):379-392 DOI:10.1080/01434632.1986.9994254

14. Kholer.M.J. & Mishra.P. & kereluik. K. Et AL (2014) Introducing TPACK in AACTE (Ed). Handbook of Technological Pedagogical Content Knowledge (TPACK) framework .Research on Educational Communications and Technology .Business Media. New York,5(9), 102-111.

15. Kholer.M.J.& Mishra.P.(2009) What is Technological Pedagogical Content Knowledge? Contemporary Issues in Technology and teacher Education 9(1),60-70.

16. Ndongfack, M. (2015). Teacher Profession Development on Technology Integration Using the Mastery of Active and Shared Learning for Techno-Pedagogy (MASLEEPT)Model, Creative Education,Vol,5,No.4;2016.

17. Nies, M. L. Zee, E.H.V.& Gillow-Wiles, H. (2010). Knowledge Growth in Teaching Mathematics /Science with Spreadsheets: Moving PCK to TPACK through Online Professional Development. Journal of Digital Learning in Teachers Education, 27(2), pp.42-52.

18. Omer, Suad Gaafer. (2021). Professional Training- needs for Faculty Members at Najran University in light of crises and emergency conditions (COVID-19) as an example. Research journal in educational sciences, humanities, Arts, and languages. Vol. (02) Issue (04) pp. 284-340 .University of Basra, Iraq.

19. Philips, M.D. (2014) Teachers TPACK enactment in a community of practice, thesis submitted for the degree of PhD in June 2014.Monash University. Retrieved from: https://www.researchgate.net/publication/266858223

20. Srisawasdi, N. (2014). Developing Technological Pedagogical Content Knowledge Framework in Using Computerized Science Laboratory Environment an Arrangement for Science Teacher Education Program. Research and Practice in Technology Enhanced Learning, 9(1), pp.123-143.