

The Extent of Activating Educational Technologies (TPACK Model) Among Teachers of Musical Skills in The Sultanate of Oman to Keep Pace with The Requirements of The Twenty-First Century Skills

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Abstract

The research aims to determine the extent to which teachers of musical skills activate educational techniques (TPACK model) in the Sultanate of Oman. The descriptive analytical approach was used with a dependent variable, which is the extent to which teachers activate educational techniques (TPACK model) in Oman. The research population was teachers of musical skills in Oman. The application was carried out through an electronic questionnaire, and it resulted that the educational knowledge axis received the highest rank, and this is due to the actual practice resulting from the effectiveness of the teachers' role and tasks, knowledge of the content, and their keenness to do so. To implement the content. As for the axis of knowledge of technology and content, it is average because there is no connection between educational content and technology. Finally, the axes of knowledge of technology and knowledge of technology and education are few and are due to the failure to link content and education with modern technology to facilitate its use and application. The research recommends the importance of paying attention to employing electronic learning platforms in presenting the subject and encouraging teachers to Participate in computer training with good planning for teaching the subject.

Keywords: TPACK Model, Musical Skills Teachers, Sultanate of Oman

INTRODUCTION

The twenty-first century came with many contemporary challenges facing all societies of the world, the most important of which are the technical and informational challenges related to the enormous knowledge and technical explosion that we are experiencing in our lives. These challenges include the technological development and its employment and integration into the educational process encountering the teacher, which has had a role in changing the teacher's professional performance. Therefore, the teacher must be qualified, provided with the experience and skills that contribute to enhancing his competencies to integrate technology into teaching in order to achieve the objectives of the educational content.

These major changes have imposed a new form of learning and new skills that students in the twenty-first century must master, and with increasing recognition of the importance of integrating technology into the educational process as one of the characteristics that an effective teacher must have in the twenty-first century, there was a need for a new framework to help understand and evaluate the knowledge and skills teachers need to effectively integrate technology into the curriculum (Mishra & Koehler, 2006; Schmidt et al., 2009; Koehler et al., 2013). Previous research and studies have shown that gaining some technical skills by teacher, does not guarantee the effective use of technology in teaching and learning in the twenty-first century, but, instead, it requires a systemic understanding of how to integrate technology, educational content, and teaching methods. Consequently, this was a motivation for the emergence of TPACK Model (Mishra & Koehler, 2006). TPACK model emphasizes the integration between knowledge of technology, knowledge and subject content, and knowledge and teaching methods as key requirements for effective teaching using educational technologies (Fontanilla, 2016; Marin et al., 2019).

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Research Problem

The researchers followed the scientific and technological progress in the twenty-first century, which has led to the world's great interest in modern education skills to keep pace with the great cognitive momentum. This knowledge requires attention to developing teachers' skills in order to develop the skills of the learner or student, in terms of methods of thinking affected by knowledge of modern technological applications, which help in dealing with the requirements of the era, as it is considered a successful means of learning and teaching. Therefore, the two researchers paid attention to identifying the extent to which teachers of musical skills in the Sultanate of Oman activate educational technologies (TPACK model) as one of the important models that attempts to employ technology, teaching skills and academic content in a framework that takes into account all its fields aiming at keeping pace with the requirements of the twenty first century skills.

Research Objectives

This Research Aims To

Identify TPACK model as one of the contemporary models based on the integration and consolidation of content knowledge, education, and technology.

Identify the extent to which musical skills teachers activate educational technologies (TPACK model) in the Sultanate of Oman

Research Importance

Provide educational specialists, especially in musical skills subject, with the necessary information about TPACK model

Provide a tool to demonstrate the extent to which musical skills teachers activate educational techniques (TPACK model) in the Sultanate of Oman

Research Questions

What is TPACK model?

To what extent do teachers of musical skills activate educational techniques (TPACK model) in the Sultanate of Oman?

Research Limits

Time limits: 2022/2023

Spatial limits Sultanate of Oman.

RESEARCH PROCEDURES

Research Methodology

Descriptive approach (content analysis) is applied on this research.

The Research Sample

Musical skills teachers in the Sultanate of Oman

Research Tools

A questionnaire to musical skills teachers regarding the level of knowledge of the TPACK model

Research Terms

TPACK Model (Technological Pedagogical and Content Knowledge)

It is the intersection of primary forms of content knowledge (CK), pedagogy (PK), and technology (TK), to produce new knowledge in pedagogical content knowledge (PCK), technological content knowledge (TPK), technological pedagogical knowledge (TCK), and the intersection of all The Three Knowledge: Content Knowledge, Pedagogy, and Technology (TPACK) (Durdul, 2017)

Instructional Technologies

The World Educational, Scientific and Cultural Organization (UNESCO) defined educational technology as “A systematic method for designing, implementing and evaluating the entire process of teaching and learning according to special specific objectives based on theories of learning and communication, and by employing a range of human and non-human resources in order to achieve effective learning.”

It is “all methods, devices, materials, tools and organizations used in any educational system intended to achieve prior defined educational goals, and also aims to speed up development in the educational system, make it more efficient and effective, and elevate it to visible and tangible levels.

21st Century Skills

The 21st Century Skills Partnership defines them as the skills that students need to succeed in school, work and life. (Montejo & Adriano, 2018)

21st century skills are distinguished as general skills different from specific skills, according to their possibility of application in the labor market. These skills can be only applied in the environment for which they were developed. Hence, specific skills are devalued when the environment changes, because they are not applicable in other professional contexts (Balcar, Lenka, and Lenka, 2014).

The Research Is Divided into Two Sections

The First Section Includes the Following

First: Previous Studies Related to The Research Topic

Second: The Theoretical Framework, Which Includes the Following

- Educational techniques.
- Twenty-first century skills.
- TPACK model.

Third: Applied Framework

Applying the questionnaire tool to teachers of musical skills at the Ministry of Education in the Sultanate of Oman

First: Previous studies related to the research topic:

Here are some of the previous researches and studies that dealt with the TPACK model, presented from oldest to newest based on the date of publication:

1. A Study Entitled: “The Effect of A Training Program Based On TPACK Model In Developing The Teaching Performance Of Social Studies Teachers In The Basic Education Stage” (Omar, 2018)

The current research study aimed to identify the effect of a training program based on the TPACK model in developing the teaching performance of social studies teachers in the basic education stage. The research sample consisted of (30) male and female social studies teachers in the basic education stage. This study used an experimental design that relies on one group with a pre-measurement and a post-measurement. Also, a list of

the teaching performance that must be developed among social studies teachers in the basic education stage was prepared along with a training program for teachers' training needs based on the TPACK model. Then, a research tool was developed and represented as teaching performance observation card for social studies teachers in the basic education stage. This research tool was applied to the research group beforehand, then the training program was applied to the teachers, and then by applying the research tool afterward, the results showed that there were statistically significant differences between the average scores of the research group in favor of the posttest measurement of the teaching performance observation card as a whole at the level of significance (3, 30). Furthermore, the results confirmed the presence of statistically significant differences for the teaching performance observation card in each of the fields of teaching planning, teaching implementation, evaluation and the academic field at a significance level of (3.30), while the results of the field of ethics and behavior of the sample were insignificant. Statistically, this confirms the effectiveness of the training program in developing the teaching performance of social studies teachers in the basic education stage.

2. A Study Entitled: “Developing Educational Technical Knowledge Related to Educational Content (TPACK) Among Science Teachers in The City Of Riyadh (Proposed Vision)” (Al-Amri, 2019)

The study aimed to build a proposed vision for developing technical pedagogical knowledge related to educational content (TPACK) among science teachers in the city of Riyadh. The research sample consisted of (1375) teachers. The study relied on the descriptive approach through two study tools, the first is to determine the extent of availability of related pedagogical technical knowledge, while the second is a list of requirements for developing educational technical knowledge related to educational content. The study was focused on presenting a proposed vision for developing technical knowledge (TK), the stage of developing technical educational knowledge (TPK), the stage of developing technical knowledge related to educational content (TCK), the stage of developing technical knowledge related to educational content (TPACK), and the follow-up and evaluation stage.

3. A Study Entitled: “The Effectiveness Of A Proposed Training Program Based On The TPACK Model In Developing Some Teaching Competencies (PTPDI) Among Female Students’ Teachers In The Basic Stage At The College Of Education At The Islamic University Of Gaza.” (Abudiya, Al-Naqa, And Darwish, 2021)

The study aimed to reveal the effectiveness of a proposed training program based on the TPACK model in developing some teaching competencies (PTPDI) among female students' teachers in the basic stage at the College of Education at the Islamic University of Gaza. The research sample consisted of 32 (female students/teachers). The researcher relied on designing a cognitive test as a research tool in order to measure the cognitive competencies of (female students/teachers), and a teaching performance observation card along with a preparation of a training program. In addition, the researcher relied on the quasi-experimental, one-group constructivist methodology. The most notable results were that there were statistically significant differences in the pre- and post-test of cognitive competencies in favor of the post-application, and positive indications were found among the research sample towards the training program.

4. A Study Entitled: “Evaluating Professional Performance Competencies In Light Of The TPACK Model And The Trend Towards The Requirements Of The Professional Learning Community For Home Economics Teachers.” (Mabrouk, 2021)

- The study aimed to determine the professional performance competencies of the home economics teacher in light of the TPACK model, and to reveal the perception of the home economics teachers about the professional performance competencies in light of the TPACK model according to the variables of the study which are (years of experience - academic degree), with determining the direction of the home economics teachers towards the requirements of the professional learning community based on variables of the study (years of experience - academic degree). The research tools included a measure of home economics teachers' perception of the efficiency of professional performance in light of TPACK, and a measure of the attitude

towards the requirements of the professional learning community. The researcher relied on a sample consisting of 150 teachers, and used the one group descriptive, analytical and experimental methodology. The results indicated differences in professional performance competencies in light of TPACK model among home economics teachers in favor of those with the most years of experience and the highest academic degree, and differences in the measure of the home economics teachers' trend toward the requirements of the professional learning community among home economics teachers in favor of teachers with higher academic degrees and more years of experience.

5. A Study Entitled: “The Degree to Which Teachers Of The Southern Badia Education Directorate Possess The Skills Of TPACK Model In Education And Its Relation To Some Variables.” (Al-Rukaybat, 2021)

The study aimed to identify the degree to which teachers of the Southern Badia Education Directorate in Jordan possessed the skills of TPACK model in education. The study sample consisted of (113) male and female teachers who were randomly selected. The researcher prepared a measure of teaching skills according to TPACK model. The study results showed that the teachers of the Directorate of Education in Southern Badia possessed a moderate score for teaching skills according to TPACK model. Also, there were no statistically significant differences in the degree to which teachers of the Southern Badia Education Directorate possessed the TPACK model skills relying on the variables of gender, academic qualification, behavioral qualification, and number of years of experience in various fields, with the exception of the differences that appeared for the behavioral qualification in the field of knowledge of technology (TK) in favor of those who hold a general diploma in education at the expense of those who do not hold a behavioral qualification.

6. A Study Entitled: “A Proposed Program Based on TPACK Model for Developing Arabic Language Teaching Skills In Light Of The Digital Learning Requirements Of General Diploma Students At The College Of Education And Its Impact On Their Attitudes Towards The Teaching Process.” (Hindawi, 2022)

The study aimed to build a proposed program based on TPACK model to develop Arabic language teaching skills considering the digital learning requirements of general diploma students at the College of Education and to determine its impact on their attitudes towards the teaching process. The researcher relied on a list of Arabic language teaching skills in light of the digital learning requirements of diploma students in the College of Education. He also prepared an observation card to measure the skills of teaching the Arabic language in light of the digital learning requirements of the General Diploma students in the College of Education. He also prepared a scale to measure the attitude towards their educational process. The sample included (60) male and female student teachers in the General Diploma specializing in Arabic Language. The most prominent results found by the study were the presence of statistically significant differences in favor of the post-application in Arabic language teaching skills in light of the digital learning requirements of general diploma students at the College of Education, and the positive trend towards the educational process.

SECOND: THE THEORETICAL FRAMEWORK

Educational Techniques

The concept of educational technologies is closely related to the concept of educational means, as they cannot be separated. Educational technologies emerged as a result of the development of the concept of educational means, which represents part of an integrated system that includes a group of components, each of which is achieving a specific goal. There were multiple and different stages of development of the educational means based on the requirements of that stage, so the concept of educational means was later changed to education technology (techniques).

Objectives of Educational Technology

Increasing students' motivation and desire to learn through the use of advanced educational methods and ways in introducing and presenting the educational material.

Providing students with different knowledge and multiple skills by applying diverse and advanced learning methods.

Providing the best possible education for each student by taking into consideration the individual differences among students.

Increasing students' memorization ability by using interesting teaching methods that stimulate memory.

Reducing learning time by keeping away from traditional methods and means of learning.

Twenty-First Century Skills

Twenty-first century skills are defined as “skills, knowledge, and experiences that students must acquire in order to succeed in their work and their professional and practical lives. These skills are an integrated combination of educational content knowledge, as well as specific skills, experiences, and cultures (Manik, Qasim & Shareef, 2014).

Competencies of the Twenty-First Century Teacher

In light of the teacher's fulfillment of the requirements for quality education, the competencies of the twenty-first century teacher are defined as the teacher's ability to possess the knowledge, skills, and personal, technical, and professional abilities that enable him to provide distinguished qualitative education to achieve the requirements of education in the twenty-first century, which are the coordinating and developing knowledge, developing Thinking skills, providing an enhanced classroom environment, employing information technology in education, individualizing education, conducting research, and linking the school to society (Bushra Khalaf, 2014).

The competencies of the twenty-first century teacher are also defined as the teacher's possession of the technological skills required for the current era like good acquisition of a set of teaching skills using and integrating media and information and communication technology. (Al-Qayed, 2013).

The Arab Organization for Education, Culture and Science (2013) identified the twenty-first century competencies as problem solving, critical thinking, creativity, use of information and communications technology, communication and cooperation, use of various teaching strategies, learning for life, and self-evaluation.

TPACK Model

In view of the modern developments and technologies that have occurred in educational institutions, which aim to improve their educational outcomes, TPACK model emerged as a result of these developments and modern technologies. Its concept was based on achieving integration between knowledge, content, and modern technologies.

Its Definition

It is a technology based on projecting virtual objects and information into the user's real environment to provide additional information or serve as a guide to him, in contrast to virtual reality, which is based on projecting real objects into a virtual environment. The user can interact with information and virtual objects in augmented reality through several portable devices such as a smart phone, or through worn devices such as glasses and contact lenses. All of these devices use a tracking system that provides accuracy in projection and displays the information in the appropriate place, such as the Global Positioning System, camera, and compass as interacted inputs through applications.

TPACK model is used as a productive framework for developing teachers' competencies. (Omar, 2018) summarized the importance of TPACK model as follows:

Transform theoretical ideas related to technology and education into practical applications that serve the educational subject.

Support the concepts of continuous professional development for teachers and following up their professional performance developments.

Improve teachers' pedagogical practices while teaching in various specializations.

Assist teachers in choosing the best and most appropriate methods for teaching academic subjects.

Improve teachers' self-efficacy and professional self-efficacy.

Assist teachers in solving technical problems and manage the classroom effectively.

Inform teachers about developments in technology, education, and content to enrich educational situations.

Activate learner's role and focusing on him in the educational process.

In view of the above, the researchers sought to know the extent to which teachers of the musical skills subject applied TPACK model to keep pace with developments occurring in the world of education and to give subject teachers ways to benefit from modern technologies by deepening students' knowledge and forming their future vision.

Third: Applied Framework

Search Procedures

RESEARCH METHODOLOGY

The researchers used the descriptive analytical approach, as it is appropriate for this type of research, and aims to collect realistic data, answer questions, classify and analyze the data to reach results, and finally develop recommendations and proposals.

Research Variables

The research included one dependent variable, which is the extent to which teachers of musical skills activate educational techniques (TPACK model) in the Sultanate of Oman. The independent variables are:

Gender: male, female.

Specialization: Musical skills.

Educational qualification: Diploma, Bachelor, and Master.

Educational experience: (from 1 to 4 years), (from 5 to 9 years), (from 10 to 14 years), (15 years or more).

Research Community and Sample

The research community consisted of teachers of musical skills at the Ministry of Education in the Sultanate of Oman. The study was applied to all members of the community through an electronic questionnaire. The number of questionnaires responses reached (616). Table (1) shows the distribution of the sample members:

Table (1): Distribution of sample members based on gender variable

Gender	Number	Percentage
Male	233	37.8
Female	383	62.2
Total	616	100%

It is noted from Table No. (1) That the total number of males and females reached (616), (233) of which were males, representing (37.8%), and the number of females was (383), representing (62.2%).

Table (2) shows Distribution of sample members based on the academic qualification variable.

Qualification	Number	Percentage
Master	32	5.2
Bachelor	563	91.4
Diploma	21	3.4

Total	616	100%
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It is noted from Table No. (2) that the total number of sample members holding Master Degree was (32), with a percentage of (5.2%), and those holding Bachelor Degree were (563), with a percentage of (91.4%), while the number diploma holders was (21), with a percentage of (3.4%). .

Table (3): shows the distribution of sample members according to the years of experience variable

Years of Experience	Number	Percentage
from 1 to 4 years	72	11.7
from 5 to 9 years	122	19.8
from 10 to 14 years	171	27.8
15 years or more	251	40.7
Total	616	100%

It is noted from Table No. (3) that the total number of sample members for the variable years of experience from one to four years was (72), at a rate of (11.7%), the number of sample members having experience from 5 to 9 years was (122), at a rate of (19.8%), the number of sample members having experience from 10 to 14 years was (171), forming a percentage of (27.8%), and the number of sample members having 15 years or more of experience was (251), forming a percentage of (40.7%).

Table (4): shows distribution of sample members according to the educational governorate variable

Educational Governorate	Number	Percentage
South Al Batinah	120	19.5
Dhofar	119	19.3
Al Dakhiliya	89	14.4
Muscat	84	13.6
North Al Batinah	72	11.7
North Al Sharqiyah	40	6.5
Al Wusta	28	4.5
Al Buraimi	18	2.9
Total	616	100%

It is noted from Table No. (4) That the total number of sample individuals in the educational governorate is distributed in a homogeneous manner with the density of the number of teachers in their governorates. South Al Batinah Governorate had the highest number (120) of male and female teachers, while Al Buraimi was the lowest with the number of (18) teachers.

Research Tools

The researchers used a questionnaire for the musical skills teachers' opinions at the Ministry of Education to identify the extent to which musical skills teachers activate educational techniques (TPACK model) in the Sultanate of Oman. Previous studies were used in preparing the questionnaire, which included seven themes, and the following measures were followed in preparing the research tool:

- Accessing educational literature.
- Using previous studies in preparing the questionnaire.
- Preparing a list of the questionnaire's themes, and giving weight to the responses of each item, as follows: strongly agree (5) degrees, agree (4) degrees, fairly (3) degrees, disagree (2) degrees, and strongly disagree (1) degree.

Validity of the Research Tool

The questionnaire, which consisted of (35) statements, was presented to (7) arbitrators, three of whom were from the Department of Curriculum and Teaching at Sultan Qaboos University, and the other (4) were from the Ministry of Education. The arbitrators expressed a number of observations, including reformulation deletion some statements. After making the amendments, the final number of statements in the questionnaire

reached (33).

Stability of the Research Tool

The stability of the research tool was confirmed by using Cronbach alpha coefficient for each item of the research tool and the tool in general. The reliability coefficient for the entire tool was (0.962), which is considered a very high reliability coefficient. Also, it was high for entire items, as it ranged from (0.961 to 0.963). Table No. (5) Shows the reliability coefficient for the research tool.

Table (5) shows the reliability coefficients using Cronbach alpha for the research tool themes.

	Questionnaire themes	Cronbach's Alpha if item deleted
1	Content knowledge	0.962
2	Education knowledge	0.961
3	Technology knowledge	0.961
4	Content and pedagogy knowledge	0.961
5	Technology and content knowledge	0.961
6	Technology and education knowledge	0.961
7	Technology, pedagogy and content knowledge	0.961
	The entire Questionnaire	0.961

Research Procedures

The Following Steps Were Followed

- Review previous studies related to the research.
- Design the study tool.
- Present the results, analyze, interpret, and discuss them.
- Provide recommendations and proposals considering the outcomes.

Data Analysis Methods

Frequency, percentages, arithmetic means, standard deviation, and statistical analysis program (SPSS) were used in analyzing the data. Table No. (6) Shows the scale for judging the extent to which teachers of the musical skills subject activate educational techniques (TPACK model) in the Sultanate of Oman through the arithmetic mean and the relative arithmetic mean for each statement of the research tool.

Table No. (6) Scale

Judging the extent to which teachers of musical skills activate educational techniques (TPACK model) in the Sultanate of Oman through the arithmetic average for each statement of the research tool.

Agreement Scale	degree	Arithmetic mean	The extent of activating TPACK model
Strongly agree	5	From 4.3 to 5	Very high
Agree	4	From 3.3 to 4.2	High
Fairly	3	From 2.3 to 3.2	Moderate
Disagree	2	From 1.3 to 2.2	low
Strongly disagree	1	From 1 to 1.2	Very low

Analyse And Interpret Results

Answering of the First Question: What Is The TPACK Model?

To answer the first question, it is worth noting that this question has previously been answered through the theoretical framework of the research, due to its importance in identifying TPACK model with its seven components, studying the extent to which musical skills teachers activate this model, and framing of the questionnaire statements to determine the extent of activation, and through answering the second question and using statistical analysis of One-Sample Statistics test to reveal the extent to which the results of the research are generalized and to benefit from its outputs. This enhances the benefit of knowing the extent to which

educational technologies are activated (TPACK model) among teachers of musical skills in the Sultanate of Oman to keep pace with the requirements of twenty-first century skills for preparers and authors of music skills curricula.

Answering to The Second Question: To What Extent Do Teachers Of Musical Skills Activate Educational Techniques (TPACK Model) In The Sultanate Of Oman?

To answer the second question, the arithmetic means and standard deviations were calculated for the questionnaire themes and items. Table No. (7) Shows the extent of the relationship between the subjects of musical skills and arts from the point of view of teachers in the Sultanate of Oman based on the questionnaire themes:

Table No. (7): Arithmetic means and standard deviations for each of the, placed in descending order.

	Questionnaire themes	Arithmetic mean	standard deviation	rank	Extent of connection
1	Content knowledge	4.6653	0.41558	2	Very high
2	Education knowledge	4.675	0.40648	1	Very high
3	Technology knowledge	4.274	0.59949	6	high
4	Content and pedagogy knowledge	4.5724	0.43199	3	Very high
5	Technology and content knowledge	4.364	0.52582	5	Very high
6	Technology and education knowledge	4.2218	0.54135	7	high
7	Technology, pedagogy and content knowledge	4.5395	0.51348	4	Very high
	The entire Questionnaire	4.4691	0.38378		Very high

Table No. (7) Concludes the following:

It is noted that the highest arithmetic mean for the second theme, education knowledge, reached (4.675), with a standard deviation of (0.40648), which conclude that the actual practice resulting from the effectiveness of the role and tasks of teachers is clearly seen in the teachers' performance of their educational roles and this lead to its activation to a very high degree in this theme. This is confirmed by the first theme, content knowledge, which came in second place with an arithmetic average of (4.6653) and a standard deviation of (0.41558). This emphasizes on the connection between the educational content of the subject and its importance, and this is clear in the teachers' opinions and confirms their keenness to implement the content. The fourth axis, content and education knowledge came in the third place, with an arithmetical mean of (4.5724) and a standard deviation of (0.43199), which can be justified by the fact that the educational content is directly linked to education. The seventh theme, technology, pedagogy and content knowledge, came in the fourth place, with a arithmetical mean of (4.5395) and a standard deviation of (0.51348), which may support the above in terms of performance, tasks, and application, as behavior and personality building require integration in application when performing joint activities and events, shared concepts, and teaching methods. The technology and content knowledge theme was ranked fifth with an arithmetic average of (4.364) and a standard deviation of (0.52582), which is resulted by lack of connection between the educational content and technology in the application of teaching the subject of musical skills from the teachers' point of view, and it requires coherence and connection in order to achieve content applied. The third theme, technology knowledge, came in sixth place with an arithmetic mean of (4.274) and a standard deviation of (0.59949), while technology and education theme came in seventh and last place as the lowest arithmetic mean of (4.2218) and a standard deviation of (0.54135), which is perhaps considered logical due to the lack of linking content and education to modern technology that facilitates its use and application.

Table No. (8) Shows Arithmetic means and standard deviations for the curriculum content theme according to in descending order.

	Statement	Arithmetic mean	standard deviation	Rank	Extent of connection
3	I know the topics I teach appropriately.	4.8	0.426	1	Very high
2	I follow developments in the field of musical skills.	4.67	0.527	2	Very high
1	I have sufficient knowledge in my field of specialization,	4.65	0.58	3	Very high

	musical skills.				
4	I know all theories and concepts related to my field of specialization.	4.65	0.545	4	Very high
5	I can provide sufficient scientific evidence on the subject of musical skills.	4.57	0.6	5	Very high
The first theme, content knowledge		4.6653	0.41558		Very high

It is noted from table No. (8) That the highest arithmetic mean is (4.8), with a standard deviation (0.426), for statement No. (3) “I know the subjects I teach appropriately.” The arithmetic means of statement No. (2) “I have sufficient knowledge in my field of specialization, musical skills,” and statement No. (1) “I have sufficient knowledge in my field of study, musical skills,” and statement No. (4), “I know all the theories and concepts related to my field of specialization,” ranged at (4.65) and (4.65), with 2 standard deviation (0.527), (0.545), therefore, they were ranked second, third, and fourth, respectively, while statement No. (5) “I can provide sufficient scientific evidence on the subject of musical skills lessons” ranked fifth, last, and lowest, with an arithmetic mean of (4.57) and a standard deviation of (0.6), which can be interpreted This is because when teaching the subject of musical skills with its educational content, the subject’s teachers, do not need to provide evidence to clarify the subjects, which confirms the teacher’s explicit knowledge and its connection to the specialty.

Table (9) shows the arithmetic means and standard deviations for the curriculum content theme, placed in descending order.

	Statement	Arithmetic mean	standard deviation	Rank	Extent of connection
6	I determine the objectives of musical skills lessons clearly	4.72	0.518	1	Very high
7	I have a sufficient ability to manage the educational process in a way that fulfills the lesson objectives	4.69	0.507	2	Very high
10	I care about the individual difference between students during the educational process	4.67	0.512	3	Very high
9	I rely on using multiple teaching methods to implement my lessons	4.66	0.525	4	Very high
8	I make appropriate planning for the classroom situation	4.63	0.521	5	Very high
The second theme, education knowledge		4.675	0.40648		Very high

From Table No. (9), the following is observed:

The highest arithmetic mean is (4.72), with a standard deviation of (0.518) for statement No. (6) “I determine the objectives of musical skills lessons clearly,” while the arithmetic mean for statement No. (7) “I have a sufficient ability to manage the educational process in a way that fulfills the lesson objectives” and statement No. (10) “I care about the individual difference between students during the educational process” and statement No. (9) “I rely on using multiple teaching methods to implement my lessons” reached (4.66) and (4.69), with standard deviations of (0.525), (0.507), and these four statements came in the first, second, third, and fourth places respectively. On the other hand, statement No. (8) “I make appropriate planning for the classroom situation” was in the fifth, last, and least, with an arithmetic mean of (4.63) and a standard deviation of (0.521). This can be interpreted as the teachers of the subject are obliged to determine their teaching objectives for each lesson, and the teaching depends on the diversity in the use modern teaching methods. Also, these results confirm which confirms that classroom planning helps to be creative and innovative and considers individual differences between the students and makes the classroom situation planning unrequited.

Table (10) shows arithmetic means and standard deviations for the curriculum content theme, placed in descending order.

	Statement	Arithmetic mean	standard deviation	Rank	Extent of connection
11	I have the ability to skillfully use computer applications	4.47	0.642	1	Very high
12	I have the knowledge of computer programming required to carry out musical skills lessons	4.34	0.718	2	Very high
14	I have the ability to follow developments in modern technology	4.29	0.721	3	high
13	I have sufficient knowledge of computer related to education and music	4.18	0.748	4	high
15	I am keen to participate in computer training courses	4.08	0.818	5	high

The third theme, technology knowledge	4.274	0.59949		high
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From Table No. (10) it is noted that:

The highest arithmetic mean is (4.47), with a standard deviation of (0.642), for statement No. (11) “I have the ability to skillfully use computer applications,” while statement No. (12) “I have the knowledge of computer programming required to carry out musical skills lessons” came in the second place with an average Arithmetic average is (4.34) and a standard deviation of (0.718). Statement No. (14) “I have the ability to follow developments in modern technology.” is ranked third with an arithmetic mean of (4.29) and a standard deviation of (0.721), while statement No. (13) “I have sufficient knowledge of computer related to education and music” came in fourth place, with an arithmetic mean of (4.18) and a standard deviation of (0.748). Finally, statement No. (15) “I am keen to participate in computer training courses” ranked fifth, last, and lowest, with an arithmetic mean of (4.08) and a standard deviation of (0.818), which can indicate, from the teachers’ point of view, that they have the ability to use modern technology in teaching through the use of modern computer applications. Also, teachers rely on applying musical skills lessons through the use of electronic music programs, which therefore, emphasize the teachers' keenness to follow modern technological developments.

Table (11) shows arithmetic means and standard deviations for the curriculum content theme, placed in descending order.

	Statement	Arithmetic mean	standard deviation	Rank	Extent of connection
18	I care about presenting the educational material in a way that makes it easy for students to learn	4.73	0.5	1	Very high
19	I rely on employing students’ previous information to develop new information	4.65	0.506	2	Very high
17	I arrange the elements of the subject to suit students’ learning	4.61	0.517	3	Very high
16	my field of specialization has multiple teaching methods more appropriate for it than others	4.44	0.616	4	Very high
20	I plan to take advantage of the capabilities of the local environment in teaching knowledge to students	4.43	0.656	5	Very high
	The fourth theme, Content and pedagogy knowledge	4.5724	0.43199		Very high

From Table No. (11) It is noted that:

The highest arithmetic mean is (4.73), with a standard deviation of (0.5), for statement No. (18) “I care about presenting the educational material in a way that makes it easy for students to learn”. Statement No. (19) “I rely on employing students’ previous information to develop new information” came in the second place with an arithmetic mean of (4.65) and a standard deviation of (0.506), while statement No. (17) “I arrange the elements of the subject to suit students’ learning,” came in the third place with an arithmetic mean of (4.61) and a standard deviation of (0.517). The arithmetic mean of statement No. (16) “my field of specialization has multiple teaching methods more appropriate for it than others” came in fourth place with an arithmetic mean of (4.18) and a standard deviation of (0.748), while statement No. (20) “I plan to take advantage of the capabilities of the local environment in teaching knowledge to students” came in the fifth, last, and lowest place with an arithmetic mean of (4.43) and a standard deviation of (0.656). This can be interpreted by the fact that teachers of musical skills are keen to present the musical skills subject to students in a way that facilitates their learning, and they rely on employing the previous information of their students in teaching and explaining the new information they have, with their interest in arranging the elements of the subject in order to match their students’ learning.

Table (12) shows arithmetic means and standard deviations for the curriculum content theme, placed in descending order.

	Statement	Arithmetic mean	standard deviation	Rank	Extent of connection
21	I use technology because it contributes to better student learning.	4.65	0.545	1	Very high
25	I use available technologies to communicate with my students.	4.49	0.632	2	Very high
24	I make sure to provide some educational activities for students that require the use of technology to solve.	4.27	0.741	3	high
22	I utilize the educational platforms of Ministry of Education	4.21	0.792	4	high

	to view computerized classes and educational videos.				
23	I am interested in using electronic learning platforms to present the subject of musical skills.	4.21	0.735	5	high
The fifth theme, technology and Content knowledge		4.364	0.52582		Very high

From Table (12) it is noted that:

The highest arithmetic mean is (4.65), with a standard deviation (0.545) was for statement No. (21) “I use technology because it contributes to better student learning.” Statement No. (25) “I use available technologies to communicate with my students” came in the second place, with an arithmetic mean of (4.49), and a standard deviation of (0.632), while statement No. (24), “I make sure to provide some educational activities for students that require the use of technology to solve” is ranked third with an arithmetic mean of (4.27) and a standard deviation of (0.741). The fourth rank was for statement No. (22), “I utilize the educational platforms of Ministry of Education to view computerized classes and educational videos” with an arithmetic mean of (4.21) and a standard deviation of (0.792), while item No. (23) “I am interested in using electronic learning platforms to present the subject of musical skills” came in the fifth, last, and lowest place with an arithmetic mean of (4.21) and a standard deviation of (0.735). This can be explained by the fact that teachers of musical skills depend on the use of modern technology as they believe that it contributes to better learning for their students. In addition, they depend on the use of technologies available in the surrounding environment in order to communicate with their students and make learning easy and effective due to the different geographical location and terrain in the Sultanate of Oman.

Table (13) shows arithmetic means and standard deviations for the curriculum content theme, placed in descending order.

	Statement	Arithmetic mean	standard deviation	Rank	Extent of connection
30	I Direct students to self-learning and how to refer to electronic resources.	4.49	0.606	1	Very high
29	I explain to my students how to search and access information using technology.	4.32	0.675	2	Very high
28	I prepare computerized classes.	4.3	0.756	3	Very high
27	I request students to use websites regarding the lesson topic.	4.27	0.727	4	high
26	My students form work groups that communicate via Internet.	3.72	0.896	5	high
The sixth theme, Technology and education knowledge		4.2218	0.54135		high

From Table (13) it is noted that:

The highest arithmetic mean is (4.49), with a standard deviation (0.606), for statement No. (30) “I Direct students to self-learning and how to refer to electronic resources”, while statement No. (29) “I explain to my students how to search and access information using technology” is ranked second with an arithmetic mean of (4.32) and a standard deviation of (0.675). The third place was for statement No. (28) “I prepare computerized classes” with an arithmetic mean of (4.3) and a standard deviation of (0.756), while Statement No. (27) “I request students to use websites regarding the lesson topic” is ranked fourth with an arithmetic mean of (4.27) and a standard deviation of (0.727). Finally, statement No. (26) “My students form work groups that communicate via Internet” came in the fifth, last, and lowest rank, with an arithmetic mean of (3.72) and a standard deviation of (0.896). This can be explained by the fact that teachers of musical skills follow modern technology and keep pace with the technological age and are keen to guide students to self-learning and train students on how to refer to electronic sources, search and access information using technology. Also, teachers have emphasis on using technology which was clear in their preparation for the subject classes in a computerized way in order to ease information communication by linking lessons with modern technology.

Table (14) shows arithmetic means and standard deviations for the curriculum content theme, placed in descending order

	Statement	Arithmetic mean	standard deviation	Rank	Extent of connection
31	I rely on modern technologies available to help me give excitement to the teaching process.	0.565	4.57	1	Very high
32	I make sure to prepare my study material using computer in	0.578	4.56	2	Very high

	a sequential manner.				
33	The varying use of technology contributes to my students' progress in learning.	0.617	4.48	3	Very high
The seventh theme, Technology, pedagogy and content knowledge		0.51348	4.5395		Very high

From Table (14) it is noted that:

The highest arithmetic mean is (4.57) with a standard deviation of (0.565) for statement No. (31) “I rely on modern technologies available to help me give excitement to the teaching process”, while statement No. (32) “I make sure to prepare my study material using computer in a sequential manner” came in the second place with a arithmetic mean of (4.56) and a standard deviation of (0.578). Statement No. (33) “The varying use of technology contributes to my students’ progress in learning” came in the third, last, and lowest rank with an arithmetic mean of (4.48) and a standard deviation of (0.617). This can be interpreted that teachers of musical skills emphasize their reliance on modern technologies available to help them excite students in the teaching process, and their keenness to prepare the material using the computer in a sequential manner through (computerized lessons, using interesting educational methods such as videos and pictures, and using the electronic calendar with fun and interesting electronic programs for the students). It may be important to investigate the use of multiple other educational technologies such as augmented reality, templated classrooms, and gamification by music teachers (Al-Hafdi & Alhalafawy, 2024; Alhalafawy et al., 2021; Alhalafawy & Zaki, 2022; Alhalafawy & Zaki, 2019; Alshammary & Alhalafawy, 2023; Alzahrani & Alhalafawy, 2023; Alzahrani et al., 2022; Najmi et al., 2023; Saleem et al., 2024; Rashid et al., 2023)

RECOMMENDATIONS

In light of the study results, the researchers recommend the following:

Employing electronic learning platforms to present the subject of musical skills.

Emphasizing the importance of benefiting from the capabilities of the local environment in teaching students the subject of musical skills.

Encouraging teachers of musical skills to participate in computer training courses.

The necessity of appropriate planning for the classroom situation in teaching musical skills lessons.

The importance of providing sufficient scientific evidence about musical skills lessons by subject teachers.

REFERENCES

- Jiří Balcar & Janičková Lenka & Filipová Lenka. (2014). What General Competencies Are Required from the Czech Labour Force? 23(2). doi:DOI: 10.18267/j.pep.483 L. &Dag. F. Durdul. (2017). Pre – service teacher's TPACK development and conceptions through a TPACK – based course. Australian journal&teacher education42 (11)171-150 .
- Ahlam Abdel Azim Mabrouk. (2021). Evaluating professional performance competencies in light of TPACK model and the trend towards the requirements of the professional learning community for home economics teachers. Journal of Research in Specific Education, 7(33), 159-233
- Amjad Farhan Al-Rikaibat. (2021). the degree to which teachers of the Southern Badia Education Directorate possess the skills of the TPACK model in education and its relationship to some variables. Al Hussein Bin Talal University Journal, 4(7), 394-411.
- Hanan Abdul Salam Omar. (2018). The effect of a training program based on TPACK model in developing the teaching performance of social studies teachers in the basic education stage. Journal of the Educational Association for Social Studies, 8(103), 221-253.
- Khairiya Al-Omari. (2019). Developing educational technical knowledge related to educational content (TPACK) among science teachers in Riyadh city (a proposed vision). International Specialized Educational Journal, 8(1), 103-116.
- Safwat Tawfiq Hindawi. (2022). A proposed program based on the TPACK model for developing Arabic language teaching skills in light of the digital learning requirements of general diploma students at the College of Education and its impact on their attitudes towards teaching process. Journal of Studies in Curriculum and Teaching Methods, 255, 45-90.
- Mohsen Attiya. (2009). Organizing learning environment. Jordan: Dar Al-Safaa Publishing and Distribution, Amman.
- Waheed, M., & Jam, F. A. (2010). Teacher’s intention to accept online education: Extended TAM model. Interdisciplinary Journal of Contemporary Research in Business, 2(5), 330-344.

- Mustafa Al-Qayed. (2013). 33 Technical skills that 21st century teacher should have. Retrieved from <http://www.new-educ.com/33-competence-technique-enseignant-21e-siecle>
- Rashid, A., Jehan, Z., & Kanval, N. (2023). External Shocks, Stock Market Volatility, and Macroeconomic Performance: An Empirical Evidence from Pakistan. *Journal of Economic Cooperation & Development*, 44(2), 1-26.
- Hana Khamis Abudayyia, Salah Ahmed Al-Naqah, and Atta Hassan Darwish. (2021). The effectiveness of a proposed training program based on the TPACK model in developing some teaching competencies (PTPDI) among female students as foundation stage teachers at the College of Education at the Islamic University of Gaza. *Islamic University Journal for Educational and Psychological Studies*, 29(2), 469-501.
- Jam, F. A., Sheikh, R. A., Iqbal, H., Zaidi, B. H., Anis, Y., & Muzaffar, M. (2011). Combined effects of perception of politics and political skill on employee job outcomes. *African Journal of Business Management*, 5(23), 9896-9904.
- Elbourhamy, D. M., Najmi, A. H., & Elfeky, A. I. M. (2023). Students' performance in interactive environments: an intelligent model. *PeerJ Computer Science*, 9, e1348.
- Elfeky, A. I. M., & Elbyaly, M. Y. H. (2023). The use of data analytics technique in learning management system to develop fashion design skills and technology acceptance. *Interactive Learning Environments*, 31(6), 3810-3827.
- Elbyaly, M. Y. H., & Elfeky, A. I. M. (2022). Investigating the effect of vodcast to enhance the skills of the Canadian smoking and complex problem solving. *Current Psychology*, 41(11), 8010-8020.
- Elbyaly, M. Y. H., & Elfeky, A. I. M. (2022). The role of metacognition in promoting deep learning in MOOCs during COVID-19 pandemic. *PeerJ Computer Science*, 8, e945.
- Elfeky, A. (2017, July). Social Networks Impact factor on Students' Achievements and Attitudes towards the "Computer in Teaching" Course at the College of Education. In *International journal on E-learning* (Vol. 16, No. 3, pp. 231-244). Association for the Advancement of Computing in Education (AACE).
- Khan, T. I., Khan, S., & Zia, M. H. (2019). Impact of personality traits on workplace deviance—a pakistani perspective. *Global Regional Review, Humanity only*, 4(2), 85-92.
- Al-Hafdi, F. S., & Alhalafawy, W. S. (2024). Ten Years of Gamification-Based Learning: A Bibliometric Analysis and Systematic Review. *International Journal of Interactive Mobile Technologies (IJIM)*, 18(7), 1-25. <https://doi.org/https://doi.org/10.3991/ijim.v18i07.45335>
- Jam, F., Donia, M., Raja, U., & Ling, C. (2017). A time-lagged study on the moderating role of overall satisfaction in perceived politics: Job outcomes relationships. *Journal of Management & Organization*, 23(3), 321-336. doi:10.1017/jmo.2016.13
- Alhalafawy, W. S., Najmi, A. H., Zaki, M. Z. T., & Alharthi, M. H. (2021). Design an Adaptive Mobile Scaffolding System According to Students' Cognitive Style Simplicity vs Complexity for Enhancing Digital Well-Being. *International Journal of Interactive Mobile Technologies (IJIM)*, 15(13), pp. 108-127. <https://doi.org/10.3991/ijim.v15i13.21253>
- Alhalafawy, W. S., & Zaki, M. Z. (2022). How has gamification within digital platforms affected self-regulated learning skills during the COVID-19 pandemic? Mixed-methods research. *International Journal of Emerging Technologies in Learning (IJET)*, 17(6), 123-151. <https://doi.org/https://doi.org/10.3991/ijet.v17i06.28885>
- Alhalafawy, W. S., & Zaki, M. Z. T. (2019). The Effect of Mobile Digital Content Applications Based on Gamification in the Development of Psychological Well-Being. *International Journal of Interactive Mobile Technologies*, 13(8).
- Alshammary, F. M., & Alhalafawy, W. S. (2023). Digital Platforms and the Improvement of Learning Outcomes: Evidence Extracted from Meta-Analysis. *Sustainability*, 15(2), 1-21. <https://doi.org/10.3390/su15021305>
- Alzahrani, F. K., & Alhalafawy, W. S. (2023). Gamification for Learning Sustainability in the Blackboard System: Motivators and Obstacles from Faculty Members Perspectives. *Sustainability*, 15(5), 4613. <https://doi.org/10.3390/su15054613>
- Alzahrani, F. K. J., Alshammary, F. M., & Alhalafawy, W. S. (2022). Gamified Platforms: The Impact of Digital Incentives on Engagement in Learning During Covide-19 Pandemic. *Cultural Management: Science and Education (CMSE)*, 7(2), 75-87. <https://doi.org/10.30819/cmse.6-2.05>
- Najmi, A. H., Alhalafawy, W. S., & Zaki, M. Z. T. (2023). Developing a Sustainable Environment Based on Augmented Reality to Educate Adolescents about the Dangers of Electronic Gaming Addiction. *Sustainability*, 15(4), 3185. <https://doi.org/https://doi.org/10.3390/su15043185>
- Saleem, R. Y., Zaki, M. Z., & Alhalafawy, W. S. (2024). Improving awareness of foreign domestic workers during the COVID-19 pandemic using infographics: An experience during the crisis. *Journal of Infrastructure, Policy and Development*, 8(5).
- Chen, J. (2018). The Application of tree-based ML algorithm in steel plates faults identification. *Journal of Applied and Physical Sciences*, 4(2), 47-54.
- Marin, I., Goga, N., & Stanciu, R. C. (2019). Web application for self-diagnosis and drug recommendation based on user symptoms. *J Adv Technol Eng Res*, 5(2), 62-71.
- Montejo, G. M., & Adriano, T. Q. (2018). A critical discourse analysis of headlines in online news portals. *Journal of Advances in Humanities and Social Sciences*, 4(2), 70-83.
- Zali, S. H., & Tahmasb, R. (2016). Medicinal plants of Farashband tribe's winter pastures and their traditional uses. *J. Adv. Health. Med. Sci*, 2(1), 18-27.