

A Blended Online Training Model for TPACK Development in Saudi Higher Education Institutions

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Abstract

The need to develop faculty technological pedagogical content knowledge (TPACK) is crucial for the purpose of appropriate technology integration in higher education institutions. TPACK model is significance since it covers the three elements each faculty need to teach online: technological knowledge, pedagogical knowledge and content knowledge. Using new approaches to develop faculty TPACK is required to help faculty acquire the knowledge sufficiently and apply it in their classes effectively. Today, online learning as an effective way of accelerating and facilitating the learning process is emerging in thousands of institutions worldwide. But as online learning has three different experiences: expository experiences, active experiences and interactive experiences. Selecting the suitable experience as in one form of the experience or in a blended form is required to utilise the benefits of each experience. Therefore, in this paper we suggest the use of a blended online model for TPACK development. This model comprises of synchronous expository experience (webinar sessions) and asynchronous active experience (interactive web-based modules). When using such a model, it is expected to reduce instructional time, facilitate social interaction and support self-paced learning that in turn can promote faculty TPACK. This model can be used by higher education institutions such as the National Centre for e-Learning and Distance Learning and Saudi universities as well in their initiatives to develop faculty members. For Saudi university, blended online training can facilitate the collaboration in the training initiatives either in term human resources (trainers) or in term of learning resources (training instructional content) to manage their resources and rationalize them efficiently during the process of online learning integration.

Keywords: faculty development – TPACK development – blended online training – online learning for professional development

1. The need for a development model for online learning integration in higher education institutions

As an effective way of teaching, the intent to integrate online learning in higher education in Saudi Arabia is noticeable today. The process of this integration is supported fully by the ruler of Kingdom of Saudi Arabia (KSA) King Abdullah Bin Abdulaziz¹. As a result of this support, the Ministry of Higher Education (MOHE) in KSA² is in position of authority to initiate e-learning plan for Saudi universities. This plan is intended to develop suitable policies and create ideal learning environment that support faculty and learners in using online facilities. One of the early support techniques is the establishment of the National Centre for e-Learning and Distance Learning (NCEDL)³ in Riyadh city the capital of Saudi Arabia. The role of this centre is to encourage and support the integration of e-learning and distance learning in Saudi universities.

Two major factors are significance for the integration of online learning in the educational process. First is the development of technology infrastructure in sort of hardware and software. Second is the development of faculty members' knowledge and skills of instructional technology use, design and development. As the technological infrastructures are beyond the scope of this paper, we will elaborate only about the development of faculty members' knowledge and skills.

Faculty who want to teach online will obviously need technological knowledge. Understanding how to use e-learning tools such as virtual classes and the ability to upload and download files are some of the needed skills. But when such skills are acquired is it enough to teach online or there missing elements.

When the development plan focuses only in technological part, the use of technology for teaching will be just for the purpose of technology itself. The faculty knowledge to teach online will be enhanced partially as shown in Figure 1. For example, let us imagine a training workshop aims at developing faculties' knowledge and skills in using a learning management

¹ http://en.wikipedia.org/wiki/Abdullah_of_Saudi_Arabia

² <http://www.mohe.gov.sa/>

³ <http://www.elc.edu.sa/portal/>

system (LMS). By the end of the training workshop, faculty can use LMS in an appropriate way. But as faculty trained to use LMS technically, the educational perspective is still hidden. This way of training can lead to a superficial use of instructional technology which in turn may cause disturbance or distraction of learners. Therefore, planning an effective use of technology and justifying the use of technology in teaching and learning is usually beyond the technical training of instructional technology. Another item or extra training should be involved in the faculty training workshop to achieve effective instruction by using technology.



Figure 1: Knowledge of technology is one of the needs to teach online.

Since Faculty are practicing the process of teaching, a new element in the training workshop should be added related to pedagogy. That means we will provide faculty with the ability to justify the use of a particular technology in their teaching and learning as shown in Figure 2. When faculty achieve that, they can use the appropriate technology to fulfil their pedagogical needs. For example, faculty can practice formative evaluation by using LMS. They can periodically generate online quiz reports from LMS, identify the learners' common mistakes in answering the quiz and give an appropriate feedback in following classes. If faculty did not recognize the major role of formative evaluation in learners development (Black, 2004), they will not continue the process of generating the reports from LMS and give their comments to the learners or they may ignore this facility completely.



Figure 2 Knowledge of technology and pedagogy are two needs to teach online.

Also, as we have a variety of content, if faculty did not informed about the different type of the instructional contents and how each type of the content has its own unique way of teaching. They cannot recognize when to use a particular technology and pedagogy to support their teaching. That is, by providing faculty with content knowledge, they can recognize the different uses of pedagogy and technology according to the type of the content being taught. Therefore, as educational technology is an interdisciplinary field (see Figure 3), faculty who want to teach online require technological knowledge, pedagogical knowledge and content knowledge.



Figure 3: Knowledge of technology, pedagogy and content are essential to teach online

When faculty perception of technology, pedagogy and content is developed, they can integrate online learning in their teaching practice successfully. Today instructional technologists believe no one best solution for using technology and pedagogy in facilitating or developing teaching and learning (Mishra and Koehler, 2006). Different contexts have different way of solving the problem. Therefore, preparing faculty by using technological

pedagogical content knowledge (TPACK) model is promising for effective integration of technology in teaching and learning.

2. What is TPACK model?

According to (Mishra and Koehler, 2006), in order to integrate technology in teaching effectively, teachers need technological pedagogical and content knowledge (TPACK). Diagram 1.1 depicts the elements of TPACK model and their relation.

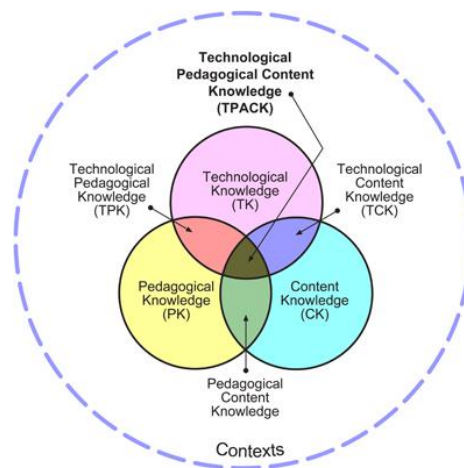


Figure 4: TPACK Model 4

The main elements of this model are *technological knowledge* TK that can be defined as “the knowledge about standard technologies, such as books, chalk and blackboard, and more advanced technologies, such as the Internet and digital video” (Mishra and Koehler, 2006, p. 1027), *pedagogical knowledge* PK that can be defined as “the deep knowledge about the processes and practices or methods of teaching and learning and how it encompasses, among other things, overall educational purposes, values, and aims” (Mishra and Koehler, 2006, p. 1026), and *content knowledge* CK that can be defined as “the knowledge about the actual subject matter that is to be learned or taught.” (Mishra and Koehler, 2006, p. 1026).

After that, the model becomes more focused towards the use of an effective match that consists of technological and pedagogical knowledge TPK, pedagogical and content

⁴ Free copy-rights - Source <http://tpack.org>.

knowledge PCK and technological and content knowledge TCK. For TPK knowledge is including “the existence, components, and capabilities of various technologies as they are used in teaching and learning settings, and conversely, knowing how teaching might change as the result of using particular technologies” (Mishra and Koehler, 2006, p. 1028). The knowledge about PCK includes “knowing what teaching approaches fit the content, and likewise, knowing how elements of the content can be arranged for better teaching” (Mishra and Koehler, 2006, p. 1027). For TCK, the needed knowledge includes “knowledge about the manner in which technology and content are reciprocally related” (Mishra and Koehler, 2006, p. 1028). As we notice, the focus becomes narrower towards the best choice of a particular element to suit the need of a particular situation. For example, when acquiring the knowledge of choosing the best teaching method to explain a particular topic of the content in PCK, the quality of our teaching can be improved as the empirical findings guiding our choice.

Lastly the model becomes focused towards the effective integration of technological knowledge, pedagogical knowledge and content knowledge (TPACK) to decide on choosing the effective method of technology and pedagogy to support our instruction for a particular topic.

According to (Mishra and Koehler, 2006, p. 1029), “ TPACK is the basis of good teaching with technology and requires an understanding of the representation of concepts using technologies; pedagogical techniques that use technologies in constructive ways to teach content; knowledge of what makes concepts difficult or easy to learn and how technology can help redress some of the problems that students face; knowledge of students’ prior knowledge and theories of epistemology; and knowledge of how technologies can be used to build on existing knowledge and to develop new epistemologies or strengthen old ones”

3. Current situation of TK and PK in Saudi Universities

TPACK model main components are PK, TK and CK. We assessed those elements in order to identify the level of faculty PK and TK. We exclude the CK since the context of higher education is different from the context of K-12 education, the content knowledge (CK) completely varies between the two. The (CK) of faculty members is the strongest part of TPACK model. They are experts in their field and they still contribute to the body of

knowledge in their fields. Even the junior lecturers are smart and considered among the best who graduated from their faculties. Therefore, in view of the fact that faculty members are considered experts in their field, the (CK) will be minimized in the preliminary assessment of TK and PK that is needed to understand the actual situation TK and PK.

Searching the literature to explore the choices of the instruments that can be used to assess TK and PK yielded a recent questionnaire with a reliability value of (.86) and was validated by three experts (Schmidt et al., 2009). Since the content of this questionnaire is related to the research needs (see the appendix A) and the reliability and validity tests of the instruments are stated clearly. The decision was made to use this instrument to assess faculty technological knowledge and pedagogical knowledge.

We used a convenience sampling technique to gather our data. The researcher distributed the questionnaire among 20 faculty members resemble different Saudi universities. Thirteen questionnaires out of twenty were returned. Respondents demographic data included in the appendix B.

Faculty self-assessment of their TK is encouraging. The participants assessed different statement about TK such as their ability to easily learn technology (item 2), use technology (item 6) and overcome technical problems (item 1) that they might face. The majority of their responses are categorized under Agree or Strongly agree categories. Figure 5 depicts the result of TK.

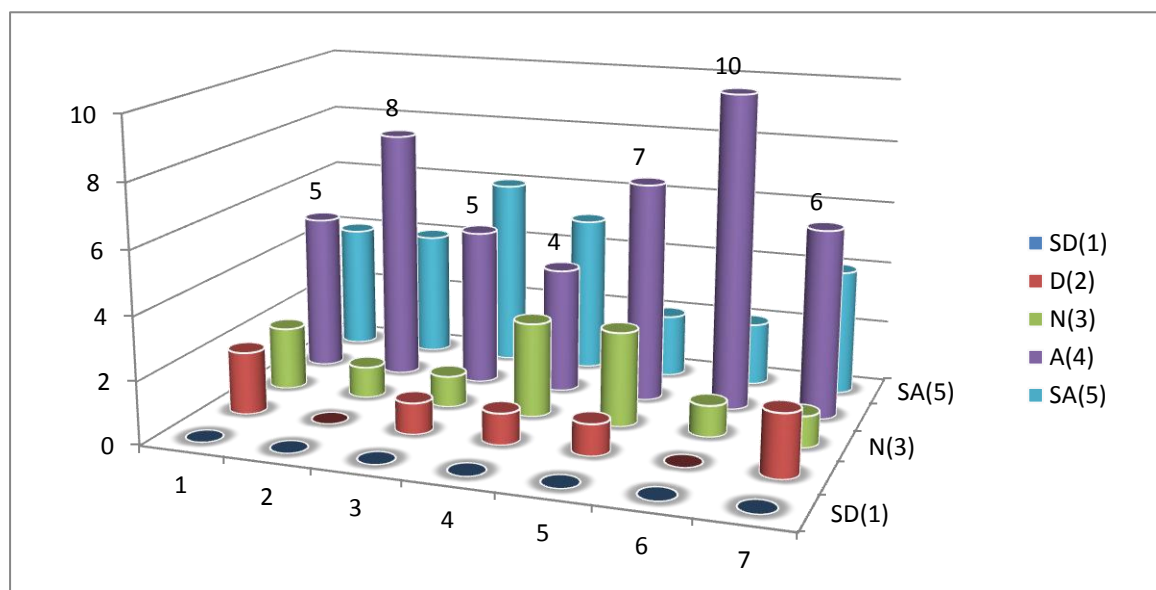


Figure 5 Faculty self-assessment of their technological knowledge (TK)

The justification of such results is that the developments of Saudi nation about the use of technology are noticeable today in general and faculty in particular. Faculty have their own official email under the university domain and can use or develop PowerPoint slides. Also, they can use the registration system to insert or edit their students' records, navigate university website and use the different online facilities that are offered. Therefore, developing TK of faculty are expected to be an easy task if the instructional materials were prepared by instructional technologist who know what type of technology is needed in the current situation to conduct successful online teaching in higher education institutions.

Also, Faculty self-assessment of their PK is encouraging. Participants assessed different statement about PK such as their ability to adapt their teaching styles according to the need of the students (item 2), apply different teaching styles that match the learning styles of the students (item 3) and use multiple ways of assessments (item 4). The majority of their responses also are categorized under Agree or strongly agree categories. Figure 6 depicts the result of PK.

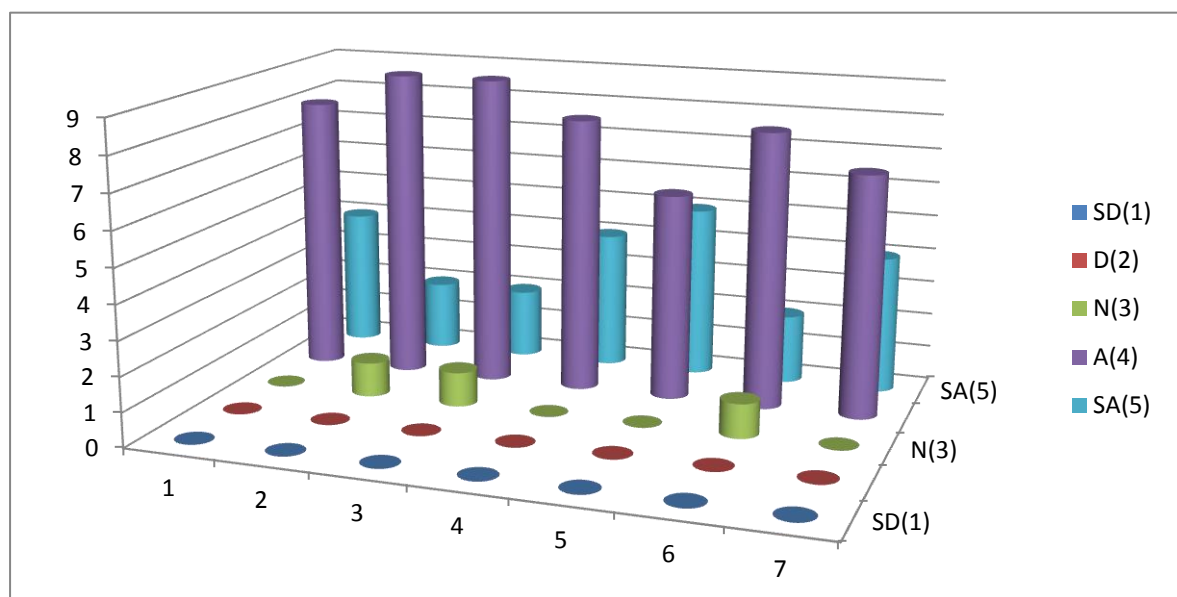


Figure 6 Faculty self-assessment of their pedagogy knowledge (PK)

But in order to confirm those results of PK we conducted a follow up interview with five participants who took part in this preliminary assessment. Demography data and interview questions are included in the appendix (C). The interviews were recorded, transcribed and the main themes after that were identified by the researcher.

One of the major findings of those interviews is a potential change from teacher-centred learning to learner-centred learning in the teaching practice today. Those efforts are noticeable in science faculties but it seems that Art faculties are still mainly practice teacher-centred learning. Also, Instructional Activities seem to need enhancement towards various forms of activities such as problem-based learning and task-based learning. Therefore, expanding their knowledge on other form of pedagogy is needed. Moreover, group work activities seem to be limited comparing to individual activities. Therefore, introducing how to use group work activities effectively to faculty is crucial to help learners developing their knowledge through social interaction technique and acquiring the skills of working in groups. Lastly, it seems they practice summative evaluation excessively whereas there are other forms of assessment such as formative evaluation and confirmative evaluation. Therefore, introducing them to different form of assessment and how it can be used to improve the students' learning is required. Those findings from the questionnaire and the interview can clarify the faculty level of TK and PK in Saudi universities.

4. Developing TPACK by using online training

There are some factors that may recommend the use of online training rather than traditional face-to-face training. Lack of free time for training and work stress are considered to be major factors that reduce the number of faculty attending professional training sessions. The researcher met many lecturers at one University and discussed various professional training issues with them. They mentioned work stress and lacking of free time as major obstacles to the enrolment in professional training courses.

Also, some of the Saudi university such as King Saud University and Taif University have dispersed branches. Joining professional development training usually requires moving to the training halls. When faculty plan to join this type of training, they should distract their schedule and reschedule their tasks before they agree to join the traditional mode of training. Many institutions such as Georgia State and Winston- Salem State University used online training as a substitution to the traditional face-to-face training Arabasz, P., Pirani, J. A., & Fawcett, D. (2003) or as an additional way of delivering training as requested by some faculty at Botswana university (Thurab-Nkhosi, Lee, & Gachago). By using such method of training, the elimination of faculty work stress can be achieved. Travelling and

accommodation expenses are not required. Movement to the main branch can be eliminated as staff from different branches of the university can access online training sessions from their offices or houses. According to (Wolf, 2006), online training is a suitable way to train staff from the institutions in widely spread branches. Moreover, it can get the advantages of full online training from increasing the interaction with the instructors and other participants to access useful and up to date resources through the Web (Means *et al.*, 2009; Sitzmann *et al.*, 2006; Zhao *et al.*, 2005).

In addition to that, the training system in KSA is mostly single-gender training. Therefore, if the trainer is a male, female faculty will be separated in different hall. Male trainers can present PowerPoint slides and communicate with female trainees by using a Closed-circuit television (CCTV) and microphone. Trying to activate the use of full online training as an alternative to the traditional training for female faculty's professional development can improve the quality of communication during the training sessions. Therefore, our suggestion to overcome such obstacles that may hinder the training effectiveness or reduce participants' enrolment in face to face workshop training is to use purely blended online training.

According to (Means *et al.*, 2009), purely online learning experiences can be divided into *expository experiences* where technology is used to convey the instructional message, *active experiences* where learners are independent and have control on the online learning objects they use such as web-based modules and *interactive experiences* such as collaborating with other learners to construct a specific knowledge and the instructor role is to facilitate learning (see Figure 7) . Therefore, as synchronous expository experiences is significance to learning (Means *et al.*, 2009; Wang and Hsu, 2008) and suits the faculty needs to be connected during the training and asynchronous active experience is promoting learning (Stergioua *et al.*, 2009; Yang and Liu, 2004) in a self-paced progress, the researcher is proposing the use a blend of instructor-led expository experience (webinar session) blended with active experience (web-based modules) for TPACK development.

We call it blended since the use of two or more of information delivery techniques in one instructional system is an example of blended e-learning practices today (Littlejohn and Pegler, 2007). By using such blend, we can support the drawbacks of each experience with the advantages of another. For example, one of the drawbacks for web-based instructional modules is the trainees' feeling of loneliness and the absence of social interaction. In order to get rid of this drawback, we can use numbers of webinar sessions to promote the social interaction among learners.

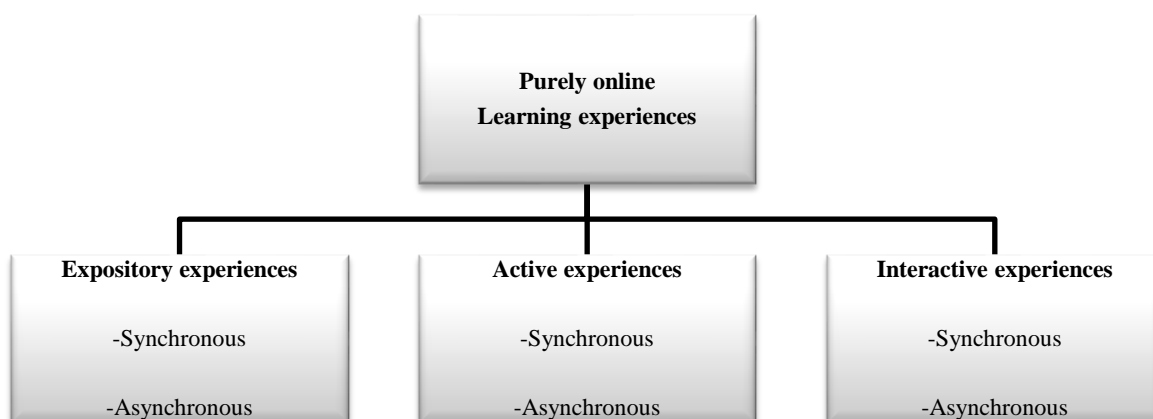


Figure 7: online learning experiences

For webinar instructional sessions, influencing the schedule of trainees as a result of the allocating a specific time for synchronous sessions and missing some information as a result of the pace of trainees' cognitive processing are some of the drawbacks. Thus, by using web-based instructional modules, we can increase the freedom for trainees to organize their studying time according to their own free schedule and navigate the web-based models based on their own cognitive pace. Therefore, by blending these two techniques, we can achieve better online training for faculty that fulfils their needs in an effective and efficient way.

5. Future Work

In the future, although the effectiveness of each technique was studied, a little is known about the effectiveness of this blend for faculty TPACK development. According to (Owston *et al.*, 2008) "It is recommended that future research be directed toward examining various designs of blended programs and their impact ...etc". Therefore, we are going to conduct a blended online TPACK workshop for faculty development at one university in Saudi Arabia to examine empirically the effectiveness this model. The evaluation results for the effectiveness of blended online training to develop TPACK will be published in next September.

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Appendix (A)

Technology Knowledge (TK) and Pedagogical Knowledge (PK) Assessment

Technology is a broad concept that can mean a lot of different things. For the purpose of this questionnaire, technology is referring to digital technology/technologies— that is, the digital tools we use such as computers, laptops, iPods, handhelds, interactive whiteboards, software programs, etc. Please answer all of the questions, and if you are uncertain of or neutral about your response, you may always select “Neither agree nor disagree.”

Technology Knowledge (TK)

Strongly Disagree = SD Disagree = D Neither Agree/Disagree = N Agree = A Strongly Agree = SA

1. I know how to solve my own technical problems.	SD	D	N	A	SA
2. I can learn technology easily.	SD	D	N	A	SA
3. I keep up with important new technologies.	SD	D	N	A	SA
4. I frequently play around with the technology.	SD	D	N	A	SA
5. I know about a lot of different technologies.	SD	D	N	A	SA
6. I have the technical skills I need to use technology.	SD	D	N	A	SA
7. I have had sufficient opportunities to work with different technologies.	SD	D	N	A	SA

Pedagogical Knowledge (PK)

Strongly Disagree = SD Disagree = D Neither Agree/Disagree = N Agree = A Strongly Agree = SA

8. I know how to assess student performance in a classroom.	SD	D	N	A	SA
9. I can adapt my teaching based upon what students currently understand or do not understand.	SD	D	N	A	SA
10. I can adapt my teaching style to different learners.	SD	D	N	A	SA
11. I can assess student learning in multiple ways.	SD	D	N	A	SA
12. I can use a wide range of teaching approaches in a classroom setting.	SD	D	N	A	SA
13. I am familiar with common student understandings and misconceptions.	SD	D	N	A	SA
14. I know how to organize and maintain classroom management.	SD	D	N	A	SA

Appendix (B)

ID	Name of University	Gender	Age	Area	Certificate in education
1	Princess Norah	Female	40 +	History	Yes
2	Shaqrah	Female	32-40	Computer science	Yes
3	Princess Norah	Female	40 +	Education	Yes
4	Princess Norah	Female	40 +	Science	Yes
5	Taif	Male	32-40	English	Yes
6	King Khalid	Male	40 +	Educational technology	Yes
7	Damam	Male	32-40	English	Yes
8	King Saud	Male	40 +	Engineering	No
9	Imam	Male	32-40	Computer science	yes
10	King Saud	Male	32-40	Medicine	No
11	AlJoof	Female	27-32	English	Yes
12	Jizan	Male	40 +	Medicine	No
13	King fahad	Male	32-40	health	Yes

**Table 1 Demographic data for the participants who participated in
The technological and pedagogical assessment of faculty in Saudi Arabia**

Appendix (C)

Interview questions and participants' demographic data

Interview questions	
•	Can you mention some of the teaching approaches you use in your teaching?
•	If learners did not understand a topic, what are the alternative ways you may use?
•	What are the types of learning styles or cognitive style of the learners you keep in mind when you teach?
•	What are the styles of assessing students' performance in the class room?
•	How do you choose your teaching approach?

No	University	Gender	Teaching experience	Discipline	Certificate in education
1	King Saud	Male	6	Medicine	No
2	King Abd Alaziz	Male	10	Islamic studies	No
3	Dammam	Male	5	English	Yes
4	Aljoof	Female	3	English	yes
5	Princess Norah	Female	18	Educational Administration and Planning	Yes

Table 2 Demographic data of the interviewees