



The Current Use of Web 2.0 Tools in University Teaching from the Perspective of Faculty Members at the College of Education



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This study aimed to identify the current status of using Web 2.0 tools in university teaching by the faculty members of the College of Education at Sudan University of Science and Technology. The study used a descriptive analytical method based on the use of questionnaires and interviews. The questionnaire was administered to a sample of 40 members selected randomly from the study population. The results showed that the level of using Web 2.0 tools in university teaching by faculty was medium, and the highest level of usage was represented in the field of scientific research. The results also showed that there are no statistically significant differences on the use of Web 2.0 tools in university teaching due to the degree level, whereas the findings showed statistically significant differences on the use of Web 2.0 tools due to departmental specialisation. The results also showed that using Web 2.0 in teaching caused by some difficulties. In light of these results, a set of recommendations and further research are provided.

Keywords: internet applications, web 2.0, faculty members, Sudan University of Science and Technology, teaching and learning

INTRODUCTION

The educational process in the third millennium is facing many challenges due to rapid change in various cognitive, demographic, social, and economic fields as well as the field of technology and communications, and thus accelerating transmission of knowledge and science is the main feature. Therefore, all these factors pressurise educational institutions to keep pace with these developments and to develop new methods and techniques that contribute to the simplification of knowledge and ways to deliver this knowledge to students in successful and fast ways. Al Qadani (2007) confirms that computers and Internet applications have become important elements of people's daily lives, and that educational institutions do not confine their interest to the cultural deployment of modern technologies, but rather focus on teaching skills to use

and integrate them into the educational process. Thus, with the development of computers and the means of communication, the Internet appeared and provided a great amount of information in all disciplines. The Internet has changed the way that educational material is presented to students and trainees, with websites, mailing lists, and discussion forums playing an important role in the delivery of educational material. However, with the emergence of new technologies for delivering the educational material, the previous media began to lose its luster and was gradually replaced by new Web 2.0 technologies. The term of Web 2.0 refers to the “next generation” of Internet technologies that facilitate interaction with the user (Velagapudi, 2013). It describes the leap from a primarily static World Wide Web where most websites were online brochures consumed by the end user, to today’s web, where sites are dynamically generated and content is both created and shared by end users. In other words, Web 2.0 sites encourage collaboration, allowing social interaction to form virtual communities around user-generated content. Web 2.0 technologies have the potential to create more interactive and powerful learning environments in which learners become knowledge creators, producers, editors, and evaluators (Richardson, 2009). These technologies provide Internet-based systems that offer pedagogical applications for online teaching. Some examples of these tools are: blogs, discussion boards, audio/video chat, RSS feeds, file sharing, social media platforms, interactive whiteboards, and wikis. All of these tools are Web 2.0 platform, and each captures the essence of different pedagogical elements for teaching where have been documented in the literature, such as content sharing, assessing student performance, communicating and collaborating with students, and audio/video recording lecture sessions (Velagapudi, 2013).

LITERATURE REVIEW

Barnett et al. (2004) state that Internet applications such as e-mail, websites, and news groups have benefitted traditional classroom knowledge delivery and have positively impacted the course of delivery and design in many colleges and universities. In the past few years Web 2.0 has emerged, further enhancing the teaching and learning environment in higher education. Despite the gradual increase of these technologies there is no commonly accepted definition of Web 2.0 in the literature, and as such different definitions are used in different contexts. Some scholars focus on the technical side of Web 2.0, while other scholars emphasise the evolving culture of the internet due to Web 2.0 (Birdsall, 2007; Miller, 2005; O’Reilly, 2005; Sodi & Summey, 2009). With the read/write access provided by Web 2.0 tools, users have become active online participants and content creators. They not only find information on the Internet, but they also create and share content (Thompson, 2007). Weller (2013) states that Web 2.0 tools such as YouTube, Skype, Facebook, Google Docs, Word Press, Blogger, Wikipedia, and Padlet have allowed users to easily create and publish content online and to connect with other people from all over the world who have similar interests. These technologies could be characterised by openness, user participation, knowledge sharing, social networking and collaboration, and user-created content (Alexander, 2006; Brown & Adler, 2008; Richardson, 2009). Moreover, Web 2.0 tools can be used to develop new learning strategies that can enhance student motivation, improve participation,

facilitate learning and social skills, and increase self-directed learning (Redecker et al., 2010).

The studies that have addressed the issue of Web 2.0 technologies in university teaching are relatively few, whether at the local or national level or internationally. One recent study by Al Tayeb (2014) deals with the aspect at the local level, showing that the majority of faculty members in Sudanese universities (75%) have a positive attitude towards using the Internet in scientific research. The results also showed that there were no significant differences in the level of using the Internet in scientific research due to the rank and years of experience variables, whilst the result showed significant differences due to the specialisation in favour of the professors of Applied Sciences.

In addition, Al Tahir (2013) conducted a study on the current use of Web 2.0 tools in teaching in the College of Education in Khartoum state, Sudan. Results showed that the most important obstacles were the lack of knowledge and skills to use Web 2.0 tools by the faculty members. The findings of this study also showed that there are a number of difficulties facing the use of Internet applications in university teaching such as the lack of adequate training for faculty members and students to use computers and the Internet. At the national level, Al Matrafi (2009) conducted a study to identify the current status of using the Internet by natural sciences faculty members in Saudi universities and the impact of rank, expertise, and specialisation in faculty members' responses. The results showed that there were significant differences between faculty members due to rank of axes (1, 2, and 4), no significant differences due to the rank for the rest of the axes, and no significant differences due to scientific experience. Many studies have been conducted at the international level, and Estable (2014) found that the intrinsic factors of a lack of time and training were the main barriers to use Web 2.0 tools. The respondents reported positive views of Web 2.0 use in class, with 75% saying that these tools would benefit students and 83% saying they would benefit teacher-student interactions. Tyagi (2012) conducted a study in six universities in the National Capital Region (NCR) of India to explore the usage analysis of Web 2.0 technologies in learning environments by faculty members. The results reveal that the adoption of Web 2.0 tools at NCR universities is associated with important challenges (potential risks, institutional fears), and an effective strategy to deal with implementation problems may therefore include learning from others' experience, as well as open access to content and reliance on open platforms for knowledge sharing and creation. The results also indicate that the faculty's attitude and their perceived behavioural control are strong predictors of their intention to use Web 2.0. Sawant (2012) presents a study on investigation of Library and Information Science teacher's familiarity with Web 2.0 concepts, tools, services, and applications related to LIS education. The results reveal that most of the teachers use Web 2.0 for video sharing via YouTube but nearly half of the teachers never used Wikis. The main problem in using Web 2.0 in teaching was the lack of training programmes organised by universities and other institutions for teachers to use/teach Web 2.0 tools. Yuen et al. (2011) found that teachers indicated positive perceptions of the pedagogical benefits and importance of Web 2.0 tools for teaching and learning, and expressed interest in gaining further skills and understanding in order to more effectively and seamlessly integrate Web 2.0 tools to support and supplement classroom

instruction. An and Williams (2010) conducted a study to explore best practices in teaching with Web 2.0 technologies as well as the benefits and barriers associated with this usage. The study results indicate that the major benefits of using Web 2.0 technologies in teaching include (1) interaction, communication, and collaboration, (2) knowledge creation, and (3) ease of use and flexibility. The major barriers that university instructors encounter in teaching with Web 2.0 technologies include uneasiness with openness and technical problems. The issue of using Web 2.0 tools in university teaching may provide both opportunities and as well as barriers that are yet to be investigated. Therefore, this research attempts to provide a breakdown of the current use of Internet applications in university teaching in some national and international universities and understanding the importance of and barriers to using Web 2.0 technologies, especially in higher education. In addition, the results of this study could be useful for all stakeholders who are using the Internet in university teaching in local and regional educational institutions.

RESEARCH QUESTIONS

The primary research question is as follows: What is the current status of using Web 2.0 tools in university teaching by the faculty members of the College of Education at Sudan University of Science and Technology?

The sub-research questions are:

- i. To what degree do these faculty members use Web 2.0 tools in their university teaching?
- ii. What is the importance of using Web 2.0 tools in university teaching by these faculty members, according to their point of view?
- iii. What are the difficulties faced by these faculty members when attempting to use Web 2.0 tools in their teaching, according to their point of view?
- iv. Are there any significant differences in the degree of the use of Web 2.0 tools in teaching by these faculty members due to academic rank and specialty?

PURPOSE OF THE STUDY

The purpose of this study is to investigate the current status of using Web 2.0 tools in university teaching by the faculty members of the College of Education at Sudan University of Science and Technology.

OBJECTIVES

The objectives of the present study were as follow:

- i. to determine to what degree faculty members use Web 2.0 tools in their university teaching;
- ii. to explore the importance of using Web 2.0 tools in university teaching by faculty members;
- iii. to find out what are the difficulties faced by faculty members when attempting to use Web 2.0 tools in their teaching; and
- iv. to determine if there any significant differences in the degree of the use of Web 2.0 tools in teaching by faculty members due to academic rank and specialty.

METHODS

The researchers used a descriptive analytical method by using a survey approach to investigate the current status of using Web 2.0 tools in university teaching. The survey contained several qualitative questions centred on the use of and barriers to use of Web 2.0.

POPULATION AND SAMPLE

The target population of this study consisted of all faculty members of the College of Education at Sudan University of Science and Technology. The total number of the population was 71 individuals and all of them use Internet in teaching. A sample of 40 faculty members who routinely use at least one Web 2.0 tool in teaching was selected through stratified random sampling. The researchers divided the entire population into different subgroups according to their academic rank, the number of Web 2.0 used, and specialty or department. The total number of the participants in sample represented 56.3% of the total population.

INSTRUMENT

In order to develop the instruments, the researchers surveyed the literature and informally interviewed some faculty members to obtain initial information regarding their use of Web 2.0 tools in teaching. A questionnaire consisting of two sections was designed using the Google forms tool. The first section collects demographic data, whilst the second section consists of 44 Likert-type items, 16 for the level of use of Web 2.0 tools in teaching, 17 for their importance, and 11 to assess the perception of difficulties inhibiting Web 2.0 tools used in teaching. The survey was expected to take 10 to 15 minutes to be completed, and the instrument was given to a panel of faculty members for face validation. They reviewed the instrument and gave some suggestions, which the researchers used to revise the instrument accordingly. The reliability of the instrument was measured by Cronbach's alpha and was found to be 0.86, which is sufficient for the purpose of this study. The questionnaire was administered online and data were collected in 2014. The researchers also used interviews by directing questions to a number of specialists in the field of educational technology from the College of Education at Sudan University of Science and Technology to find out the reality of the use of Web 2.0 tools in teaching.

STATISTICAL ANALYSES

The data were analysed using Statistical Package for the Social Sciences (SPSS-version 21). Initial data analysis used frequencies to provide a profile of respondents by demographic characteristics. The Kruskal Wallis test was used to differentiate between estimated average of the sample on the level of usage of Web 2.0 tools in teaching for academic rank and specialisation. Statistically significant differences were reported using $p. < 0.05$.

FINDINGS AND DISCUSSION

Demographics of participants

Table 1 summarises the demographics of the participants' data in terms of academic rank, number of years of teaching experience, and their specialty/departments. It is observed that out of 40, two were associate professors and above, 15 were assistant professors, and 23 were lecturers. More than half of the respondents had over 12 years of teaching experience (57.5%), whilst 22.5% had 5-12 years of experience, and 20% had less than five years of experience.

Table 1: Frequency distributions of the respondents' demographic profile

	<i>Number of Participants (n=40)</i>	<i>Percentage %</i>
Academic rank:		
Associate professor and above	2	5
Assistant professor	15	37.5
Lecturer	23	57.5
Teaching experience:		
Less than 5 years	8	20
5 ~ 12 years	9	22.5
More than 12 years	23	57.5
Specialty/Department:		
1. Educational Technology	10	25%
2. Science	7	17.5%
3. Languages	5	12.5%
4. Art Education	2	5%
5. Technical Education	4	10%
6. Psychology	4	10%
7. Basic Education	2	5%
8. Educational Science	6	15%

The faculty members were asked an open-ended question in order to ascertain which Web 2.0 tools they used in their teaching and learning processes. Only 11 (27.5%) faculty members listed one or more of the following four tools:

- i. Social media: Three teachers mentioned that they used Facebook to create groups that enable their students to communicate and share their comments on course-related topics. Two additional faculty members reported that they used WhatsApp and Skype in order to provide virtual office hours and to communicate with students, especially postgraduates.
- ii. YouTube: Six faculty members mentioned that they use YouTube videos relevant to course topics.
- iii. Blogs: One faculty member used student blogs in class to help increase student participation and provide a collaborative reflection space for discussion of course topics.
- iv. Online quizzes and grading tools: Four teachers reported that they use a number of online websites and tools to create quizzes for their courses. They mentioned that they used Google forms, quiz creator online, and the WizIQ website.

The faculty members were also asked in the survey instrument to indicate the degree level of use with 16 five-point scale statements regarding the use of Web 2.0 tools in teaching and learning. Table 2 displays mean scores, standard deviation, ranks, and the degree of use for the whole axis, as well as for each item. The mean scores for individual statements ranged from 1.87 to 4.41, with an overall mean response of 3.18, which indicated that the degree of use for Web 2.0 tools in teaching and learning was medium according to the faculty members' points of view.

Table 2: Mean scores, standard deviation, ranks, and the degree of use of Web 2.0 tools in teaching and learning by the faculty members

Statement	Mean & sd		Rank	Degree of use
	M	sd		
1- I deal with students through virtual classrooms.	1.87	0.97	16	Low
2- I interact with my students through blogs in the teaching process.	2.52	1.31	13	Low
3- I communicate with students using instant messenger	4.26	1.09	4	High
4- I communicate with students through Twitter.	1.91	1.04	15	Low
5- I communicate with students through Facebook.	2.26	1.14	14	Low
6- I communicate with my colleagues through my personal website.	3.57	1.31	6	Medium
7- I analyse the student grades online.	2.83	1.47	9	Low
8- I create quizzes to assess student performance.	2.61	1.23	12	Low
9- I use websites to present course materials.	2.87	1.42	8	Low
10- I use Web 2.0 tools in scientific research	4.41	0.79	1	High
11- I search for information.	4.17	1.15	5	High
12- I ascertain what is new in my field.	4.39	0.78	3	High
13- I use Web 2.0's bookmarking application.	2.78	1.41	10	Low
14- I create lectures and tasks for students.	3.30	1.39	7	Medium
15- I download books, articles, and research materials	4.43	0.79	2	High
16- I share YouTube videos with students.	2.70	1.19	11	Low
General degree of use	3.18	1.15		Medium

The top three usages of Web 2.0 tools are as follows: (a) the use of such tools in scientific research represented the highest degree of use (4.41), followed by (b) downloading books, articles, and research materials (4.43); and (c) ascertaining what is new in the field (4.41). These results may be explained by the fact that the teachers are personally motivated to use the internet in their research field to access the latest research studies and ascertain what is new in the field. The interviews with educational technology specialists and others who are interested in using Internet applications indicated that their actual use of Web 2.0 tools is limited to searching for information

from websites such as academia.edu and researchgate.net, as well as blogs, social networking sites, and podcasting using YouTube. This result supports the findings of prior research (Al Tayeb, 2014; Tyagi, 2012), thus confirming that faculty members use Internet applications in scientific research. Moreover, the study showed nine items that represent a somewhat lower level of Web 2.0 tool usage in teaching by faculty members. The average mean score for these items ranged between 1.87 and 2.87 (1, 4, 5, 2, 8, 16, 13, 7, and 9), respectively. This result could be explained due to the lack of necessary training for the use of Web 2.0 technologies and also due to the low internet connectivity, which inhibits these tools from being integrated in teaching. These results are similar to those reported by Al Tahir (2013) and Sawant (2012), but in contrast with those reported by Yuen et al. (2011). The results also indicate that there is a disparity between faculty members in terms of the use of Web 2.0 tools in teaching and learning due to various issues such as attitudes, educational environments, and educational cultures.

The faculty members were asked to rate the importance of using Web 2.0 tools in university teaching according to their point of view on a five-point scale, ranging from 1 (very low) to 5 (very high). Table 3 shows the mean scores, standard deviation, ranks, and the degree of the importance of using Web 2.0 in teaching for the whole axis, as well as for each item. The mean scores for individual statements ranged from 4.09 to 4.65, with an overall mean response of 4.37, which indicated that the degree of importance for using Web 2.0 tools in university teaching was generally high.

Table 3: Mean scores, standard deviation, ranks, and the degree of importance for using Web 2.0 tools in teaching and learning according to the faculty members

Statement	Mean & sd		Rank	Degree of use
	M	sd		
1- To provide collaborative learning opportunities.	4.57	0.66	2	High
2- To help students become more proficient in writing and technology skills.	4.39	0.72	8	High
3- To find and share educational resources with students.	4.65	0.65	1	High
4- To promote self-publishing on the web.	4.44	0.73	7	High
5- To facilitate communication and feedback between learners and teachers.	4.51	0.67	4	High
6- To provide a flexible learning environment.	4.09	0.99	16	High
7- To encourage students to interact and build a learning community.	4.52	0.68	5	High
8- To help learners to create and publish their own material.	4.35	0.94	9	High
9- To support innovative teaching methods.	4.44	0.90	6	High
10- To create quizzes and tasks for students.	4.17	0.83	15	High
11- To support web-based teaching and research.	4.35	0.83	10	High
12- To promote knowledge sharing.	4.57	0.73	3	High
13- To help teachers to design classroom activities.	4.35	0.83	11	High
14- To bookmark web pages and share them with students.	4.30	0.77	12	High

15-	To share YouTube videos with students.	4.22	0.90	14	High
16-	To help students to download the teaching materials.	4.09	0.85	17	High
17-	To keep up-to-date on related topic of interest.	4.22	0.85	13	High
	General importance of use	4.37	0.80		High

The top six statements for the importance of using Web 2.0 tools in teaching as viewed by the faculty members are as follows: (a) to find and share educational resources with students (mean score 4.65); (b) to provide collaborative learning opportunities (4.57); (c) to promote knowledge sharing (4.57); (d) to facilitate communication and feedback between learners and teachers (4.52); (e) to encourage students to interact and build a learning community (4.52); and, (f) to support innovative teaching methods (4.44). These results could be explained by that Web 2.0 tools have many advantages in learning which allow for providing a more flexible learning environment, help build a sense of community, increase interaction and communication among the instructor, students, and other people, and promote collaboration and resource sharing. The full results of the importance of using Web 2.0 in teaching can be viewed in Table 3. The researchers could explain this result due to faculty member realisation of the role that Internet applications play in the educational process, which has become an important part of our daily lives. Furthermore, educational institutions do not confine their interest in the cultural deployment of modern technologies, but focus on teaching skills to use and integrate them into the educational process (Al Qadani, 2007). Moreover, the use of Web 2.0 technologies in educational environments has become an important issue for developing educational content and teaching tools that enrich the educational environment with the necessary methods and techniques. This will help prepare educated generations that have the ability to communicate and deal positively with the modern issues and technologies under proliferation and openness. Therefore, the use of Web 2.0 technologies is of major importance to the faculty members in both their teaching and scientific research. These results are similar to those reported by Estable (2014), who aimed to analyse the current uses of emerging Web 2.0 technologies in higher education with the intent to understand better which tools teachers are using in the classroom. Her results showed that the respondents reported positive views of Web 2.0 use in class, with 75% saying that these tools would benefit students and 83% saying they would benefit teacher-student interactions.

Table 4: Mean scores, standard deviation, ranks, and the degree of difficulties for using Web 2.0 tools in teaching and learning by faculty members

Statement	Mean & sd		Rank	Degree of use
	M	Sd		
1- Lack of training courses on how to use Web 2.0 in teaching and learning.	4.44	0.89	1	High
2- No interest in using Web 2.0 in teaching and learning.	1.83	1.07	11	Low
3- Absence of a future plan to develop and use Web 2.0 technologies in teaching processes.	3.57	1.53	4	Medium
4- Lack of administrative support.	3.52	1.27	5	Medium
5- Student reticence to participate in Web 2.0	4.35	0.94	2	High

technologies.					
6-	Low speed of internet for downloading web pages and files.	3.13	1.42	8	Medium
7-	Increased administrative work and teaching load.	4.09	0.85	3	High
8-	Out-dated computers to use Web 2.0 technologies in teaching.	2.26	1.36	10	Low
9-	High cost of using Internet applications.	3.26	1.32	6	Medium
10-	High cost of devices and applications.	3.26	1.32	7	Medium
11-	Lack of time to learn how to use Web 2.0 tools.	2.87	1.55	9	Low
	General level of difficulties of use	3.32	1.24		Medium

Study participants were asked to highlight potential difficulties of using Web 2.0 tools in teaching and learning processes. The top four reported difficulties were as follows: (a) a lack of training courses on how to use them, (mean score: 4.44); (b) student reticence to participate because of their uneasiness with the openness of using such web tools (4.35); (c) the increasing administrative work and teaching load (4.09); and, (d) the absence of a future plan to develop and use Web 2.0 technologies in teaching processes (3.57). These results could be explained that the open nature of Web 2.0 technologies (An & Williams, 2010) is wonderful, but sometimes anyone can see your work. If non class members have access to the wiki or virtual world, they can disrupt the class or cause damage (sabotage) to the environment. The full results are documented in Table 4. These results may be explained by the fact that most universities in Sudan have poor facilities and environments. In addition to the above results, the faculty members were asked an open-ended question in order to ascertain the difficulties they face when using Web 2.0 tools in their teaching and learning processes. They reported that Web 2.0 tools are still new to many teachers and students, and some students are very uncomfortable with the openness and are thus unwilling to participate and use Web 2.0 technologies. This study supports previous findings (An & Williams, 2010; Sawant, 2012; Tyagi, 2012; Al Tayeb, 2014; Al Tahir, 2014), confirming that the most common barriers to Web 2.0 use in teaching and learning are as follows: time constraints, poor facilities and tools, lack of training and support, student reticence, and technical problems. All of these issues hinder the effort of teachers to integrate new technologies in their teaching and learning processes.

The Kruskal Wallis test was used to differentiate between estimated average of the sample on the level of usage of Web 2.0 tools in teaching for academic rank and specialisation.

Table 5: Kruskal Wallis test for mean difference in usage of Web 2.0 tools with respect to academic rank

	<i>Academic rank</i>	<i>n</i>	<i>Mean</i>	<i>df</i>	<i>F</i>	<i>P</i>
Usage	Associate professor and above	2	3.50	2	1.41	0.50
	Assistant professor	15	3.59			
	Lecturer	23	4.15			

It is clear from Table 5 that there were no significant differences among the three groups of academic ranks (associate professor and above, assistant professor, and lecturer) on Web 2.0 use in teaching ($F_2 = 1.41$, $p > 0.05$). This result could be explained by taking into consideration the point that the instructional uses of Web 2.0 technologies are changed and transform access to information, and could be used by all academic ranks especially for knowledge transfer and communication. This result is supported by studies that show no significant differences regarding the use of technology, such as that of Al Tayeb (2014), who found no significant relationship between the use of the Internet applications and academic rank.

Table 6: Kruskal Wallis test for mean difference in usage of Web 2.0 tools with respect to specialisation

	<i>Specialisation</i>	<i>n</i>	<i>Mean</i>	<i>df</i>	<i>F</i>	<i>p</i>
Usage	Science Education	7	4.29	7	25.21	0.001
	Technical Education	4	3.75			
	Art Education	2	3.75			
	Language Education	5	3.60			
	Educational Psychology	4	3.00			
	Educational Science	6	3.75			
	Educational Technology	10	4.78			
	Basic Education	2	4.00			

It is clear from Table 6 that there were significant differences among the eight groups of specialisations (Science Education, Technical Education, Art Education, Language Education, Educational Psychology, Educational Science, Educational Technology, and Basic Education) on Web 2.0 use in teaching ($F_7 = 25.21$, $p < 0.05$). The faculty members in the departments of Educational Technology and Science Education reported a significantly higher mean value (4.78 and 4.29, respectively) of Web 2.0 usage than their counterparts in other departments ($Mean \leq 4$). This result could be justified by the fact that the majority of the faculty members in the Department of Educational Technology have a Master's or PhD degree in Computer Integrated Education programme from Sudan University of Science and Technology in association with the University of Pretoria in South Africa. This is a unique specialisation in the College of Education, and the programme is concerned with how teachers integrate computers and the Internet in their teaching and learning. Thus, their level of use for Internet applications and Web 2.0 tools were advanced and extensive. The interview with some faculty members also yielded the fact that the majority of the faculty members in the Science Department were using the Internet to access information and to ascertain what is new in their field (e.g., chemistry, physics, or mathematics). This might also increase their level of use for Web 2.0 tools in teaching and learning. The results of this study match those of Al Tayeb (2014), who indicated that there were significant differences in the level of use for internet applications due to a specialisation variable in favour of science teachers.

FINDINGS

The findings of this study showed that the degree of using Web (2.0) tools in teaching and learning as rated by faculty members was between the ranges of “low” and “very high”, with an overall mean response of (3.18), that is indicated the moderate level of usage of Web 2.0 in teaching. The faculty members used some of Web 2.0 tools in their teaching and learning process as follow:

- i. Social media: (Facebook , WhatsApp and Skype for virtual office hours and to communicate with students, especially the postgraduate students).
- ii. YouTube: searching for YouTube videos which are relevant to their course topics.
- iii. Blogs: using student blogs in class to help increase student participation on the topics.
- iv. Online quiz and grading tools: using a number of online website and tools to create their quizzes for their courses. (Google forms, quiz creator online, and WizIQ platform).

The finding also found that the faculty members used Web (2.0) tools to search for information and connected with other researchers around the world (e. g., academia.edu, researchgate.net).

In addition, the results showed that the degree of importance for using Web (2.0) tools in university teaching was high according to the faculty members’ point of view (4.4).

The faculty members rated the first four items as of high barriers as follow:

- i. lack of training courses on how to use web 2.0 tools in teaching (mean = 4.4);
- ii. the weakness of students admission to participate because of their uncomfortable with openness of using such web (mean = 4.4);
- iii. The increasing of administrative work and teaching load (mean = 4.1); and
- iv. absence of the future plan to develop and use of web 2.0 technologies in teaching process (mean = 3.6).

CONCLUSIONS

The goal of this research was to investigate the current status of using Web 2.0 tools in university teaching by the faculty members of the College of Education at Sudan University of Science and Technology. A survey was conducted and the responses of 40 participants were analysed. Results suggest that the degree of Web 2.0 tool usage in teaching and learning across all academic ranks was medium according to the faculty members’ point of view. It was thought that the rapid advance of technology and increasing student use were encouraging the faculty to use technology in their classroom, but those individuals who participated in this study were self-motivated to use Web 2.0 for teaching purposes. First, the study found that the top three usages of Web 2.0 tools by educators are as follow: (a) for scientific research, (b) to download books, articles, and research materials, and (c) to discover what is new in the field. Second, it showed that the degree of importance for using Web 2.0 tools in university teaching by faculty members was high. The study found that the faculty members viewed the importance of using Web 2.0 tools in teaching as follows: (a) to help find

and share educational resources, (b) to provide collaborative learning opportunities, (c) to promote knowledge sharing, (d) to facilitate communication and feedback between learners and teachers, (e) to encourage students to interact and build a learning community, and (f) to support innovative teaching methods. Third, the study found that there were some difficulties encountered by the faculty members when attempting to use Web 2.0 tools in teaching and learning. The top four reported difficulties were as follows: (a) lack of training courses on how to use them, (b) student reticence because of their uneasiness with the openness of using such web tools, (c) the increase of administrative work and teaching load, and (d) the absence of future plans to develop and use Web 2.0 technologies in the teaching process. Finally, the results found that there are no significant differences among the three groups of academic ranks (associate professor and above, assistant professor, and lecturer) on the usage of Web 2.0 in teaching and learning. However, the results showed that there was a significant difference among the eight groups of specialisations on Web 2.0 usage in favour of the faculty members in the departments of Educational Technology and Science Education.

RECOMMADATIONS

According to these study findings, the researchers recommend the following:

- i. Educational institutes should follow the continuous development of Web 2.0 technologies and encourage teachers to benefit from their free services in teaching and learning processes.
- ii. Training sessions and workshops should be designed and developed to provide faculty members with a basic knowledge of Web 2.0 technologies and how they can be used in teaching and learning.
- iii. The administrators in the Colleges of Education in Arab universities must develop a plan to benefit from the best practices of the use of technology innovations which are applied in the most prestigious universities in developed countries.

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Turkish Abstract

Sudan Bilim ve Teknoloji Üniversitesi Eğitim Fakültesi Öğretim Üyelerinin Gözünden Öğretimde Web 2.0 Araçlarının Kullanımı

Bu çalışma Sudan Bilim ve Teknoloji Üniversitesi Eğitim Fakültesi öğretim üyelerinin Web 2.0 araçlarını üniversite öğretiminde kullanma durumlarını ortaya çıkarmayı amaçlamaktadır. Çalışma anketler ve görüşmelerin kullanımı temelli betimleyici analiz metodları kullanmıştır. Anket evrenden rassal olarak seçilen 40 kişilik örneklem üzerinde uygulanmıştır. Sonuçlar öğretim üyeleri tarafından Web 2.0 kullanım düzeylerinin orta olduğunu ve en yüksek kullanımın bilimsel araştırma alanında olduğunu göstermiştir. Sonuçlar ayrıca seviyeye göre Web 2.0 kullanımının anlamlı olarak farklılaşmadığını fakat dölüm uzmlığına göre anlamlı olarak farklılaştığını göstermiştir. Ayrıca öğretimde Web 2.0 kullanımı bazı zorluklara neden olmuştur. Bu sonuçların ışığında bir takım öneriler ve gelecek araştırma önerileri sunulmuştur.

Anahtar Kelimeler: internet uygulamaları, Web 2.0, öğretim üyeleri, Sudan Bilim ve Teknoloji Üniversitesi, öğretim ve öğrenme

French Abstract

L'Utilisation Actuelle de Web 2.0 Outils dans Université Enseignant de la Perspective de Membres de Faculté au Collège d'Enseignement dans Université du Soudan de Science et Technologie

Cette étude a eu pour but d'identifier le statut actuel d'utiliser le Web 2.0 outils dans l'université enseignant par les membres de faculté du Collège d'Éducation à l'Université du Soudan de Science et la Technologie. L'étude a utilisé une méthode analytique descriptive basée sur l'utilisation de questionnaires et des entretiens (interviews). Le questionnaire a été administré à un échantillon de 40 membres choisis aléatoirement de la population d'étude. Les résultats ont montré que le niveau d'utiliser le Web 2.0 outils dans l'université enseignant par la faculté étaient moyens et le niveau le plus haut d'utilisation a été représenté dans le domaine de la recherche scientifique. Les résultats ont aussi montré qu'il n'y a pas statistiquement de différences significatives sur l'utilisation de Web 2.0 outils dans l'université enseignant en raison du niveau de degré, tandis que les découvertes ont montré des différences statistiquement significatives sur l'utilisation de Web 2.0 outils en raison de la spécialisation départementale. Les résultats ont aussi montré que l'utilisation du Web 2.0 dans l'enseignement de causés par quelques difficultés. À la lumière de ces résultats, on fournit un ensemble de recommandations et des recherches plus approfondies.

Mots Clés: applications Internet, Web 2.0, membres de faculté, Université du Soudan de Science et Technologie, enseignement et apprentissage

Arabic Abstract

استخدام الحالي من 2.0 أدوات ويب في التدريس الجامعي من وجهة نظر أعضاء هيئة التدريس في كلية التربية في جامعة السودان للعلوم والتكنولوجيا

هدفت هذه الدراسة إلى التعرف على الوضع الحالي لاستخدام أدوات الويب 2.0 في التدريس الجامعي من قبل أعضاء هيئة التدريس في كلية التربية في جامعة السودان للعلوم والتكنولوجيا. استخدمت الدراسة المنهج الوصفي التحليلي على أساس استخدام الاستبيانات والمقابلات. كانت تدار الاستبيان على عينة مكونة من 40 عضوا تم اختيارهم عشوائيا من مجتمع الدراسة. وأظهرت النتائج أن مستوى استخدام أدوات الويب 2.0 في التدريس الجامعي من قبل أعضاء هيئة التدريس والمتوسط، وكانت ممثلة على أعلى مستوى من الاستخدام في مجال البحث العلمي. كما أظهرت النتائج أنه لا توجد فروق ذات دلالة إحصائية على استخدام أدوات الويب 2.0 في التدريس الجامعي نظرا لمستوى درجة، في حين أظهرت النتائج فروق ذات دلالة إحصائية على استخدام أدوات الويب 2.0 المقرر أن تخصص الإدارات. كما أظهرت النتائج أن استخدام الويب 2.0 في التدريس بسبب بعض الصعوبات. في ضوء هذه النتائج وتقدم مجموعة من التوصيات وإجراء مزيد من البحوث.

كلمات البحث: تطبيقات الإنترنت، الويب 2.0، أعضاء هيئة التدريس، جامعة السودان للعلوم والتكنولوجيا، التعليم والتعلم

University Teacher's Knowledge, Personality and Teaching Effect: A Qualitative Study from Students' Cognition Perspective



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Abstract

Teaching effect is a core index for measuring the validity of teaching practices in universities. How to improve it in class? It is an important issue in educational reform. From students' cognition perspective, the study analyzed students' statements about the knowledge, personalities and behaviour of their teachers. Through the process of text analysis, the study summarized the common elements of teachers' knowledge and personality as well as their impacts on teaching effects. A new theory, i.e. *Intellectual Management for University Teacher* (IMUT), was constructed. Results show that: At first, university students can definitely cognize and appraise their teachers' knowledge and personalities; Second, an effective combination of knowledge and personality decides one teacher's teaching effect, and; Finally, according to the feedback of students, the elements of teacher's knowledge should include knowledge level and knowledge behaviour, and the elements of teacher's personality could be summarized as personality trait and personalized behaviour. In order to improve teaching effects, university teachers are suggested to implement intellectual management, for realizing intellectual beauty through building a syncretic system which helps to develop knowledge and personality together.

Keywords: knowledge, personality, teaching effect, university teacher, qualitative research

1. Introduction

The *National Medium- and Long-term Educational Reform and Development Program (from 2010 to 2020)* of China has clearly stated that the qualities of both higher education and talent training should be comprehensively improved, and teaching effect should be taken as one of primary contents for evaluating university teachers. As a basic function of college teachers, teaching demands to be taken seriously by most of full-time teachers. In China, the ability and effectiveness of teaching are often considered when university teachers, either teaching-oriented or research-based ones, try to promote their professional and technical posts. However, compared with the relatively simple quantification of scientific payoffs, the characterization of teaching effects seems to be more diversified and implicit, full of causal ambiguity. The assessment and evaluation of teaching effects are certainly more difficult. Because of the absence of effective assessment tools, in most instances, the improvement of teaching effects depends more on university teachers' self-discipline. Enjoying the services provided by teachers, students become one and sometimes only insider as well as beneficiary, from teachers' teaching effects. Many colleges and universities therefore incorporated students' appraisal into the evaluation system of teachers' teaching effects. However, we are required to consider and answer the following several questions before this action. First, what kinds of teacher's characteristics do students mainly concern? Second, how do they perceive and appraise teacher's characteristics? Third, do biases of selective perception exist in different teaching contexts? Finally, reverse thinking, how can university teachers make use of student's cognitive mechanism to better display their characteristics, promote teaching activities and improve teaching effects?

In the *Opinions for the Comprehensive Improvement of Higher Education Quality* (issued by Ministry of Education, China), the construction of teacher's ethics and the improvement of teacher's professional level and teaching ability were advocated emphatically. Li and Chen (2016a) proposed that a good teacher in university should have good

reputations in both virtue and art. The art, reflected as professional level and teaching ability, mainly depends on the profound knowledge and teaching skills of college teachers. The virtue, manifested as moral, responsibility and attitude, is always closely related to teacher's personality traits (Colnerud, 2006). According to the correspondent author's working experiences, nearly 10 years as an university teacher, the fact that the post competence of a teacher depends on his/her knowledge and personality in most cases is approved. The release of signals in accordance with one's unique knowledge and personality would significantly improve the effects of classroom teaching. We are further reminded to consider the following questions. First, how do students recognize the knowledge and personalities of teachers? Second, via students' psychological cognition, how do the teachers' knowledge and personalities affect their teaching effects? Third, fitting in student's cognition, what types of knowledge and personality do university teachers commonly behave, and what types of knowledge and personality do they prefer to express?

In order to answer the above questions, taking advantage of the full-time position as an university teacher in Nanchang University in China, the corresponding author and his research team interviewed 14 students, from sophomore to postgraduate. By using qualitative analysis method to organize and analyze data, we completed an exploratory analysis of the characteristics of knowledge and personality displayed by university teachers as an occupational group, and the impacts of teacher's knowledge and personality on teaching effect. Based on the research conclusions, a new theory - IMUT was constructed to lead to improve university teacher's teaching effect.

2. Literature Review

The concept of personal knowledge management was firstly proposed by Frand and Hixon (1999). Gorman and Pauleen (2011) emphasized that it is an evolving combination of knowledge, skills and abilities that makes individuals to survive and succeed in complex social environments. The research of personal knowledge management focuses on the exploration of knowledge learning, exchange and innovation, which help to establish personal professional knowledge system, improve individual work efficiency and competitiveness, and promote career development and the realization of life value (Razmerita et al., 2009; Jiang & Ma, 2009). As a result, university teachers, who are closely connected with knowledge creation and dissemination, are more in need of personal knowledge management. They should have both extensive theoretical knowledge and necessary practical knowledge (Wei & Chen, 2017). They need to not only create new knowledge through academic study activities, but also impart existing knowledge through teaching behaviors (Cao, 2011). Hence, in the context of studying university teacher group, the authors more agree with the discussion of Kong (2003) on personal knowledge management. He defined the construct from three aspects: First, the management of individual knowledge; Second, the learning of new knowledge through various ways, to make up for the defects of individual thinking and knowledge, and then show the characteristics of ones own knowledge system, and; Third, the integration of existing knowledge and acquired knowledge, helping to create new knowledge through mutual arousal (Kong, 2003). Li and Tang (2009), Xu (2013) and Tahir et al. (2016) have all carried out in-depth research on knowledge management of university teachers. However, their research results focused on the construction of knowledge management system or the analysis of knowledge sharing behaviors, but lacked the attention to the relationship between personal knowledge management and teaching effectiveness.

As early as the 5th century BC, Hippocrates has divided human beings into four types in terms of their temperaments: the choleric, the sanguine, the phlegmatic and the melancholic. From then on, the temperament theory was gradually formed. Nowadays, psychology has become a perfect discipline. Under its category, educational psychology is vigorously developed and plays an important role in directing teaching practices. On the basis of Big Five personality theory, Arif et al. (2012) found that the extraversion personality is most important to teachers' development, in comparison to other four personalities. In order to build a model for exploring teacher's competency, He and Xiong (2015) proposed that the personalities to be a qualified university teacher include adaption, persistence, confidence, humor, criticalness, self-regulation, fairness, tolerance, and communication friendliness and cooperative spirit. Rather than innate temperaments, these unique personalities only for university teachers are more related to professional environments and acquired training. Chen (2011) noted that teachers' professional personalities are relatively stable psychologies formed in their careers, for better meeting the requirements of education. In terms of personality management, Sui and Chen (2007) suggested that the cultivation of teacher's professional personality depends on humanistic education and emotional education, through which the influential power of personality increases. Zhou (2011) proposed the improvement of teacher's individual management relies on the optimization of social environments and teacher's educational practices and self-training.

Both knowledge and personality are the key enablers of a good university teacher. For one thing, according to the

study of Li and Pang (2007), in order to do a good job in classroom teaching, university teachers are required to master comprehensive knowledge in terms of discipline, major, and teaching skill and creative thinking. Li and Chen (2016b) regarded teaching as a process of knowledge expression, which is supported by teacher's reasonable knowledge structure. In consideration of knowledge stock and knowledge structure, Zuo and Hu (2009) defined the concept of knowledge system. They indicated that it determines the way and capability of knowledge sharing, and thus makes an important impact on the teaching effects of university teachers. For another, Wang (2008) argued that personality is the comprehensive expression of teacher's moral quality, ideological realm and sentiment, which are beneficial to the improvement of teaching effects and the shaping of students' personalities. Zhang (2012) emphasized that the personality charm of teachers, as a potential factor, could promote the success of liberal education in universities. Lim and Kim (2014) measured the significant correlation between teacher's strength in personality and teaching efficiency by taking 111 South Korean teachers as samples.

The research in the field of knowledge management and individual personality provides theoretical supports for this study. However, knowledge and personality were usually analyzed as two separate factors at the individual level, lacking of integration. Especially in the field of higher education, although some scholars have recognized the independent influence of knowledge and personality on teaching effects, there is still no effective exploration on how they interact and jointly work. Integrating knowledge management and personality management, Yu et al. (2015) proposed a new concept, *Intellectual Management*, which focuses on the realization of intellectual beauty by means of knowledge development and personality cultivation. Intellectual beauty is a Chinglish phrase which is often used to describe a person who is elegant, pleasant and cultured on the basis of profound knowledge (Lin, 2013). Although the theory is under the background of enterprise management, it also enlighten and direct the individual management of university teachers from the individual perspective. In short, the study aims to construct a theory to lead university teachers to improve themselves through the cultivation and integration of knowledge and personality, in order to make themselves intellectually beautiful.

3. Methodology

Semi-structured interview was used to collect data. After the interview recording materials were translated into verbatim draft, research results and core viewpoints were gotten through qualitative analysis method.

At the convenience of working in Nanchang University, the authors selected 14 students for in-depth interview, through snowball sampling: one of students in the class taught by the correspondent author was randomly selected at first, and the next interviewee limited in different class but in the same school was recommended by the former, and so on. All of them were applied to take participate in the interview on their own initiatives, for free. In addition, all of them have made ethical approval for the interview, data usage and publication. All interviewees come from School of Management. The interviewees cover both undergraduate and graduate students. Considering that the freshmen do not have deep understandings towards their teachers and senior students are busy in employment or postgraduate entrance examination, only sophomore and junior students were selected among undergraduates. The major of undergraduate interviewees is limited in *Management Science* (MS). The majors of graduate interviewees include *Management Science and Engineering* (MSE), *Applied Economics* (AE), and *Library Information and Archives Management* (LIAM). The composition of samples and the information of interview are shown in Table 1, and the demographic information of the interviewees are further summarized in Table 2.

The interview mainly focuses on the following contents: First, from the perspective of student's cognition, the criteria for appraising excellent university teachers; Second, comments on the teaching methods, styles, characteristics and effects of university teachers; Third, on student's opinion, the impacts of university teacher's knowledge and personality on teaching effects. In addition to these focal points, the interview was not outlined. Valuable information was collected through mutual communication and free questions. The entire process of the interview was recorded. The recording materials were transformed into verbatim drafts, which were analyzed by step-by-step coding. On the basis of the organization of the materials, generic analysis was adopted to distinguish and summarize constructs, extract core relationships, and thus obtain results and generate a new theory (Chen, 2000).

The authors took the grounded theory to direct the process of data analysis (Moghaddam, 2006). First, two of the research team members were required to make open coding to extract basic constructs; Second, a comparative analysis of the basic constructs was completed to test the coding consistency; Third, an axial coding was made to summarize the major clusters and minor clusters, such as knowledge level, knowledge behaviour and personality trait; Finally, core clusters and the relationships between them were explored through a process of selective coding, via which the constructs such as knowledge, personality and teaching effect were distinguished. The relationship analysis and framework construction were led by the theory of *Intellectual Management* which emphasized that the

core intangible resources of an individual or an organization could be summarized into knowledge and personality, and the coordinating governance of them depends the sustainable growth of the body (Yu & Zhou, 2017).

Table 1. Samples and interview

<i>Interviewee</i>	<i>Gender</i>	<i>Grade</i>	<i>Major</i>	<i>Date</i>	<i>Time</i>	<i>No. of Chinese Characters</i>
A	Female	First-year graduate	AE	2017.6.16	1h 21m 51s	15463
B	Female	Junior	MS	2017.6.26	1h 50m 46s	11510
C	Female	Sophomore	MS	2017.6.23	0h 30m 18s	2651
D	Female	Junior	MS	2017.6.25	0h 58m 56s	4404
E	Male	Second-year graduate	MSE	2017.6.15	1h 00m 23s	4650
F	Female	Second-year graduate	MSE	2017.6.8	0h 30m 41s	2387
G	Female	Junior	MS	2017.6.8	0h 35m 59s	2672
H	Female	Junior	MS	2017.6.22	0h 44m 04s	2999
I	Female	First-year graduate	MSE	2017.6.26	0h 49m 44s	3864
J	Female	First-year graduate	MSE	2017.6.15	1h 16m 18s	5904
K	Female	Sophomore	MS	2017.6.23	0h 42m 41s	3427
L	Female	Sophomore	MS	2017.6.23	0h 36m 59s	2756
M	Male	First-year graduate	LIAM	2017.6.16	0h 55m 37s	3934
N	Female	Sophomore	MS	2017.6.23	0h 32m 14s	2392

Table 2. The demographic information of the interviewees

<i>Clusters</i>	<i>Number</i>	<i>Frequency</i>	<i>Clusters</i>	<i>Number</i>	<i>Frequency</i>
Gender			Ranking by score		
Male	2	14.3%	Top 50% in the class	8	57.1%
Female	12	85.7%	Second 50% in the class	6	42.9%
Grade			Major		
Sophomore	4	28.6%	AE	1	7.1%
Junior	4	28.6%	MS	8	57.2%
First-year graduate	4	28.6%	MSE	4	28.6%
Second-year graduate	2	14.2%	LIAM	1	7.1%

4. Results

4.1 University Teachers' Knowledge

Through the coding and analysis of interview materials, we found that the knowledge of university teachers should include two elements, i.e. knowledge level and knowledge behaviour.

4.1.1 Knowledge Level

As the interviewee A said, "I think, a good teacher must have profound professional knowledge primarily". The first president of Chung Cheng University, Xiansu Hu, also suggested that: "In terms of university education, specialization in a certain field is very important, but generalization is even more valuable to a certain extent". Because of the requirement of scientific research in universities, many teachers are deep in their expertise, but lack profound and general knowledge. However, during the process of classroom teaching, through the matching and selection based on students' cognition, teachers with profound knowledge, rather than the ones with deep professional knowledge, could always play greater roles in promoting the learning effects of most of university

students. In order to be competent for teaching several relevant courses in a subject field, university teachers are required to establish a complete knowledge system, not only professional but also profound.

Through the in-depth analysis of interview materials, we conclude that university teachers should master seven kinds of knowledge in the teaching process, i.e. basic knowledge, professional knowledge, subject matter knowledge, teaching skills and experiential knowledge, talent cultivation related knowledge, practical knowledge, and world view and methodology knowledge.

(a) Several interviewees mentioned that they become to worship some teachers after entry only because the teachers' profound basic knowledge - "They seem to know everything", "From advanced mathematics to spoken English, from ancient poetry to computer programming, they can express fluently".

(b) Professional knowledge refers to the specific knowledge in a subject field. According to the interviewees involved in *Management* discipline, it includes the knowledge in accounting, marketing, production operation and economics etc.. As one of the interviewees said, "The fact that teachers master professional knowledge, can make us avoid repetitive learning in different courses, and also help us to absorb and integrate the knowledge from different courses".

(c) Subject matter knowledge refers to the knowledge related to the student's discipline (Mccutchen & Berninger, 1999). It is beneficial to the understanding of professional knowledge. In the field of *Management*, subject matter knowledge includes psychology, sociology, and philosophy and so on. An interviewee mentioned that, for example, when he studied the two-factor theory in the course, the teacher introduced some psychological knowledge to help understanding the principle and logic.

(d) Teaching skills and experiential knowledge are helpful for teachers to better express and present knowledge. It can be found from the interview that, for instance, the case teaching method commonly used in management teaching is generally well accepted by students.

(e) Talent cultivation related knowledge refers to the knowledge related to students' physical and mental development, knowledge acquisition and personality cultivation, etc.. Several interviewees indicated that they could clearly feel that some teachers regarded them as talents to cultivate, but some others did not. The teachers with the idea of talent cultivation help to guide students roundly, and of course, they are more respected.

(f) Practical knowledge refers to the knowledge acquired and summarized by teachers from practice. In the teaching of *Management* discipline, teacher' work experiences in enterprises or in social life play an important role in teaching effects. The interviewee M said, "The teacher who taught *Management* often told us her practical experiences in an enterprise before, and we thought it was quite good". Several interviewees repeatedly mentioned that, they faced such a teacher, with over 30 years teaching experiences, who could nicely integrate his life experiences and the knowledge points of course, through which a boring theory could be illustrated deeply and thus be loved by most of students. The teacher was affectionately called as "god" by his students.

(g) The knowledge of world view and methodology refers to the thinking mode and logic that teachers use to understand and transform the world. Some interviewees mentioned that in class, some teachers often emphasize that they "prefer to impart thinking methods rather than impart knowledge", and the teachers with this teaching idea usually present more wonderful classroom teaching.

Although the above discussion on knowledge system and structure has been relatively complete, we also found a problem related to knowledge level but could not be explained by the mentioned knowledge system. In the interview, a classmate said, "Even a teacher is knowledgeable, it (the success of teaching) also depends on the way of expression; if a kind of ostentatious expression is taken, I will not approve or admire". According to existing theories, we classify it as knowledge literacy. Knowledge literacy reflects the quality, accomplishment and demeanor of a teacher, supported by knowledge level (Crawford, 2010). It originates from but is above the knowledge level. It becomes a kind of temperament for a teacher when his/her knowledge is presented to public. Knowledge literacy is beneficial to teachers to make a good image and achieve the expected teaching effects.

4.1.2 Knowledge Behaviour

In the interview, students reflected that, extensive and high-quality knowledge creates conditions for successful teaching instructions, but the impact of profound knowledge on teaching effects is not simply linear. In a formal classroom, teaching effect is also closely related to the teacher's behaviour performance. Teachers need to complete the whole process of knowledge transfer through effective teaching skills and methods. After analyzing interview materials, knowledge transfer was divided into two sub-processes: knowledge dissemination and knowledge

interaction. The former reflects as a knowledge transfer process in one-to-many pattern, and the latter expresses a two-way process, which promotes the knowledge communication and integration through the interaction between teachers and students (Kuiken & Peter, 2011). According to the responses from interviewees, knowledge transfer behaviors directly affect their learning willingness and the difficulties in absorbing knowledge, and thus have important impacts on teaching effects.

Knowledge dissemination refers to the process through which teachers impart their knowledge to students by their unique styles and modes. Nowadays many teaching modes, for example, traditional teaching, independent learning, inquiry-based teaching and case-based teaching, are coexisting (Yakovleva & Yakovlev, 2014). According to the interview, students make a general evaluation towards the traditional teaching mode, not obviously like and dislike, but they always speak highly of other modern teaching modes. However, students often find that many teachers have difficulties in introducing and applying new teaching modes, e.g. decentralized topics, unremarkable knowledge points, and low teaching efficiency etc.. A teacher's style reflects his/her unique vocational personalities displayed in the process of classroom teaching. Mosston and Ashworth (1990) summarized the teaching style into seven types, i.e. legislative, executive, critical, holistic, detailed, and radical and conservative. Analyzing the interview materials, we found that students have more or less faced those styles of teacher. However, in addition to the legislative, critical and holistic ones, other styles of teacher could not receive favourable reviews, and they were nicely accepted only by the students with low requirements or strong adaptive capabilities. As the interviewee A stated, "[The teachers] don't only have one style, [...] but what suits the teacher is the best, [...] students have the abilities to adapt to different styles of teacher". In addition, the study also found that many students have different evaluations on the same teacher's different courses. This implies that teaching style and teaching mode should be consistent with not only teachers' personality traits, but also the nature of courses. In other words, individualized education and course-based education are required. Furthermore, we also drew a conclusion that no matter what kind of teaching style or mode a teacher has chosen, he/she must follow a fundamental principle, i.e. student-first and knowledge-oriented. That is, teaching mode and style are tools to assist knowledge dissemination, which is the ultimate goal.

The interview indicated that, rather than knowledge dissemination behaviors recognized by students, knowledge interaction behaviors got more expectations. Students hope to exchange knowledge and dialogue equally with teachers, rather than lofty and endless knowledge indoctrination from teachers. The highly appraised teachers are usually not the knowledgeable, responsible and eloquent ones, but those who "focus on students and care about their understandings of knowledge". Some interviewees even reported that a respected teacher is usually not the one speaking well in class, but the one who often participates in extracurricular activities organized by students, or who has a lot of communications with students after class. Furthermore, during the interview, students highly appraised the teachers who are willing to give feedback for students. According to student's cognition, knowledge feedback includes two kinds of behaviour. The first one indicates that teachers can make feedback and evaluation to student's learning. For example, a good teacher is required to timely and effectively answer student's questions, carefully correct student's homework, and make pertinent comments on student's ideas in class. The second one suggests that teachers should listen to student's comments and suggestions, consciously accept student's suggestions, and then make changes in the following teaching process. The feedback shows teacher's respect on student's opinions. For example, the interviewee I said, "He is different from other teachers; when he gives us comments, we find that he is very competent".

4.2 University Teachers' Personalities

As John Holland has stated: If vocational interests are construed as an expression of personality, then they represent the expression of personality in work, school subjects and hobbies and so on (Holland, 1973). University teacher is a kind of special vocation, and the group of university teachers may have its own personalities. Different from individual personalities explained by the theories such as Big Five or Enneagram, the vocational personalities of university teachers should be only or most fitted to describe the persons of this vocation, instead of the public. Considering the lack of the understanding of university teachers' vocational personalities according to the existing literature, on the basis of analyzing interview materials, we summarized the vocational personalities of university teachers into two elements, i.e. personality trait and personalized behaviour.

4.2.1 Personality Trait

According to the interview, we found that not only knowledge is an important enabler of teaching effects, but also teacher's personality plays a role in teaching performance. Through the analysis of interview materials, the teacher's personality trait that influences teaching effects can be summarized into three components, i.e. innate temperament, acquired personality and personality charm.

According to personality psychology, the temperament, with genetic basis, is relatively stable in the process of human growth. Traditional personality psychologists often followed the humoral theory, which usually classifies temperament into four types, i.e. choleric, sanguineous, and phlegmatic and melancholic. The interview indicated that university teachers are also influenced by their own temperament types, which would be reflected in the teaching process, so that students can perceive and make different appraisals. For example, the interviewee C said, "(Teacher Z) is passionate and loud; I like very much". This suggests that the student C prefers the teacher with choleric temperament. Another student (the interviewee E) said, "I like my English teacher best. She is very young and thus has no deep generation gap with us. She is also fashionable. In class, we have something in common, resulting resonance and affinity". This statement indicates that the student tends to accept the teachers with sanguineous temperament. On the contrary, the interviewee L said, "I think teachers should be strict and principled". It indicates that the teachers with phlegmatic temperament are more likely to be praised by L. The opinions held by N are different. She presented "I like the teacher who taught me probability theory. He has a kind of unique style, giving me a special elegant feeling, and often leads us to think philosophically in class". This indicates that the teacher with melancholic temperament may also be popular with some students. From the perspective of temperament, any university teacher may not be recognized by all students, since the temperament, after all, originates from nature - it is always changeless but students' preferences are various. However, as a professional teacher, he/she is required to avoid or discard the shortcomings in his/her temperament. For example, the teachers with choleric temperament are easily restless and irritable, and the teachers with melancholic temperament are restrained and thus they maybe not good at self-expression. If a teacher cannot restrain his/her shortcomings, which may magnify negative influences on students, he/she would gain bad teaching effects. For example, one of the interviewees mentioned such a story. A teacher giving students good impressions in class, often complained about her family and even shared with her friends via WeChat. When such behaviour was discovered by her students, they negatively perceived, diffused and overstated it. Since then, the appraisals from her students changed, and her teaching effects in class made a discount.

Acquired personality suggests that university teachers should be trained after they choose the occupation. It is selected (developed or suppressed) according to the special occupation, on the basis of teacher's innate temperament. Through the in-depth interview, students generally proposed that teachers should be responsible, suiting action to the word, principled, rigorous, patient and so on. Among the characteristics, conscientiousness and walking the talk are regarded as the most important teacher's vocational personality by students. As the interviewee A said, "A good teacher should be sincere to us at first, [...] how does the teacher expect us, such as to the class in time, at least he/she should be such a person - he/she could not be late for class; if he/she wants us to study hard, he/she should prepare the lessons carefully before". Teachers in universities have very high requirements on vocational personality. Some personality traits are easily recognized and welcomed by most students, such as humor. However, not all teachers are recommended to develop towards such personalities. In many cases, the training and cultivation of a teacher's vocational personality need to be consistent with his/her innate temperament endowed by gene. As the interviewee M stated, "If you (a teacher) are really funny, be funny; else if you are a serious person but try to be funny, it would be self-defeating and everyone would be embarrassed".

The release and transfer of knowledge literacy, innate temperament and vocational personality usually generate attraction to students, since it is often difficult to describe and capture. The contributions of the attraction to teaching effects are also fuzzy. However, it does exist and we try to conclude it as personality charm. Through the analysis of interview materials, the personality charm was reduced to three types, i.e. intellectual love, temperament-based charm and characteristic charm.

(a) Intellectual love reflects as the attraction of university teachers towards the students who are eager to learn, innovative and energetic, by virtue of their profound knowledge and good qualities. The interview showed that the students with good academic performance generally prefer and even admire the knowledgeable teachers.

(b) Temperament-based charm helps university teachers to attract students by virtue of their innate temperaments. For example, the interviewee J has mentioned a "powerful, deep and vigorous" teacher, who could make students quiet through "banging the table". She also appraised another teacher as "the kind of cold humor" - "Although he does not laugh, and may not feel funny by himself, but the students feel really funny". She told the interviewers that such feeling makes her learn easily and happily. As the interviewee A stated, "We focus on the class because the teacher's lecture is very interesting". Similarly, the interviewee K presented, "When a teacher is not passionate in class, students will be less passionate and doze".

(c) Characteristic charm is a kind of spiritual and moral culture, expressed by teachers in professional work. The culture has positive impacts on students - changing their views on life and value, which promote their success

(Tierno, 1996). Irresponsible, unprincipled, and unjust and immoral teachers are particularly hated by students. Such personalities would cause harm to student's mental health. For example, a teacher referred to by the interviewee J, gave the students classes for only five weeks, while the designed contents were 16 weeks. According to her description, the teacher often missed class or left class halfway when he "has something important to do". In addition, the interviewee B stated her views, "Teachers should have their own principles" - "They should continue to investigate and affix the responsibility for students since they are late or have not complete homework, regardless of student's plea for mercy". She also made a complaint against some teachers who "treat students well just when they know each other, and would inequitably give the students high marks at the end of semester". The interviewers could obviously feel the negative emotion of the interviewee B, since she might be hurt by such cases. Furthermore, the interviewee G made a supplement before the end of her interview. She emphasized the appropriate distance between a teacher and his/her student, especially when they are of different genders. She also noted that "a teacher's noble personality can easily infect to his/her students".

4.2.2 Personalized Behaviour

A qualified university teacher should not only master extensive and high-quality knowledge and impart it to students, but also give positive guide for students to shape their views of world, life and values (Hao et al., 2016). The personality charm of a teacher can make tangible or intangible impacts on students, through direct or indirect ways. According to the interview, the impacting ways are created through three behaviors, i.e. motivation, demonstration and edification.

The charm of a teacher displayed in his/her teaching process would stimulate students to learn, thus realizing teaching aims (Li, 2009). As the interviewee H said, "Some teachers are strict, making us feel that we can do better. Their strictness, like a spur, drives us". Facing attractive teachers, students are willing to get close to and respect them, trustfully and convincingly, thus change the attitude towards learning and increase the willingness to learn. A charming teacher could easily make students to cooperate with his/her teaching activities. However, students would resist or even bully in groups the teachers without or lack of charm. For example, the interviewee C mentioned a teacher who is gentle and good-natured, judging by his appearance. When the teacher try to hold a class meeting, students are almost absent, because "he is vulnerable". In the interview, the interviewee I also introduced this teacher, "At first sight, we know that he is a yes-man, without strict requirements. It makes us relax and try to provoke him". From the example, we know that personality charm is not equal to nice temperament. The real personality charm enables teachers authoritative among students, makes students comply with teaching arrangements, and improves the efficiency of knowledge transfer. The interviewee G told an interesting story in the interview. Four girls in my dormitory, she said, always get up after 7:50 am, late to the first class. However, a cry happens on every Wednesday on time, "Hurry up, today is teacher Y's class". Then, they gets up quickly, never late. According to the description of the interviewee G, Y is a typical teacher with profound knowledge and charming personality. Students are "afraid" of him not because he may check on the attendance, but on account of his unchallengeable traits, such as solemnity, stateliness, and responsibility. It needs to be emphasized that some behaviors and habits of teachers may give very bad impression to students. For example, the interviewee G mentioned something like this, "[We] usually write homework, in the year of freshman. Many students seriously hand write it, hoping to attract the attention of the teacher. However, unfortunately, their scores are very low. On the contrary, the students who copy and paste their homework get higher scores". "The irresponsible teacher lost our trust from then on, and all students were not willing to take their best shots in his other courses", the student G said.

Demonstration refers to a kind of behaviour, through which a teacher can set an example for students by his/her own charm, so as to lead students to form a good habit of learning. According to the social learning theory, moral behaviors such as model demonstration, learning by doing, and self-efficacy motivation play important roles in the development of individual personality (Xu & Wu, 2015). According to the corresponding author's work experiences about nearly ten years in the field of higher education, he also felt the importance role of demonstration by good examples of teachers. Students would subconsciously imitate their teachers' behaviors and habits, which are taken as behaviour standards. Through this process, those behaviors and habits would be internalized into their own personality traits. Students would also despise some teachers' behaviors and habits that they do not recognize, initiating a warning against themselves. The interviewee D held similar views, "If I feel good with a teacher, I will learn attentively and accept everything what the teacher required". The interviewee J stated, "Our seriousness depends on whether the teacher is sincere. If he/she is serious, we will be similarly serious; else if the teacher is not serious, we can be more careless than him/her". Analogously, the interviewee I said, "Students can feel the sincerity of their teachers. We are particularly disgusted the one who is not responsible, but trying to make many strict requirements". Therefore, similar to the positive and negative incentive mechanisms, the demonstration effects of

teachers are also two-sided. Hence, a teacher wanting to motivate students with his/her personality charm should have senses of mission and responsibility, treat with his/her occupation, work and students seriously and rigorously. Only in this way can he/she play a positive role of demonstration in motivating and influencing students more convincingly.

Most of time, the impacts of teachers on students in teaching processes are like the life-giving functions of spring breeze and rain, soundless and stirless. The Confucius has said, "Living with a good person is like entering a room full of vanilla, in which you can not smell the fragrance after a long time, since you have been integrated into it" (Low, 2011). In higher education, different from primary and secondary education, imparting knowledge is only one of the functions; its responsibility with more importance reflects on the education and cultivation of young talents in terms of personality, which is beneficial to their integration into society. From this perspective, the significance of edification may be even higher than the knowledge imparting itself. Teachers with high personality charm have strong attractions and impacts on students. Their words and behaviors, and sounds and smiles may silently influence students, who are led to develop psychologically and spiritually. As the interviewee A said, "[A good teacher] may teach me a method or a theory, such intangible things, but he/she will not instruct me how to solve a specific problem, but will edify me the handling methods via his/her own actions".

4.3 The Impacts of Knowledge and Personality on Teaching Effects

4.3.1 The Relationship Between Knowledge and Personality

Through the above analysis, the knowledge of university teachers is divided into knowledge level and knowledge behaviour, and their personality is examined from personality trait and personalized behaviour. Among them, knowledge level covers basic knowledge, professional knowledge, subject matter knowledge, teaching skills and experiential knowledge, talent cultivation related knowledge, practical knowledge, and world view and methodology knowledge, etc., which constitute a complete body of knowledge. Furthermore, the knowledge can sublimate, thus expressing as a kind of knowledge literacy. Knowledge behaviors include knowledge dissemination and knowledge interaction. The former forces most of students to study passively, while the latter leads a small part of students to study actively. Teacher's personality trait is classified into three elements, i.e. innate temperament, acquired personality and personality charm. The roles of teacher's personality reflect through three behavioral mechanisms - motivation, demonstration and edification.

On the surface, knowledge and personality represent different qualities of university teacher. However, their coexistence and interaction, becoming an integrative unit, bring teachers sustainable developments. The interactive relationship, rooting in the essence of individual gene, reflects as five modes. First, the body of knowledge, formed by a variety of knowledge, could transform into knowledge literacy only by the mediating effects of personality charm. Second, supported by the knowledge literacy, and integrated with innate temperament and acquired personality, the higher level of knowledge charm would appear. Third, the demonstration effects of personality happen in the process of knowledge dissemination, and the edification effects work in the process of knowledge interaction. Fourth, a teacher's innate temperament and acquired personality would affect his/her way of knowledge dissemination and interaction. In turn, the motivation, demonstration and edification roles of personality charm would strengthen the efficiency and effect of knowledge dissemination and interaction. Finally, the developments of knowledge and personality, of equal importance in educational business, aim to improve teaching effects similarly, better cultivating talents. In other words, an internal mechanism exists in a good teacher, to promote the mutual transformation and enhancement of the one's knowledge and personality. The mechanism urges the teacher to grow up continuously. The integration of knowledge and personality, as a unit, is the high-level requirement proposed by the theory of *Intellectual Management* (Yu & Zhou, 2015).

In the interview, evidences were also found to support the view that students could perceive the identity of knowledge and personality in teacher groups to some extent. As the interviewee M emphasized, "In many cases, the more knowledgeable and experienced a teacher is, the more serious and responsible he/she would be in the class. We could perceive the efforts he/she makes for us. On the contrary, those teachers who are lack of knowledge and capability are usually irresponsible, irrational and ill-conditioned in the meantime".

4.3.2 The Role of Knowledge and Personality in Teaching Effects

The stage of learning in university is important to the cultivation of student's personality and moral. In the stage, the guidance of a good teacher is fatal. Teachers should pay attention to their own personality and knowledge, the charm of which influence and shape students in educational activities. Teaching effects not only reflect as the knowledge acquisition of students, but also the cultivation of student's personality, spirit and moral. According to the above

analysis, university teacher's knowledge and personality would improve their teaching effects through interaction. The impacting mechanisms are twofold. First, in the process of occurrence, the roles of knowledge and personality generate together. A single process of knowledge action or personal edification does not exist. Personalized behaviors usually take place in the process of knowledge transfer. However, the effects of teacher's knowledge and personality on teaching effects are different, and sometimes they would even change due to different students.

As the interviewee E stated, "In my opinion, [teacher's] knowledge is quite important. After all, my purpose is learning, and so knowledge level is the most important criterion for me to evaluate a course. Of course, teacher's personality is also very important. At least, a nice teacher makes me learn happily". On the contrary, the interviewee K believed that "Although being happy in class is not more important than learning, happiness is indeed very important to me". The interviewee B integrated their views and proposed a detailed idea. "To distinguish which one is more important requires to consider the situations. I want to learn more knowledge in important courses, such as basic courses and professional courses, so the teacher's knowledge level is important. But in the class of a public course or innovative credit course, I aim to gain credits, so that the teacher's personality charm is relatively important, making me relaxed and happy". Among the above students, the interviewee E and K represent the top and middle class of students respectively, and the interviewee B ranks the first in her class. It indicates that the impacts of teacher's knowledge and personality on teaching effects not only depend on the efforts of teachers, but also rely on the goals, expectations and adaptability of students. Furthermore, it also indicates that the promotion of teaching effects on the basis of teacher's knowledge and personality is always random, unstable and complicated. The key to solve such problems lies in the observation and control of student's psychology, on basis of which teachers can make self-adjustment. Thankfully, no matter how much uncertainty there is, knowledge literacy and charming personality traits would always play a positive role in teaching effects. It provides theoretical support for university teachers to enrich knowledge and cultivate personality, thus their impetuses being strengthened.

It should be emphasized that, compared with personality, the influence of teacher's knowledge on teaching effects looks like more stable and sustainable. In the interview, more than one student mentioned that the teacher's style and characteristics in class, as well as the traits such as humor, authority and pressure, might have a temporary impact on students' learning. However, in the study of a 16-week course, the positive effects based on teacher's personality charm gradually decrease, while the negative effects appear and gradually increase. The interviewee B mentioned a fact that some teachers try to piffle in class, hoping to adjust the learning atmosphere. If such action lasts within 5-10 minutes, it has effects; else it would be hated when it continues more than 20 minutes. The interviewee E told us a story that he experienced personally. In a class, a teacher, not good at lecturing, entertained himself by telling many jokes and gossips. No one listened to him, and almost all students were playing with their mobile phones. However, a student wanted to pass the exam of postgraduate entrance. This course was therefore very important to him. At last, he stood up and asked the teacher a question, "Can we talk about the course itself please, sir?". The views of students and practical examples indicate that in university classes, teaching effects are mutually supported by the teacher's knowledge and personality, whichever is indispensable. From a long-term perspective, knowledge plays the core role, and personality supports the former. As the interviewee B summarized, in student's expectation, "they want to have a fun learning".

5. Conclusions

According to the above analysis, a comprehensive system (as shown in Figure 1) of the relationship between knowledge, personality and teaching effect of university teachers can be summarized. The system is considered to consist of knowledge subsystem, personality subsystem, and an interactive subsystem, which directs the interaction between knowledge and personality and their combined influence on teaching effects. As the figure shows, the comprehensive system tries to embed teacher's individual trait system into teaching process system. In the comprehensive system, the teaching effects originated from teaching process system is the ultimate goal, and the self development and optimization of teacher's knowledge and personality is underlying basis. Many Chinese university teachers may have similar feelings - Teaching is both a technical and conscientious task (Li, 2014). Teaching effects of higher education therefore depend greatly on the quality and literacy of teachers themselves. Hence, issues in terms of teacher's training, motivation and management from self-efficacy perspective are important to the improvement of teaching effects in classroom. In a word, the teaching effects in universities are supported by the self-management of teachers.

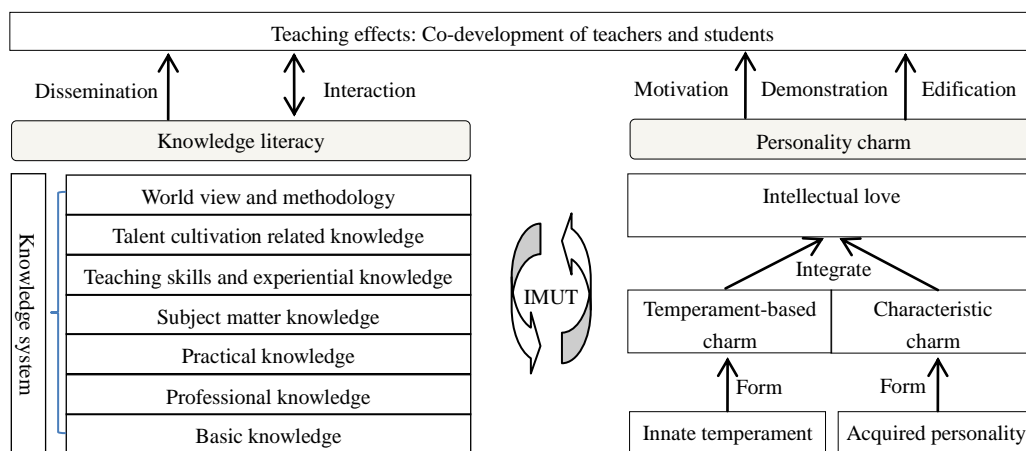


Figure 1. The framework of IMUT system

How could university teachers realize their self-management? In the study, the authors introduced *Intellectual Management* theory (Yu & Zhou, 2017) into teacher management and constructed a new theory called *Intellectual Management for University Teacher* (IMUT), which follows the inherent laws of individual’s personality evolution and knowledge growth. Stimulating the integration of a teacher’s knowledge and personality through the mechanism of mutual transformation is beneficial to the joint improvement of teaching effects. The essence of IMUT is “a syncretic system of knowledge and personality”. For one thing, teachers’ attitudes towards knowledge learning can be improved by virtue of their sound personalities. The improvement helps to enrich one’s knowledge and optimize the knowledge structure. For another, a teacher’s knowledge may lead to form his/her acquired personality on the basis of one’s innate temperament. The cultivation of knowledge literacy supports the formation of personality charm in the meantime. The goal of IMUT is to realize the intellectual beauty of university teachers. In other words, as intellectual and the soul engineer of human, with the mission of cultivating young talents, university teachers should have the personality trait of intellectual beauty. It should be the symbolic feature that distinguishes university teachers from individuals in other fields. Nothing else than this feature makes university teachers respected by the public and imitated by their students (Süssmuth, 2006).

According to the development rules of IMUT, we can gain some implications to teacher management and higher education.

First, university teachers are required to strengthen knowledge management. In current China, most of universities require PhD degree when they recruit teacher (Welch & Zhang, 2008). Those who have obtained the degree usually have received a long time of study practice and research training, resulting in a high level of knowledge in professional field. The doctoral training, emphasizing the ability of scientific research, deepens the professional and domain knowledge. However, most of young teachers, just graduating from doctoral degree and newly joining university, are often unable to achieve profound knowledge. The imperfect knowledge system becomes a bottleneck factor, restricting some teachers’ teaching capabilities. Consequently, for those teachers, a process of learning to expand and optimize knowledge structure is required. For example, for young teachers in management field, they are demanded to enrich practical knowledge through temporary job training in enterprises, improve teaching skills through continuous teaching experiences, and enrich discipline knowledge via curriculum rotation, and learn talent-training relevant knowledge through induction training, learning from old teachers and participating in various teaching meetings, as well as accumulate sophisticated professional knowledge through research practices (Dai & Yan, 2016). More importantly, teachers should start to learn to effectively externalize their knowledge and lead students to correctly perceive their knowledge level and abilities. In addition, university teacher’s knowledge management focuses on the transformation of knowledge from individual to others, and from implicit knowledge to explicit one.

Second, university teachers should strengthen personality management. Each person has his/her own genetic predispositions and personality traits, but once he/she becomes an university teacher, his/her personalities are required to be selectively carried forward and restrained according to the characteristics of occupation, so as to ensure the behaviors inspired by the personalities in line with the professional ethics (Guseva et al., 2014). In fact, in

addition to the explicit threshold in terms of knowledge level, an implicit threshold for personality trait does exist when a new university teacher enters the job. Those who cannot bear loneliness, have low moral standards or quest for money and so on are rarely chosen by universities. Even they have chosen this career, it would be difficult for them to stick to it for a long time. However, as a halo occupation, the university teacher is higher required in terms of personality trait than the entry threshold. This may be one of the reasons that only a few of university teachers are really popular and respected by students. An excellent university teacher should not only have good congenital temperament conditions, such as favorable appearance, nice voice, and good temper, but also have noble personalities in line with the occupation, in terms of moral, principle and spirit. In terms of innate temperament, teachers need to make up for the defects as much as possible under feasible conditions. In terms of acquired personality, teachers should continue to improve themselves through self-training and self-constraint, making themselves noble and sound. Moreover, university teachers can take advantage of their knowledge to make up for the inherent disadvantages in personality. Attracting students via profound knowledge is beneficial to the creation of knowledge charm.

Third, university teachers should try their best to build the syncretic system of knowledge and personality. In IMUT theory, knowledge and personality are two core dimensions for an individual teacher. Any one of them is indispensable. But in reality, a large part of teachers faces the problem of intellectual separation - only developing one of them successfully, or developing them independently (Guo, 2017). Li and Chen (2016a) pointed out four styles of university teacher: “personality-based perfect style”, “knowledge-based perfect style”, and “personality-based separated style” as well as “knowledge-based separated style”. In particular, in the impetuous context of Chinese higher education system, overemphasis on quantitative assessment and reward for research, the problem of “knowledge-based separated style” is common (Li, 2014). However, a good teacher recognized by students should be the “perfect style”, with equally abundant development of personality and knowledge. The syncretic system is therefore a necessary management tool. In order to build the syncretic system, we should understand and master the rules of mutual transformation between individual knowledge and personality. On the one hand, an individual should temper one’s personality to high-intensively acquire and create knowledge. On the other hand, the individual should shape one’s acquired personality and thus generate personality charm through the accumulation of knowledge. The development of the system requires teachers to have a strong sense of mission and professional identity. Only with the strong driving force, can they be willing to continuously enrich their knowledge and challenge their personalities. Only through continuous change and mutual transformation, could one’s knowledge and personality gradually integrate, resulting in the syncretic situation. On the contrary, teachers who are unwilling to make changes are unable to improve their teaching capabilities, and then lose in teaching gradually (Harrison, 2005).

Finally, university teachers are required to implement *Intellectual Management* in teaching practice, and take the theory to improve teaching effects. Although personality is partly congenital, acquired personality and knowledge level can be improved through hard-working by practice. Even though it is difficult, teachers need constant improvement. Through teaching practice, social experience and professional training, their shortcomings in knowledge and personality can be discovered and then optimized. Taking teaching tasks as the goal, teachers could more quickly develop the programs and channels for learning knowledge and cultivating personality. Moreover, only in teaching practice, taking the improvement of teaching effects as the goal of the implementation of IMUT, can its optimal direction ensure correct. Through these processes, the IMUT can be continuously improved to better serve teaching practice. In addition, IMUT not only emphasizes the improvement of teacher’s knowledge and personality, but also focuses on the functional development of knowledge and personalized behaviors, of which the functional object is teaching practice. Consequently, the improvement of teaching effects should be the target of IMUT, and teaching effects perceived by students should be one of standards to appraise the effect of IMUT. An excellent university teacher can balance the developments of his/her knowledge and personality through IMUT, thus achieving teaching objectives, realizing teaching outcomes, and gaining students’ respects.

In conclusion, the IMUT theory emphasizes the idea that university teachers should attach equal importance to the development of knowledge and personality, and make full use of them to improve classroom teaching effects. IMUT should not be developed into a set of strict management system, which could not fully motivate the initiative and potential of teachers. Excessive emphases on the control of IMUT would lead it to the opposite direct, resulting in a disaster for both teachers and students. Teaching reform from IMUT perspective advocates “doing nothing redundant” but “following the natural rules”. The theory is suited for the sustainable development of higher education, and benefits the Double First-Class initiative proposed by Chinese government (Peters & Besley, 2018).

Limitations do exist in this study. For instance, the evidences provided by the study are only on the basis of an

interview of 14 responders in the same school, the generalization of the theory thus requires more evidences and broader discussion. Furthermore, the grounded theory was used to direct the data analysis of this study, but in fact we did not demonstrate a strict coding process in the paper, since the authors considered to tell an interesting story instead of to display cold data in tables. However, it may cause to loss of preciseness and systematization. In the future, the authors will try to collect more structural data through questionnaire survey and make an empirical study by quantitative analysis, through which the evidences for the theory would be more perfect.

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Investigation into the Utilization of ICT Facilities for Teaching Purposes among University Lecturers: Influence of Gender, Age, Qualification and Years of Teaching Experience



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ABSTRACT

This study investigates lecturers' level of utilization of ICT facilities for teaching purposes in Nigerian universities. A descriptive survey design was adopted for the study. And a questionnaire with a reliability of 0.907 was used for data collection. Data was collected at the Abubakar Tafawa Balewa University, Bauchi from a sample of 433 lecturers out of a population of 928. The results show that lecturers have the knowledge of using ICT facilities in teaching, however, they rarely use them in teaching. It was also found that lecturers' age and years of teaching experiences were significant factors influencing the level of ICT utilization in teaching. However, no significant difference was found due to gender and educational qualification. It was recommended among others that there should be regular sensitization programmes on the importance of using ICT facilities as it promotes students' learning and enhance their academic achievement.

Keywords: lecturers, level of utilization, ICT, teaching, university

INTRODUCTION

The advent of various ICT facilities has brought substantial changes globally within the educational system. This development has given rise to a lot of investment in various kinds of ICT facilities for teaching and learning. The availability of these facilities in higher institutions has proven to enhance teaching and learning (Hamilton-Ekeke & Mbachu, 2015); enabled self-paced learning (Shahmir, Hamidi & Bagherzadeh, 2011); removed the time and space barriers for learning (Oyovwe-Tinuoye & Adogbeji, 2013; Krishnaveni & Meenakumari, 2010). Furthermore, studies have shown that students' learning and teachers' teaching are enhanced with these facilities (Apagu & Wakili, 2015; Stephen, 2013).

ICT is now used in various educational aspects for enriching the quality of teaching and learning. The resourcefulness of ICT to academic staff of higher institution has also been reported (Hamilton-Ekeke & Mbachu, 2015). And studies have shown that the integration of ICT in teaching offers different forms of Multimedia channels that provide variety of approaches and expertise (Nusir, Alsmadi, Al-Kabi & Sharadgah, 2013). The use of ICT in teaching has also been found to be relevant in the area of offering guidance for students self-learning; critical evaluation of students' performance and facilitation of high-quality skills for communication (Barakabitze, 2014).

Considering the benefits of ICT, the Federal Government of Nigeria developed an ICT policy in 2001. This policy led to the establishment of the National Information Technology Development Agency (NITDA). Among the objectives of NITDA are; to ensure that ICT resources are readily available to promote efficient national development; and to integrate ICT into the mainstream of education and training (NITDA, 2017).

However, studies relating to lecturers' level of utilization of ICT facilities for teaching purposes has presented conflicting results. Some have shown low level of utilization of ICT in teaching (Olelewe & Okwor, 2017; Archibong, Ogbiji & Aniaobi-Idem, 2010; Nwachukwu & Asom, 2015). Others are pointing to the fact that the utilization level is high (Enakrire & Ocholla, 2017; Emeasoba & Ezenwafor, 2015). These seems to indicate that studies concerning the level of utilization of ICT in teaching is inconclusive, and varied from one university to the other.

Since studies have also shown that ICT facilities for teaching purposes are available in universities (Nannim & Yushau, 2019; Agboola, Okorie, Omotoso, Bamigboye & Bello, 2018; Olelewe & Okwor, 2017), it is natural to expect that the lecturers are utilizing these facilities in teaching. It is against this background that the researchers investigate lecturers' level and extent of utilization of

ICT facilities for teaching purposes in ATBU Bauchi, Nigeria. The study also investigated the influence of gender, age, qualification and years of teaching experience on lecturers' level of ICT utilization in teaching.

Purpose of the Study

The purpose of this study is to investigate lecturers' level and extent of utilization of ICT facilities for teaching purposes in Abubakar Tafawa Balewa University (ATBU), Bauchi. Furthermore, the study investigates the influence of gender, age, qualification and years of teaching experience on lecturers' level of ICT utilization in teaching.

Literature Review

People are increasingly depending on ICT for their daily activities, yet, the utilization of these facilities in teaching is not widely in practice, though this varies between institutions and between the staff of the same institution (Jumare et al., 2017; Amusa & Atinmo, 2016; Archibong et al., 2010). Review of related literature with respect to lecturers' level of utilization of ICT facilities in teaching has presented contradicting findings. Some studies found high level of utilization of ICT facilities for academic purposes, while others are pointing to the fact that the level of utilization is low.

For instance, in a study conducted by Emeasoba and Ezenwafor (2015), it was found that lecturers highly utilized computers in their teaching. And a similar result was equally reported by Tezci (2009). However, Olelewe and Okwor (2017) found that lecturers are not utilizing ICT facilities in their teaching. A similar low utilization of ICT facilities in teaching was earlier reported by Akuegwu, Ntukidem, Ntukidem and Jaja (2011), Agbatogun (2013) and Amusa and Atinmo (2016). Some studies have reported the reasons of low utilization of ICT facilities in teaching to be mainly lack of computer knowledge and skills for effective utilization of ICT in teaching (Olelewe and Okwor, 2017; Nwachukwu & Asom, 2015; Atsumbe, Raymond and Duhu, 2012). While others reported lack of institutional support (Al-dheleai, Baki, Tasir, & Al-rahmi, 2019; Enakrire & Ocholla, 2017).

Studies have shown that gender stereotypes hinder women's active utilization of ICT (Buskens & Webb, 2009; Edwina, 2005). It is also a general believe that women are lagging behind when it comes to the use of ICT (Hallberg, Kulecho, Kulecho & Okoth, 2011). For example, male lecturers were found to use ICT facilities most as compared to their female counterparts (Mahdi & Al-Dera, 2013). Similarly, Tezci (2009) found significant influence of gender on the level of utilization of ICT facilities by teachers. However, Agbatogun (2013) did not find any significant influence of gender on lecturers' use of ICT facilities.

It has also been shown that age is a strong factor that influences ICT usage in teaching. Roger's diffusion of innovation theory posited that age of individuals plays an important role in their adoption and use of technology. The younger individuals are the more likely to accept and use a technology compared to the older individuals (Rogers, 2003). What this mean is that younger lecturers are expected to use more of the technology in their teaching since they are considered technology freak (enthusiast). For instance, studies have shown that older teachers are less confident with using computers as compared to their younger counterpart (Teo, Lee & Chai, 2008). While, some other studies have shown that age is not a determining factor in use of ICT in teaching (Mahdi & Al-Dera, 2013; Tezci, 2009).

Years of teaching experience has also been found to be an influential factor in determining the use of ICT facilities by teachers. Study conducted by Egbert, Paulus and Nakamichi (2002) show that teachers with longer years of working experience utilize ICT facilities most. Also, Olafare, Adeyanju and Fakorede (2018) in their study found a significant difference between the less experienced and the experienced lecturers. However, the less experienced lecturers were found to be doing better in utilization of ICT for academic purposes. Tezci (2009) has found that the less the years of experience, the higher the knowledge and use of ICT by teachers. This has been attributed to the enthusiasm and openness of the youths towards technology (Onansanya et al., 2010; Tezci, 2009). On the other hand, some studies have not found years of experience as a determining factor for the utilization of ICT facilities in teaching (Mahdi & Al-Dera, 2013; Niederhauser & Stoddart, 2001).

Another factor that was found to play a role in the utilization of ICT facilities in teaching is the teachers' academic qualifications. In a study conducted by Agbatogun (2013), it was found that academic qualification is an influential factor that is a predictor of use of ICT in teaching. Similarly, Olafare et al. (2018) also found lecturers with first degree had a positive attitude towards the use of ICT than those with higher qualification. On the contrary, Gombe, Jega, Dahiru, Aji and Sani (2016) found no significant difference in the utilization of ICT based on lecturers' qualification, though lecturers with Ph.D qualification had a slightly higher mean rating, followed by those with Masters' degree, while those with Bachelors' degrees had the least mean rating.

Therefore, as a result of these contradictory findings in literature, this study investigates the level and extent of utilization of ICT facilities for teaching purposes among lectures of Abubakar Tafawa Balewa University, Bauchi. Also, the study looks into the influence of gender, age, years of teaching experience and academic qualification on lecturers' level of utilization of ICT teaching facilities.

METHOD

The methodology adopted for this study is the quantitative method, specifically the descriptive survey design. The population of this study is 928 lecturers of Abubakar Tafawa Balewa University, Bauchi. A sample of 500 lecturers were selected for the study using a stratified sampling technique. Out of 500 questionnaire administered to the lecturers, 433 questionnaire were successfully completed and returned giving the response rate of 86.6%. The demographic information was elicited through the part A of the survey. Part B of the instrument consists of items on the level and extent of utilization of ICT facilities among lecturers. Section 1 of part B was formulated to help the researchers in ascertaining the level at which lecturers use ICT teaching facilities in ATBU Bauchi. The section 1 of part B of the instrument was adapted from ICT self-audit chart (Johnston-Wilder & Pimm, 2006, p. 136).

Section 2 was designed to determine the extent to which the available ICT teaching facilities are being utilized by lecturers. (See Appendix A for details). The instrument was validated and had a reliability index of 0.907.

In this study, Level of utilization operationally mean how the teachers utilize their ICT knowledge in teaching. While Extent of utilization in this study means the frequency of use of ICT facilities in teaching.

RESULTS

Demographic Variables

The lecturers' demographic data of the 433 respondents is in **Table 1**. Most of the participants were male 331 (76.4%) while 102 (23.6%) were female. Most of the respondents were Age between 34-43 years 207 (47%). Majority of the respondents holds Masters' Degree 302 (69.7%). Also, most of the respondents have their years of teaching experience between 1-8 years. See **Table 1** for details.

Table 1. Lecturers Demographic Information

Category	Groups	Number of participants	Percentage
Gender	Male	331	76.4%
	Female	102	23.6%
	Total	433	100%
Age	25-33 years	114	26.3%
	34-43 years	207	47.8%
	44-53 years	90	20.8%
	Above 53 years	22	5.1%
	Total	433	100%
Qualification	Ph.D	78	18.0%
	Master Degree	302	69.7%
	Bachelors' Degree	53	12.2%
	Total	433	100%
Years of Teaching Experience	1-8 years	265	61.2%
	9-16 years	121	27.9%
	17-25 years	38	8.8%
	Above 25 years	9	2.1%
	Total	433	100%

Levels of Utilization of ICT Facilities for Teaching Purposes

The level of utilization of ICT facilities for teaching purposes in ATBU Bauchi is presented in **Table 2**. Frequency count, percentage, mean and Standard deviation was computed for each of the items, and remark provided.

Table 2. The Frequency Distribution and Means of Lecturers' Level of Utilization of ICT Facilities for Teaching Purposes

Items	I cannot Use it	I can Use it But Not in Teaching	I Can Use it in Teaching	I have Used it in Teaching	Mean	SD	Remark
Microsoft word	4 (0.9%)	98 (22.9%)	187 (43.2%)	144 (33.3%)	3.09	0.77	ICUT
Microsoft Excel	6 (1.4%)	75 (17.3%)	199 (46.0%)	153 (35.3%)	3.15	0.75	ICUT
Microsoft PowerPoint	7 (1.6%)	80 (18.5%)	190 (43.9%)	156 (36.0%)	3.14	0.77	ICUT
Google Docs	97 (22.4%)	160 (37.0%)	133 (30.7%)	43 (9.9%)	2.28	0.92	IHUBNT
Google Sheets	177 (40.9%)	115 (26.6%)	100 (23.1%)	41 (9.5%)	2.01	1.01	IHUBNT
Google Slides	169 (39.0%)	125 (28.9%)	100 (23.1%)	39 (9.0%)	2.02	0.99	IHUBNT
Google Forms	174 (40.2%)	125 (28.9%)	103 (23.8%)	31 (7.2%)	1.98	0.96	IHUBNT
PDF	41 (9.5%)	182 (42.0%)	143 (33.0%)	67 (15.5%)	2.55	0.87	ICUT
Electronic white board/ Smart Board (Triumph Board, Genee touch e.t.c)	40 (9.2%)	46 (10.6%)	135 (31.2%)	212 (49.0%)	3.20	0.96	ICUT
Graphic Packages (e.g Adobe Photoshop, Corel Draw, AutoCAD, Adobe framework, 3D movie maker, PC paintbrush e.t.c)	49 (11.3%)	157 (36.3%)	179 (41.3%)	48 (11.1%)	2.52	0.84	ICUT
Statistical Packages (SPSS, Minitab e.t.c)	170 (39.3%)	119 (27.5%)	99 (22.9%)	45 (10.4%)	2.04	1.02	IHUBNT
Learning Management Systems (e.g Google Classroom, Moodle e.t.c.)	189 (43.6%)	152 (35.1%)	78 (18.0%)	14 (3.2%)	1.81	0.84	IHUBNT
Programming/ Simulation Software (C, C++, Java, Matlab, e.t.c.)	102 (23.6%)	184 (42.5%)	117 (27.0%)	30 (6.9%)	2.17	0.87	IHUBNT
Internet	12 (2.8%)	148 (34.2%)	153 (35.3%)	120 (27.7%)	2.88	0.85	ICUT
External Devices e.g flask disk, CD-ROM, Modem	32 (7.4%)	80 (18.5%)	205 (47.3%)	116 (26.8%)	2.94	0.86	ICUT
Cluster Mean					2.52	0.54	

Key: SD=Standard Deviation, I Cannot Use it (ICNU)=1.00-1.49, I Have Use it But Not in Teaching (IHUBNT)=1.50-2.49, I Can Use it in Teaching (ICUT)=2.50-3.49, I Have Use it in Teaching (IHUT)=3.50-4.00

Table 2 shows the lecturers' level of use of ICT facilities for teaching purposes. The lecturers' response showed that the Electronic white board/ Smart Board such as Triumph Board and Genee touch (Mean=3.20, SD=0.96) has the highest level of

utilization in teaching among lecturers. The result shows that 212 (49.0%) of the lecturers who participated in the study have used the ICT device in their teaching. The least used ICT facilities are the Learning Management Systems such as Google Classroom and Moodle (Mean=1.81, SD=0.84) where 189 (43.6%) of the lecturers indicated that they cannot use it in teaching. The cluster mean of 2.52 showed that overall, the lecturers can use ICT facilities in teaching however, they have not been using them.

Extent of utilization of ICT facilities for teaching purposes

The frequency count, percentage, mean and Standard deviation of the responses of lecturers on their extent of utilization of ICT facilities for teaching purposes is presented in **Table 3**.

Table 3. The Frequency Distribution and Means of Lecturers' Extent of Utilization of ICT Facilities for Teaching Purposes

Items	Not at All	Few Times a Month	Few Times a Week	Almost Every Day	Mean	SD	Remark
Desktop/Laptop Computers	3 (0.7%)	16 (3.7%)	81(18.7%)	333(76.9%)	3.72	0.56	AED
Handhelds/Tablets computers (iPad)/other mobile devices	4(0.9%)	31(7.23%)	91(21.0%)	307(70.9%)	3.62	0.66	AED
Electronic/ Smart Board (Triumph Board, Genee touch e.t.c)	265(61.2%)	152 (35.1%)	16(3.7%)	0(0.0%)	1.42	0.57	NAA
Digital Camera	268(61.9%)	149 (34.4%)	16(3.7%)	0(0.0%)	1.41	0.56	NAA
Hard Disk Drive (External)	18(4.2%)	132 (30.5%)	192(44.3%)	91 (21.0%)	2.82	0.81	FTW
Flash Drive	8 (1.8%)	85 (19.6%)	222(51.3%)	118(27.3%)	3.04	0.74	FTW
CD/DVD	21(4.8%)	101(23.3%)	187(43.2%)	124(28.6%)	2.96	0.84	FTW
Internet	0(0.0%)	9(2.1%)	119 (27.5%)	305(70.4%)	3.68	0.51	AED
University Website	6 (1.4%)	42 (9.7%)	141 (32.6%)	244(56.4%)	3.44	0.72	FTW
E-mail (Gmail, Yahoo Mail e.t.c)	6 (1.4%)	65 (15.0%)	200 (46.2%)	162 (37.4%)	3.20	0.74	FTW
Digital Signage	343 (79.2%)	86 (19.9%)	4(0.9%)	0(0.0%)	1.22	0.43	NAA
Video conferencing facilities (e.g NgREN)	325 (75.1%)	105 (24.2%)	3(0.7%)	0(0.0%)	1.27	0.47	NAA
Microsoft Office Packages (Ms Word, Ms Excel, Ms PowerPoint, Ms Access)	34(7.9%)	49 (11.3%)	194 (44.8%)	156 (36.0%)	3.09	0.88	FTW
Statistical Packages (e.g Minitap, SPSS, MSTAT)	275 (63.5%)	142 (33.0%)	15 (3.5%)	0(0.0%)	1.40	0.55	NAA
Graphic Packages (e.g. Adobe Photoshop, Corel Draw, AutoCAD)	270 (62.4%)	148 (34.2%)	15 (3.5%)	0(0.0%)	1.41	0.56	NAA
Learning Management Systems (e.g Google Classroom, Moodle)	273(63.0%)	145(33.5%)	15(3.5%)	0(0.0%)	1.40	0.57	NAA
Programming/ Simulation Software (C, C++, Java, Matlab, e.t.c.)	267(61.7%)	149(34.4%)	17(3.9%)	0(0.0%)	1.42	0.57	NAA
Cluster Mean					2.38	0.28	

Key: SD=Standard Deviation, Not at All (NAA)=1.00-1.49, Few Times a Month (FTM) =1.50-2.49, Few Times a Week (FTW)=2.50-3.49, Almost Every Day (AED)=3.50-4.00

Results in **Table 3** show that the most frequently used ICT facility was the Desktop computer/Laptop (M=3.72, SD=0.56), which is closely followed by Internet (M=3.68, SD=0.51) and Handheld/Tablets computers (M=3.62, SD=0.66). The least used ICT facilities are Digital signage and videoconferencing facilities with means 1.22 and 1.27 respectively. The cluster mean of 2.38 shows that the extent (frequency) of use of ICT facilities among ATBU lecturers is low.

The Influence of Gender on ATBU Lecturers' Level of Utilization of ICT Facilities for Teaching Purposes

Table 4 shows the influence of gender on ATBU lecturers' level of utilization of ICT facilities for teaching purposes. The result show that male lecturers had mean ratings of 2.54, SD=0.56 while their female counterparts had mean ratings of 2.34, SD=0.47.

Table 4. Mean Ratings on Influence of Gender on ATBU Lecturers' Level of Utilization of ICT Facilities for Teaching Purposes

Gender	N	Mean	SD
Male	331	2.54	0.56
Female	102	2.45	0.47

The result in **Table 4** shows that the male lecturers had a slightly higher mean rating compared to their female counterparts. An independent t-test run on influence of ATBU lecturers gender on their level of utilization of ICT facilities in teaching shows that there is no significant difference between the mean ratings of male and female lecturers $t_{(2,431)} = 1.50, p=0.14$ (2-tailed). This means that the male and female lecturers do not differ in their level of utilization of ICT facilities for teaching purposes.

The Influence of Age on ATBU Lecturers' Level of Utilization of ICT Facilities for Teaching Purposes

Table 5 shows that lecturers who are more advanced in age had higher mean ratings compared to those who are younger in age. A Oneway ANOVA was conducted at 0.05 level of significance to compare the mean difference across the age groups. The result shows that there is a statistically significant difference in the mean scores ratings of the four age groups, $F_{(3,429)}=7.233, P=0.000$. This shows that the lecturers differ in their level of utilization of ICT facilities for teaching purposes based on age. Thus, age is an influencing factor. A Post Hoc Test was conducted to determine where the difference lies among the groups. **Table 6** shows the result of the analysis on Scheffe's post-hoc and the mean difference.

Table 5. Mean Ratings on Influence of Age on Lecturers' Level of Utilization of ICT Facilities for Teaching Purposes

Age Range	N	Mean	SD
25-33 years	114	2.41	0.45
34-43 years	207	2.48	0.54
44-53 years	90	2.64	0.59
Above 53 years	22	2.89	0.55
Total	433	2.52	0.54

Table 6. Scheffe's Analysis of Significant Difference of Lecturers' Level of Utilization of ICT Facilities in Teaching based on Age

(I) Age Range	(J) Age Range	Mean Difference (I-J)	Std. Error	Sig.
25-33 years	34-43 years	-.07418	.06164	.694
	44-53 years	-.23244*	.07452	.022
	Above 53 years	-.48341*	.12307	.002
34-43 years	25-33 years	.07418	.06164	.694
	44-53 years	-.15826	.06673	.133
	Above 53 years	-.40924*	.11851	.008
44-53 years	25-33 years	.23244*	.07452	.022
	34-43 years	.15826	.06673	.133
	Above 53 years	-.25098	.12569	.264
Above 53 years	25-33 years	.48341*	.12307	.002
	34-43 years	.40924*	.11851	.008
	44-53 years	.25098	.12569	.264

*. The mean difference is significant at the 0.05 level

The result of the post-hoc analysis of the four age groups in **Table 6** infers that there is a significant difference on level of utilization of ICT facilities among lecturers within the age of 25-33 years and 45-53 years. Also, there was a significant difference between the age range of 25-33 year and Above 53 years. Moreover, it can be inferred that there was a significant different between the age range of 34-43 years and the age range of above 53 years. Therefore, the Scheffe's analysis established a significant difference between lecturers' level of utilization of ICT facilities for teaching purposes based on age. This post-hoc test established that lecturers who are more advanced in age utilized more ICT in their teaching as compared to those younger in age.

The Influence of Years of Teaching Experiences on ATBU Lecturers' Level of Utilization of ICT Facilities for Teaching Purposes

Table 7 shows that, lecturers with higher years of teaching experiences (Above 25 years) had higher mean rating (2.96) compared to those with smaller years of teaching experiences (1-8 years) who had means rating of 2.42. Oneway ANOVA was conducted at 0.05 level of significance to compare the mean ratings of lecturers based on difference in years of teaching experience. The result shows a statistical significant difference in lecturers level of utilization of ICT facilities for teaching purposes based on years of teaching experiences, $F_{(3, 429)}=9.493$, $P=0.00$. This implies that the lecturers differ significantly on level of utilization of ICT facilities with respect to years of teaching experience. The Scheffe's post-hoc test was conducted to determine where the difference lies among the lecturers' years of teaching experience. **Table 8** shows the result of the post-hoc analysis and the mean difference.

Table 7. Mean Ratings on Influence of Years of Teaching Experience on ATBU Lecturers' Level of Utilization of ICT Facilities for Teaching Purposes

Years of Teaching	N	Mean	SD
1-8 years	265	2.42	0.49
9-16 years	121	2.67	0.58
17-25 years	38	2.66	0.57
Above 25 years	9	2.96	0.58
Total	433	2.52	0.54

The Scheffe's post-hoc analysis in **Table 8** shows that there was a significant difference between lecturers with 1-8 years of teaching experience and those with 9-16 years ($p=0.00$). Also, there was a significant difference between those with 1-8 years and those with above 25 years of teaching experiences ($p=0.25$). The Scheffe's post-hoc therefore established a significant relationship between lecturers with lower years of teaching experience and those with higher years of teaching experiences with respect to level utilization of ICT facilities for teaching purposes. This mean that lecturers with longer years of teaching experience have higher level of utilization of ICT facilities in teaching compared to lecturers with lower years of teaching experience.

Table 8. Scheffe's Post-hoc Analysis of Significant Difference of Lecturers' Knowledge of ICT Facilities for Teaching Purposes Based on Years of Teaching Experiences

(I) Years of Teaching Experience	(J) Years of Teaching Experience	Mean Difference (I-J)	Std. Error	Sig.
1-8 years	9-16 years	-.24570*	.05755	.000
	17-25 years	-.24781	.09099	.061
	Above 25 years	-.54586*	.17780	.025
9-16 years	1-8 years	.24570*	.05755	.000
	17-25 years	-.00210	.09755	1.000
	Above 25 years	-.30015	.18124	.434
17-25 years	1-8 years	.24781	.09099	.061
	9-16 years	.00210	.09755	1.000
	Above 25 years	-.29805	.19446	.504
Above 25 years	1-8 years	.54586*	.17780	.025
	9-16 years	.30015	.18124	.434
	17-25 years	.29805	.19446	.504

*. The mean difference is significant at the 0.05 level

The Influence of Lecturers' Qualification on their Level of Utilization of ICT Facilities for Teaching Purposes

To determine the influence of lecturers' qualification on their level utilization of ICT facilities for teaching purposes, the mean ratings of their responses were computed.

Table 9 shows that lecturers with Ph.D. qualifications had mean ratings of 2.62 (SD=0.55), Masters' Degree holders had mean ratings of 2.51 (SD=0.54), while those with Bachelors' degree had mean ratings of 2.42 (SD=0.47). This result shows that lecturers with higher qualification had a slightly higher mean ratings than those with lower qualification. A Oneway ANOVA conducted to determine if there was a significant difference in lecturers response based on their qualification shows that there is no statistically significant difference in lecturers level of utilization of ICT facilities for teaching purposes $F_{(2, 430)}=2.265$, $p=0.105$. This means that the lecturers do not differ in their level of utilization of ICT facilities for teaching purposes based on qualification.

Table 9. Mean Ratings on Influence of Lecturers' Qualification on their Level of Utilization of ICT Facilities for Teaching Purposes

Qualification	N	Mean	Std. Deviation
Ph.D.	78	2.62	0.55
Master Degree	302	2.51	0.54
Bachelor's Degree	53	2.42	0.47
Total	433	2.52	0.54

DISCUSSION

The purpose of this study was to investigate the level and extent of lecturers' utilization of ICT facilities in teaching, as well as the influence of gender, age, years of teaching experience and educational qualification on level of utilization of ICT facilities in teaching.

The demographic information in **Table 1** showed that there were 331 (76.4%) male and 102 (23.6%) female lecturers. Also, most of the respondents were Age between 34-43 years 207 (47%). Also, a majority 302 (69.7%) of the respondent holds Masters' Degree.

Findings based on level of utilization of ICT facilities in **Table 2** showed that lecturers in ATBU can use ICT facilities for teaching purposes. The ICT facilities with the highest level of utilization is the Electronic white board/ Smart Board (Triumph Board and Genee touch) with Mean=3.20 (SD=0.96), followed by MS Excel, MS PowerPoint, MS Word, external devices, internet, PDF and graphic packages. The least used ICT facilities is the Learning Management Systems (Google Classroom and Moodle) with Mean=1.81 (SD=0.84). The cluster mean of 2.52 showed that overall, the lecturers can use ICT facilities in teaching. However, they have not been using them in actual teaching. This implies that, although they can use these facilities for teaching purposes, a number of them have not been using it in their teaching. Few lecturers actually used these ICT facilities in their teaching. For example, only 33.3%, 35.3%, 36%, 49% and 27% of the lecturers indicated that they have used Microsoft word, Microsoft excel, Microsoft PowerPoint, Smart Board and the internet respectively. The least response was 14 (3.2%) of the participants who indicated that they have used Learning Management System (LMS) in their teaching. This is despite the fact that LMS such as Moodle and Google Classroom are available free of charge in the university for the lecturers' use (See Nannim & Yushau, 2019). Similarly, study conducted by Nannim, Yushau and Gital (2018) had shown that lecturers are aware of the availability of these facilities. Therefore, the low level of utilization of these facilities in teaching could be due to lack of technical knowledge of how to use these facilities in actual teaching. It could also be attributed to institutional factors such as not providing the enabling environment to use these facilities or individual factor such as lack of will from the side of the lecturers to use the facilities in teaching. It could also be due to heavy course loads that left lecturers with less time to organize and plan how to use the available facilities in teaching. This result is similar to findings of previous studies (Enakrire & Ocholla, 2017; Emeasoba & Ezenwafor, 2015) which show that lecturers can use ICT facilities in universities. However, it disagrees with (Olelewe & Okwor, 2017; Nwachukwu & Asom, 2015; Agbatogun, 2013; Atsumbe et al., 2012) whose research found that most teachers cannot use ICT facilities in teaching.

The result in **Table 3** is on extent of utilization of ICT facilities for teaching purposes. The result showed that the most frequently used ICT facility by the lecturers in the University is the Desktop computer/Laptop (M=3.72, SD=0.56), which was closely followed by Internet (M=3.68, SD=0.51) and Handheld/Tablets computers (M=3.62, SD=0.66). The least used ICT facilities are Digital signage and videoconferencing facilities with means 1.22 and 1.27 respectively. Other ICT teaching facilities which most of the lecturers indicated that they have not been using them at all in teaching included: Smart Boards (Triumph Board and Genee touch) (M=1.42, SD=0.57), programming/Simulation software (M=1.42, SD=0.57), Learning Management Systems (M=1.40, SD=0.57), Graphic Packages (M=1.41, SD=0.56), Statistical Packages (M=1.40, SD=0.55) and Digital Camera (M=1.41, SD=0.56). This finding is surprising because ATBU is a university of technology where these facilities should be used adequately in teaching. But the lecturers' response is showing otherwise. The lecturers' responses further showed that they fairly used the university website, E-mail, storage devices and Microsoft office packages (few Times a Week). The cluster mean of 2.38 showed that overall, the extent of use of ICT facilities among ATBU lecturers is low. This finding agrees with Jumare et al. (2017) which report low extent of use of ICT facilities in teaching. Tercy (2009) also showed that the frequency of used of ICT facilities among teachers is low. However, the result disagrees with Tella et al. (2017), Nkoyo and Egbe (2016) who both reported high extent utilization of ICT facilities among lecturers.

Result on influence of gender on lecturers' level of utilization of ICT facilities for teaching purposes in **Table 4** shows that the male lecturers had a slightly higher mean (2.54) rating than their female counterparts (2.45). However, t-test result showed that there was no statistically significant difference between the male and female lecturers on their level of use of ICT facilities for teaching purposes. The result of this study agrees with previous findings (Olafare et al., 2018; Agbatogun, 2013). However, it is in

contrast to Mahdi and Al-Dera (2013) which found a significant difference between the male and female teachers in terms of ICT use in teaching.

The result in **Table 5** showed that lecturers who are older in age had higher mean ratings on level of utilization of ICT facilities in teaching as compared to the younger lecturers. Oneway ANOVA result showed that there was a significant difference between the age groups. The Scheffe's post-hoc in **Table 6** inferred that there was a significant difference on level of utilization of ICT facilities among lecturers within the age of 25-33 years and 45-53 years. The result also showed a significant difference between the age range of 25-33 year and Above 53 years. It can also be deduced that there was a significant difference between the age range of 34-43 years and the age range of above 53 years. The Scheffe's post hoc analysis therefore established a significant difference in lecturers' level of utilization of ICT facilities for teaching purposes based on age. This shows that the older lecturers used ICT in teaching more as compared to the younger lecturers. This could be that the older lecturers have been teaching for longer period of time, so they are aware of the pedagogical usefulness of ICT. Also, the younger lecturers could not be using ICT in teaching because they lack confidence regarding their subject area. This is in agreement with (Mahdi & Al-Dera, 2013; Morley, 2010) whose study showed significant difference in utilization of ICT based on age. It is in contrast to Jegede (2009) which showed that there was no significant difference between younger teachers and elderly ones in their competency of use of ICT in teaching. This finding is also contrary to Rogers (2003) which says that the younger people are tech savvy individuals, therefore, they are more positively disposed to the use of ICT which is a new innovation.

The influence of years of teaching experience on ATBU lecturers' level of utilization of ICT facilities in teaching in **Table 7** showed that lecturers with longer years of teaching experiences had higher level of utilization of ICT facilities in teaching compared to those with smaller years of teaching. The result also showed a significant difference between the lecturers based on years of teaching experience. Lecturers with longer years of teaching experience were found to have higher level of ICT utilization than those with lower years of teaching experience. This agrees with (Olafare et al., 2018; Tezci, 2009) who reported significant difference between lecturers on utilization of ICT based on years of teaching experience. Also, Egbert et al. (2002) reports that teachers with longer years of working experience have more knowledge on ICT facilities and use it most. However, this result disagrees with Mahdi and Al-Dera (2013) and Niederhauser and Stoddart (2001) who showed that there was no significant difference based on years of teaching experiences. The Scheffe's post-hoc test in **Table 8** shows that lecturers with longer years of teaching experience had higher level of utilization of ICT facilities in teaching than those with smaller years of teaching experience. This finding is contrary to (Tezci, 2009) who showed that the less the years of teaching experience, the higher the knowledge of utilization of ICT facilities. This was attributed to the openness of youths to innovations.

The result from this investigation also shows that lecturers with Ph.D and Masters qualification had slightly higher mean ratings on level of utilization of ICT in teaching than those with Bachelors' Degree. This result is not surprising because the added qualification of the lecturers must have exposed them to many skills of using ICT in their teaching. The ANOVA result showed that there was no statistically significant difference between the lecturers' level of utilization of ICT based on qualification. The result agrees with the findings of Gombe et al. (2016) who investigated the use of ICT by lecturers in the North-Western Nigeria and found no significant difference in the utilization of ICT based on lecturers' qualification. The findings of Gombe et al. (2016) also showed that lecturers with Ph.D qualification had a slightly higher mean rating, followed by those with Masters' degree, while those with Bachelors' degrees had the least mean rating. However, the result disagrees with (Olafare et al., 2018) who found a significant difference in knowledge of use of ICT by lecturers based on their qualifications.

CONCLUSION AND RECOMMENDATIONS

This study investigated the level and extent of utilization of ICT facilities by lecturers in ATBU Bauchi, Nigeria. The study found that lecturers in ATBU have the capability of using ICT facilities in teaching, however, they have not been using it in their teaching. The extent of use of ICT facilities in teaching by the lecturers was found to be low. Also, there was no significant difference on level of utilization of ICT facilities for teaching based on lecturers' gender and qualification. However, a significant difference was found based on age and years of teaching experiences of the lecturers. It was also found that lecturers with higher years of teaching experience had higher level of utilization of ICT facilities in teaching compared to those with lesser years of teaching experiences. Therefore, regular workshops aimed at increasing lecturers' level of utilization of these facilities in teaching should be organized. The workshop and training programme should also aimed at sensitizing lecturers on the importance of using ICT facilities as it promotes students' learning and enhance their academic achievement. Special interest should be on the newly recruited or less experienced lecturers.

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A 360 degree learning environment for university online teaching



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The paper is a sequence of methods to inform competent online video conferencing (webinar) teaching resources for universities rushing to meet learning effective provision in the current Covid crisis.

The authors consider Moore's Theory of Transactional Distance (1970), with the focus of the theory on developing autonomy in the learner, may still be relevant as a theoretical guide to a rapid growth in demand for online learning, despite originally being applied to traditional paper based distance learning.

Ensuring autonomy of learning in the theory's application, might need a WHAT, HOW, WHY, analysis to encourage the self-managed focus of webinar Presenters, Facilitators, Participants and stakeholders to be informed and aware from small PowerPoint projects to large-scale conferences.

The home-distance learning environment of the autonomous learner is now quite different to that envisaged in Moore's theory. Participants now have a broadcast studio in their home. The authors suggest a base level of hard skills of technical nature and soft skills of performance and engagement are required.

Managing complex online events are also not a feature of Moore's concept of the autonomous learner. Therefore a 'Fishbone' analysis is proposed to show the process of identifying key issues and quickly resolving solutions that may arise.

Looking to the future, the authors see the potential for a virtual online 360 Classroom. The Webinar could quickly evolve to use 3D Virtual Reality technology. One application might be to realise the traditional Socratic Method of higher level thinking accessible to many in a virtual online 3D environment. The conflation of technology and educational objectives are complex, but may now be managed with the methods suggested in the paper.*

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Finally, a Transactional Distance Toolkit, is explored as a quick and easy method of planning the structure and organisation of a webinar and a with its inbuilt visualisations are away to assess the effectiveness learner autonomy.

Keywords: online learning, webinar, learning theory, virtual environments.

Introduction

Teamwork, we take the view, is the essential component in a crisis. Stakeholders quickly recognise the nature and degree of being self-directed in these situations. But, goodwill must be maintained and nurtured and at a distance. The methods in the paper provide a clear plan of research and development of webinar interaction guidelines based on a theoretical foundation tailored for an eLearning team working to these situations.

Transactional Distance

What is 'transactional'? Dewey (1949) explains 'transaction' in an education context, as the individual's pattern of behaviour in an environment. According to Moore (1997), the separation between these [stakeholders] is sufficiently significant that special [engagement] strategies and techniques are needed.

These theories were proposed in the context of analog technologies of radio and TV of the correspondence distance learning models of the time. However, they are very relevant to the virtual 2D space of the digital transactional webinar of the present: particularly the concept of learner autonomy, responsibility for owning the processes and of their knowledge acquisition.

WHAT elements comprise a successful event

The section begins with technical components and moves to examine the stakeholder's profiles. For example, is there a clear model of the expectations of the Participants? Is there an inherent expectation for the interactions to be identical to a face-to-face discussion, classroom lecture, seminar debate, role-play enactment, or unstructured brainstorming? These

expectation need to be explicit. They become the criteria and a benchmark in 'transactional webinar design'.

WHAT Webinar Components Affect Learning

General technical elements of most webinar systems includes sound, video, live text discussion, screen share, recording, and feedback or participation surveys.

Audio: The audio component is the most important part of a webinar communication. Without clear sound, Participants stop the software and revert to a phone call. The solution is to ensure they use the 'audio set-up wizard' microphone test to confirm the sound levels. The essential check must be done well before the live event to avoid the 'can-you-hear-me' problems. A headset with earphones and microphone may be a way to avoid audio feedback or echo.

Video: Video takes up bandwidth. Frequently it is not essential to see the speaker or the audience to add value to the event. Alternatives include facilities to only show visuals of Participants that speak, limiting views of Participants to two or four in a large group. A still image of the speaker in the corner of the PowerPoint slides as an alternative to the live 'talking-head' may suffice. Technically only one channel of audio can be transmitted at a time. It may be recommended that the audience is set on mute audio and video at the start of the session.

But what is the psychological effect go these controls. Because the Participants are not necessarily in control. A long meeting is extremely tiring. It is possible that individuals are exposed to scrutiny as never before.

Text: Text chat may be a safer, disciplined method. Certainly some Participants are disconcerted by break-out sessions if they are not familiar with the protocols.

The protocols for meetings might not be as casual and informal as the technologies suggest. For these reasons prudent 'Before the event' planning on the invitation webinar registration or email invitation the Q&A (Question & Answer) protocols. Will questions be addressed during the session or only at the end? The text chat discussion can be copied and pasted in-

to the event FAQ frequently asked questions resource page. Built-in caution such as silencing mic and hiding visual before sessions start are available.

Screen Sharing: Screen sharing is a powerful 'show and tell' tool. Unfortunately, the feature demands bandwidth, so action can slow or stall. A pre-recorded video may be a better. Also, an audience might be given an option to download the video prior to the event.

Recording Webinars: Event recording is an expected service for anyone wanting to review a session or who missed the live webcast. In a business meeting, a summary of the action points can be recorded for the next agenda.

Recordings can be edited to create a lasting training resource, tell a story, create marketing and publicity. Using more than one camera beside the screen capture allows the teaching resource to give a different perspective on the subject matter. The Presenter may do an 'over the shoulder' point of view (POV) recording of the webinar. The resource can take on a more engaging tone. New technology such as the Black magic ATEM Mini Pro (2020), makes live multi-camera conferencing while recording multi-camera.

Towards Autonomy: Awareness of Hard and Soft Skills

The discussion so far identifies the variety of media and potential for creative opportunities. Next are some suggested solutions for essential hard technical and awareness of soft personal skills for protocols from a simple online room set up and for expectations of Presenters, Facilitators or Participants.

Organising the home-distance learning environment

There are a series of hard skills, tricks of the trade, which help bring the webinar model alive. The organisation and layout of the home room needs thinking about carefully.



Figure 1 Presenter set up - legend below

Red: Visuals

1 Laptop at eye level, screen vertical, recording screen

2 Box or books on hand for raising the laptop during online sessions

3 Camera used for to-camera introductions which highlight key teaching points and for end of session summary.

Blue: Lighting Control

1 Curtain

2 Blind

Both create a slit of light onto the Presenter's face controlling available daylight

3 LitePanel backlight to lighten up background behind Presenter.

4 Main light for recording video at the big screen.

Green: Scripting

You may prefer to prepare in the form of scriptwriting using tables in Pages or Word to structure your message (2). The scripting process is very rewarding: reflective, an exercise turning written concepts into spoken English using visualised, graphic, language through several script iterations (3) ending in a bullet point list on a small card. But to maintain eye contact in your personal conversation with individuals, the card is under the laptop camera (1). Unless the screen is shared, use it as an autocue.

The spoken style of writing comes with practice. Most talk on radio and certainly TV is scripted in some form and flipping from writing formal to informal spoken English and back again is a very valuable skill. The ability of the Apple pen in Pages on an iPad Pro (2020) is to record video in a variety of situations such as creating figure 1 above. Adding audio commentary and annotations on top of text is now a possibility.

Black: Video production

Creating a simple video is now technically easier to achieve using Media Video Player and Quicktime. A lecturer can either speak to camera or use screen capture to record a PowerPoint with an audio sound track. But, to do both at the same time needs special software.

1) Note the thin green rectangle on the screen. This is the boundary of the recording area of the screen that can be defined of iShowU Instant Mac software (2020) used mainly in gaming. In education, the potential is much more exciting: inside the green area, the Presenter can record themselves full-frame, part frame, or switch to grab the screen view during recording. By setting a (16:9 aspect ratio) the output video will be in the right format for online transmission. But, significantly, a PowerPoint, a pre-prepared video or live extra visuals from an iPhone for example of close-up detail, can be dragged into the green area - all on the fly!

2) The video editing software is Final Cut Pro but any simple package will do to tidy up the components recorded in iShowU Instant.

3) A slope is for scripts. Narrations can be recorded to the computer camera and sound using the script on screen as an autocue. An alternative is reading the script into a smart phone. The iPhone using VoiceMemos, outputs a very good quality close up sound because of the microphones. The sound file can be imported into the video.



Figure 2 Selfies become serious

Soft Skills Screen presence is a subtle art. The assumption that giving a lecture online is a doddle compared to the college theatre needs careful assessment - unless you are really good at it: time disappears, cogent argument becomes endless waffling, your favourite edifying story may well become an in-your-face full colour flop, largely because soft skills that work in the confines of a small screen, are ignored.

It is easier to describe than perform, the five factors of height, distance from, horizontal position and angle of screen and your background all have a significant effect of the audience and illustrated in *Figure 2*. These are described in a series of embodied metaphors, the shorthand language of the camera crew: headroom, falling out of the screen, having depth, being in the frame, the open door is the metaphor 'future opportunity'. Thinking space is the area to the side of the speakers when a more informal conversational level of engagement is required. This area, where 'minds meet', is space filled during the discussion of ideas in a restful visual scene. The example in *Figure 2* might be too busy. The lamp and bunch of flowers are standard 'props'. Your background is more important than you think. A warning, bed furniture is a big no-no.

These soft skills for lecturers as an actor or performer working online may appear irrelevant. There are many reasons why academics dislike anything to do with this approach. But Michael Caine's famous TV master class (1987), may provide insights for anyone contemplation a teaching career on the small screen.

Webinar Stakeholders: Key Actors in Transactional Distance

Who are the key actors in a webinar? Web video conferencing events may include: Host, Presenter, live text Facilitators, Participants as individuals small or large groups. We argue that the metaphor 'actor' is taken seriously.

The webinar Host owns the account on the software cloud platform. This may be in any of the current popular systems such as Microsoft Skype in Teams, Zoom, WebEx, Adobe Connect, Google Hangouts, GoToMeeting, Amazon Chime, etc. Two-way communication frees up the limitations of one-way live webcast seen in YouTube or live streaming services. The webinar Host has the flexibility to control the webinar space by setting access permissions,

and to unmute microphones and video. Some systems, such as Adobe Connect, have screen layouts that can be adapted for location of the Presenter's video slides or text chat inside the framework of the software window. In a lecture-style webinar, the Presenter speaks while showing PowerPoint slides. Experienced webinar Presenters can engage the audience by pacing the delivery of text and graphic content with opportunities to respond to questions via text chat or polling tools. The webinar Facilitator is perhaps the most important role by linking the Presenter and audience. The Learning and Skills Group (LSG 2019) of London, UK facilitated by Don Taylor demonstrates a good balance of content delivery with audience contribution.

It helps to consider the Facilitator and Presenter as Key webinar 'players' and treat them as 'actors' even in a remote location and no longer facing the lecture hall. Even though the audience falls into three categories: a) individuals b) small groups on location c) large groups on location, every participant actually experiences the event as a personal face-to-face encounter with the webinar players. Treat the audience as individuals, personally recognise their very first login with a greeting and include another identifier such as the business or organisation or location. A Facilitator working with the Presenter is helpful for following reasons.

- 1 The 'actors' at the keyboard suddenly have a heavy responsibility, the audience experiences the Presenter and the Facilitator talking personally to them in full screen reality a foot or two away. Any small movement expression glance is magnified.
- 2 We identify the Facilitator's role to include that of moderator or spokesperson for the group. The role then specifies a function that helps manage events such as a Presenter naturally glancing out of the screen window that can create concern for every participant.
- 3 Questions for the Presenter to be directed to the Facilitator, to ensure the emotional load of the Presenter is minimised. Questions might be handled by a still image or a voice or just text appear on the webinar screen.
- 4 The Facilitator should be fluent in the language of the Presenter.

HOW: Designing learning with transactional distance in mind?

The technology should not drive the pedagogy, Thorp (1989) reminds us. Our research frames webinar instructional design in a matrix linked to the level of transactional distance (range of structure and dialogue) towards the learner becoming more autonomous.

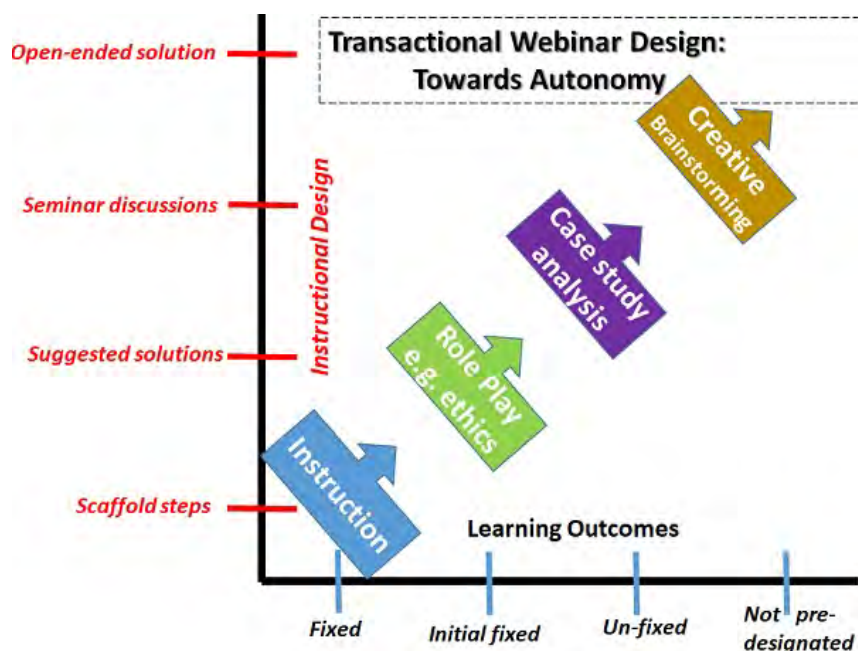


Figure 3 Webinar Design Spectrum

An Example: applying Toolkit guidelines for instructional design

A 'talking head' PowerPoint presentation with Q&A at the end, followed by an online quiz is a traditional design model. For example to train staff on using a fire extinguisher correctly there are detailed steps to follow and short-term recall is required for a specified conclusion.

The same task in a role-play webinar, with the Presenter and Facilitator providing audience members with a script to read, can act out a real-world situation.

A video of the task may portray errors or good practice with students discussing possible alternatives as a follow-up activity. Suggested solutions can also be given by the Tutor.

In small group discussions, the Presenter and Facilitator can create virtual breakout rooms to send Participants to analyse a case study. Each group may reach different or creative conclusions based upon their tacit and prior knowledge between the team members. Re-

cordings of meeting summaries can be available for review after hearing all of the solutions. The case study resource may have a sample resolution, but a multiple choice question with answer a combination (c) a + b) could address the factors under consideration. Negotiating with the team members and presenting recommendations supported by evidence in the webinar summary develops communication skills needed for virtual teams.

Finally, a key potential in webinar design is to promote autonomous learning. For example, using scenarios with no fixed outcome but a series of options requiring a creative approach. The webinar format provides a setting where team members may gain an understanding of each other's perspective. Each contribution to the argument leads to an innovative recipe of ideas and actions. Klaxon (2020), a French webinar software company, has an interaction model to foster smart teamwork. The sequence starts with a vote by team members on the project problem or research question. Through this first stage exchange, profiles of the group are established to identify any skill or knowledge gaps. Next, an ideas session provides opportunities for generating a resolution. Finally, a survey is done to gather evidence to assess the learning outputs of the webinar. All of these webinar models use a 2D interface to communicate real-life 3D audio/video data.

The next section is an exploration of a 3D environment as an immersive 360* 3D experience.

A Theoretical Underpinning for 360* Immersive Fishbowl Webinar Design

A Socratic discussion or 'fishbowl' model is proposed by the authors (Basiel et al. 2020) for the next-generation of webinar design.

Immersive webinars using a blend of 360* web video in conjunction with mobile smartphones create a virtual learning environment for the Socratic Method. The 360* software facilitates the Socratic method of cooperative argumentative dialogue between individuals, based on asking and answering questions to stimulate critical thinking and to draw out ideas and underlying presuppositions. The 'Socratic Effect' of the 'fishbowl' webinar design encourages the participant to rethink an idea after having their previously existing understanding discarded on the basis of their own answers to questions. The organisation is outlined in figure 4.

The 360* Immersive Fishbowl Webinar Design

The immersive blended learning model knits together: 360* video, mobile smartphone video conferencing, a local digital video camera, voice-to-text software for auto-transcription and a webinar Host platform.

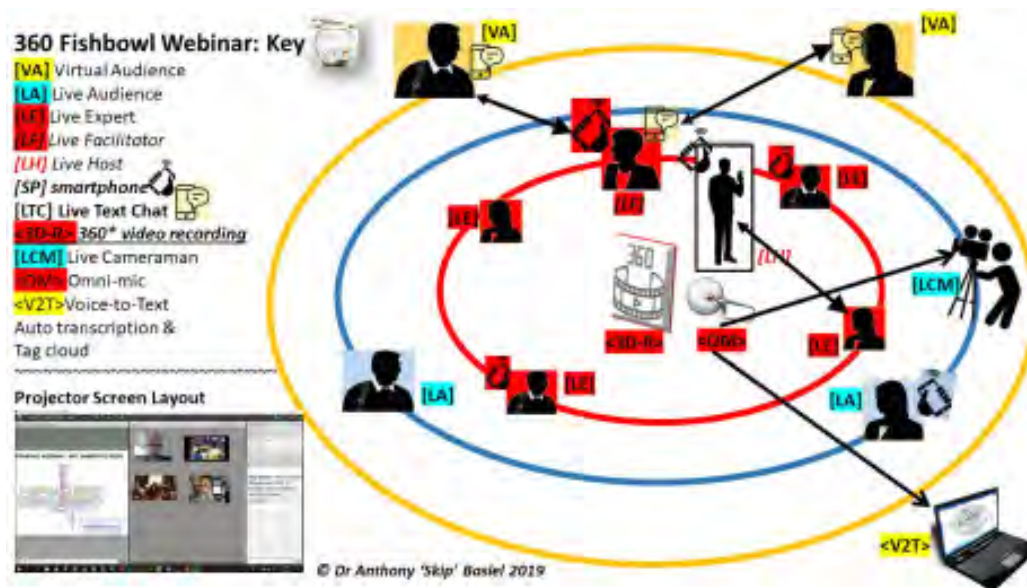


Figure 4 the 360* Immersive Fishbowl Webinar Design

The face-to-face 'fishbowl discussion' is a small central group of Local Experts [LE] sitting in an inner (red) circle with a Live Host [LH] using their mobile phone as a video camera and microphone to interview the Experts. The Host swaps the video camera from viewing themselves, when acting as Master of Ceremony, to showing the Expert speaking.

Webinar Participants using smartphones to record themselves using news journalism methods during the teaching event 2D 'Meta-Film' approach (Basiel & Howarth, 2017), now applied in a 3D situation. It sees the inner-and-outer circle actors [LA] being active Participants in a 360* 'unconference', using their mobile phones to record events from their own perspective. These videos are shared in social media platforms to promote the conference and develop an online community of learners.

In the centre of the circle, there are two capture devices:

1. 360* video camera <3D-R>— A device that first records the introduction before the live event. Then records the fishbowl discussion.
2. Omni mic <OM> – The device creates two outputs. First, the main audio for the Live Camera Man [LCM] who produces the main screen of the event. Second, the audio is fed into a live voice-to-text transcription <V2T>.

Text output creates a tag cloud summary graphic of the transcript. Text can be used as the database for an AI chatterbot dynamic FAQ resource.

The event Live Facilitator [LF] is a key player in the model. They sit in the inner circle and act as moderator for the Host and remote audience virtual [VA] members. This interaction is mediated silently, at first, by live text chat [LTC] discussion. As the Live Facilitator finds questions to add to the discussion, they give the VA member video access and turn off their [LF] self-video.

The projector screen layout diagram in the bottom left corner suggests how the event may look online to the virtual audience [VA]. The live event is projected on a big screen so the face-to-face actors can see the video of the entire group.

The event uses interactive webinar elements previously discussed such as whiteboard mind maps, voting, surveys, and polling. These activities promote evaluation of the event success. Next iterations of the 360* fishbowl model includes use of video drones (2020) and replaces the inner-circle people with a 360* monitors model (2020) when it is not possible to meet in person such as social isolation during the Coronavirus pandemic.

A 360* meeting during the Coronavirus in 2020 is may be a contribution to creative solutions to the situation of self-isolation.

A weakness of the open discussion model is that the webinar can become chaotic. The Live Host/Local Facilitator can juggle the flow of the interactions, but the larger the audience the more difficult it is to choreograph the online event. Let a physics principle called py^\ddagger (2020) be applied to guide us through the webinar mayhem. Entropy predicts any system will tend towards disorder, rather than develop a systematic structure. For example, if I

[‡] <https://www.quora.com/What-is-entropy-4>

have a container with 20 game dice that I throw across the table, the grouping patterns will be random, not tidy. The probability of the dice forming a pyramid is very low. Instead, there may be no evident pattern. Some of the dice may cluster together, while others are isolated.

An example of '*Learning entropy*' occurs in the unstructured nature of brainstorming in a webinar. The creative process can be steered by the Host/Presenter through the technical features of the webinar such as limiting participant video and audio transmission. Questions and comments can be redirected into the live text chat, but that can also become chaotic.

Is there a way to funnel the interactions of the webinar without too much control from the event organisers?

A fishbone or Ishikawa diagram (2020) is a way to conduct a *cause and effect analysis* for a brainstorming session. The diagram-based technique combines brainstorming with mind mapping to consider all possible causes of a problem, rather than just the obvious ones. According to Mindtools.com (2020), '*When you have a serious problem, it's important to explore all of the things that could cause it, before you start to think about a solution. Then, you can solve the problem completely, first time round, rather than just addressing part of it and having the problem run on and on.*' A fishbone diagram can:

- Discover the root cause of a problem,
- Uncover bottlenecks in your processes,
- Identify where and why a process is not working.

Step 1: Identify the problem

You can use a Soft Systems Methodology technique (SSM) from Checkland (2012) called CATWOE where the problem is examined from the perspective of Customers, Actors in the process, the Transformation process, the overall World view, the process Owner, and Environmental constraints.



Figure 5 Fishbone Diagram - Identify the problem Mindtools.com

Step 2: List the major factors

Next, identify factors that may be part of the problem such as systems, equipment, materials, external forces, people involved with the problem.

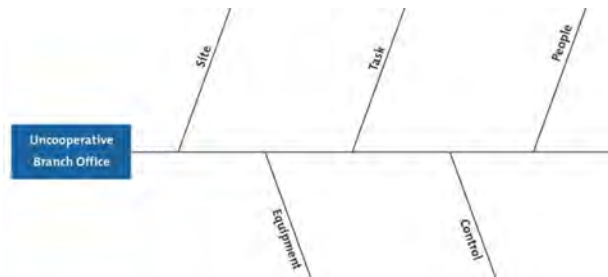


Figure 6 Step 2 Fishbone diagram - Major Factors

Step 3: Possible causes

Now, brainstorm the variety causes of the problem for each of the factors you considered in step 2.

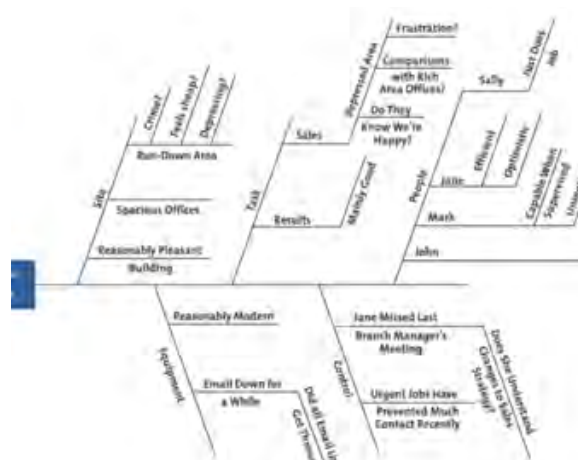


Figure 7 Step 3: Possible causes

Step 4: Analyse the problem

Analysis involves setting up investigations, carrying out online surveys, and web video conference interviews. These techniques test the causes actually contributing to the problem and provide evidence to inform action. In the context of the Transactional Webinar Design, the same analytical processes take place easily and quickly in a short effective event or a series of webinars.

The manager in the example above may have assumed that people in the branch office were "being difficult". He thinks the best approach is to arrange a meeting with the Branch Manager. The decision allows him to fully brief her on the new strategy, and talk through problems she may be experiencing.

Why Transactional Distance Theory?

The final question, WHY would you want a webinar model that is informed by Moore's Transactional Distance Theory (1997)? Stepping back in time to the 1960s there are two dominant pedagogical traditions. Perhaps most of your webinar experiences have fallen into a Behaviourist webinar model. In this online learning event, the webinar audience is taken through a linear, systematic path of instruction based upon behavioural objectives. There is maximum Tutor/Presenter control of the resources, timing of the content delivery, media types used and opportunities for audience participation. Knowledge in this webinar design is a product metaphor. Mastery of a new skill or ability to recall short-term information may be a learning outcome linked to a standard assessment such as a written essay or presentation. The Behaviourist webinar model focuses on deliverables and not the process.

The Humanistic Tradition, on the other hand, has its roots in counselling and education psychology. Special value is placed in less formal, unstructured learning. The value of interpersonal, open-ended dialogue and creative brainstorming falls into this pedagogy. The creative webinar space may produce a bottom-up, learner-generated content experience with personalised learning outcomes. The Participant ownership of the learning journey is a key element. Moore was concerned with distance learning and responsibility for the learner to manage their learning from manuals radio or TV. Today the same process is live, active and

public in the digital environment with the students and the Presenter and Facilitator being more relevant than ever. They can be creative players on a stage.

Through the Transactional webinar model the participant has acquired a new skill, understood a new concept or mind mapped a path to an innovation or discovery. The next stage of the process provides the opportunity to apply that capability. The webinar or series of online events has the potential to bring a virtual community into action in the real world.

Key Components of the Transactional Webinar Profile Toolkit

Our research provides a software toolkit that guide the programme structure and learning dialogue to create a successful Webinar Profile (2020). A set of ten transactional factors are rated from your perspective as a webinar Host/Presenter or Participant. The next figures provide a summary of the analysis.



Figure 8 Webinar Profile Toolkit - Structure

Values are added to the Toolkit and appear as a visual bar charts. The assessment begins with establishing that the webinar has a pre-event resource induction or discussion. Next, is there an introduction of the Host or Presenter and Participants providing context to the webinar event? Are the stakeholders given appropriate resources or opportunities to create their own? Is any formative, self-assessment or reflection built into the webinar? Are the

webinar Participants given the opportunity to analyse, evaluate or create? At the end of the event, is evaluation data collected and analysed?



Figure 9 Webinar Profile Toolkit – Dialogue

The overall goal is not just review the webinar design and systems used to match the needs of the stakeholders, but the quality of learner autonomous, self-managed webinar Participants and stakeholders.

Evaluation

Evaluation should not be an afterthought. An online survey built into the webinar design from the start to quantify open-ended feedback and provide ‘feedforward’ evidence is needed. Each webinar event can use built-in polling tools and external systems to capture participant profile information. Some useful data may include:

1. Demographics e.g. geographic location, occupation, native language, webinar technology expertise
2. Expectations e.g. personal learning outcomes matched against the intended learning objectives
3. Human-Computer Interaction e.g. usability of the system

4. Pre-During-Post event sharing of knowledge and opinion, recorded as a score or tag cloud.

Web video recordings of the events can provide auto-transcriptions, text discussion exchange and whiteboard mind mapping evidence to support any modifications proposed to the webinar design.

Conclusion

The paper outlines practical methods for designing webinars for learning from an effective planning process to a 360* design for immersive learning experience with a simple way to assess participant performance. A theoretical framework is provided by Transactional Distance Theory (Moore 1997) adapted to current online distance technologies.

Training for the modern versions of distance learning is facilitated by asking organisers to assess: WHAT are the key factors of a successful webinar? HOW can webinars be blended with the interactive and transactional design? and WHY should you choose the transactional distance webinar model?

Moore (1997) at the time suggested that teachers need training to extend their traditional skills to embrace telecommunications for distance learning. Our paper provides a structure for that training by requiring stakeholders to assess their profile for technical and pedagogic blending. The spotlight on learner autonomy is a powerful reminder that end-user objectives are included in planning. The spotlight provides a focus towards Humanist creativity rather than the traditional instructional design Behaviourist model of webinar design.

Practical techniques such as the fishbone diagram maintain attention on learning despite the complexity of online events. The Transactional Webinar Profile Toolkit gives participants feedback guidance in aspects of the process from planning software to assessing effectiveness.

A glimpse into the future of a move from 2D technologies to a 3D immersive experience for participants suggests the benefit of shifting the balance from participants looking in to an event where looking out in terms of application of ideas in the world of the user. The So-

cratic Method may be achievable as an online experience using the technology. The result might allow participants to engage in higher levels of thinking.

The future is fast changing and ways to quickly collaborate to evaluate methods which are not platform dependent. The focus on the quality of online life in Higher Education is likely to be the norm not the exception.

The reader is invited to use the Transactional Webinar Profile Toolkit (2020) and test the guidance to choose software that applies Moore's Transactional Distance Theory in real-world webinar events. Test our webinar learning theory in online activity from basic lecture, discussion, large scale webinar or the 360* environment.

Please contact us with case study feedback on the results. The analysis of the case study examples inform the future designs of webinars. The authors predict a paradigm shift to more creative webinars that promote autonomous learners.

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**Online University Teaching at the time of COVID-19 (2020): An Australian
Perspective**



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Abstract

The impacts of COVID-19 have been widespread, and the education sector has not been immune to its effects. In March 2020 Australian universities were forced into a shutdown, which prompted an unanticipated, sudden shift in education, from on-campus and face-to-face to an off-campus and online mode of teaching and learning. This paper describes the experiences of two Sydney-based university unit coordinators, from two different institutions, who rapidly shifted their units online as a result of COVID-19. In particular, it applies reflection as a research method, to share what the authors' encountered as successful, and what was challenging about teaching online. Motivating and retaining students was a key challenge identified by the authors. Therefore, the paper discusses the authors' application of various digital programs and tools in their response to this challenge of motivation and engagement. It is hoped that our experiences might benefit those looking to integrate programs and tools in the online teaching and learning space. Although Australia is currently one of the most successful countries in their handling of COVID-19, there is still great uncertainty about the future. Globally the pandemic shows no signs of abating, as many countries struggle to manage high levels of transmission and infection rates, which in turn have an impact on the education sector more broadly. Consequently, online learning may be the 'new normal' for many institutions in the near future. Therefore, it is important for educators to share their online teaching experiences that can contribute to greater understandings of this space.

Keywords: COVID-19, higher education, online learning, online teaching, university

In the past two decades Australian higher education institutions and their teaching units have exponentially increased the function of their online platforms to support face-to-face teaching. On 18th March 2020, the Australian Government advised that “university and higher education should continue at this time with risk mitigation measures, including working from home arrangements where effective” (Morrison, 2020, Universities and Other Higher Education Centres section). For many Australian universities this announcement coincided with the start of the semester. In Sydney, Macquarie University responded to the COVID-19 pandemic by pausing all face-to-face and online teaching from 18th March (in their fourth week of session 1), removing the mid semester break (13th - 26th April), thereby allowing the University to prepare their transition to online teaching and learning. Similarly, University of Technology Sydney paused their teaching on 17th March to enable staff to prepare an online mode of delivery for their subjects, and commenced online teaching on 24th March. At other universities, the transition to online teaching and learning was immediate, and needed to be as seamless as possible to maintain professionalism and quality education standards. For some teaching staff the online space was familiar territory, with many having used their university’s online platform to complement face-to-face teaching to provide resources, lecture recordings, conduct tests/quizzes, post readings and/or assessment resources. Aside from teachers having to overcome gaps in technology infrastructure, the forced transition online meant that teachers needed to become more knowledgeable and skilled with their institution’s online learning platform, adjust approaches to pedagogy, rethink lesson plans, consider strategies for online engagement and be more considerate of students’ circumstances that may impact on their attendance, participation and/or timeliness of assessment submission.

This paper presents our experiences as university unit coordinators and teachers from two different Sydney universities who transitioned our face-to-face teaching skills to the online space in March 2020. When each of our universities transitioned to online teaching and learning we were coordinating and teaching both undergraduate and postgraduate units that were comprised of domestic and international students. Online learning enabled our students to continue their studies without delaying or pausing their degrees. The following sections explore our experiences of online teaching and what we found improved the online learning experiences of our students, the programs that we integrated to enhance engagement, the challenges we encountered and some of the techniques we employed to counter some of the challenges we came across while having to teach and promote learning in the online space in semester 1 (March-June), 2020.

Due to the scope of this paper and the need for data collection, this paper did not address one key overarching challenge of online learning in the university sector. In Australia (and other developed nations) there is the general presumption that all students have a dedicated space in their home to study effectively, have access to a computer, and have access to reliable internet and/or technological devices. Data and research indicate that this is not the case. Approximately 87% of Australians have access to the internet at home, but only 68% of Australian children (5-14 years old) living in disadvantaged communities have access to the internet at home (Graham and Sahlberg, 2020). However, access does not equate to reliability, especially for students who are studying online in remote or regional locations. Furthermore, ‘more than four million Australians access the internet solely through a mobile connection’ (Noble, 2020), which is impacted by mobile phone plan data limits, sharing (or hotspotting) and internet speeds. Much of the research published focuses on Australian children and teenagers, but university students are also negatively impacted by the same internet and technology challenges, especially those from racial and ethnic minority backgrounds, lower socioeconomic backgrounds and those in rural or regional areas (Gillis and Krull, 2020). While

some of our students made off-hand comments during the semester about one or more of these challenges (space, technology, internet), there are likely to be others who were severely impacted by online learning that we did not hear from, who perhaps withdrew from study or suffered academically as a result. Further research is required to ascertain this data because without access to technology and reliable internet students will struggle to participate in online learning, thereby widening the digital divide and educational divide.

Engagement

As higher education educators, we identify that engagement is “one of the most important variables for the learning process” (Kucuk & Richardson, 2019, p. 199). One of the most accepted theoretical frameworks for understanding online learning processes is the Community of Inquiry (CoI) framework (Garrison et al, 2001; Garrison et al, 2010a). Central to the CoI framework are three elements (cognitive presence, teaching presence and social presence) which “work together to create and maintain a collaborative community of inquiry and effective learning processes in online education environments” (Kucuk & Richardson, 2019, p. 197). For online learning, these three elements of the CoI framework and their overlap reflect the dynamics of online learning experiences that are key to sustaining and improving the quality of online education (Kucuk & Richardson, 2019; Garrison et al, 2010b). Cognitive presence “refers to the extent to which online learners can construct and validate meaning based on critical and continued communication and thinking” (Kozan & Richardson, 2014, p. 68) and relates to the learning and inquiry process, based on the Practical Inquiry model that recognises four phases in the inquiry process (Garrison et al, 2001): the definition of a problem or task; exploration for relevant information/knowledge; making sense of and integrating ideas; and, finally, testing plausible solutions’ (Garrison et al, 2010b). Teaching presence in the CoI framework is “the design, facilitation and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes” (Anderson et al, 2001, p. 5). According to Garrison et al (2010b, p. 32) the first responsibility of this element “is establishing curriculum content, learning activities, and timelines”, the second “is monitoring and managing purposeful collaboration and reflection”, and the third “is ensuring that the community reaches the intended learning outcomes by diagnosing needs and providing timely information and direction” (Kucuk & Richardson, 2019, p. 197).

We recognise that student engagement is “broad and there is no agreement on its meaning, definition, and measurement” (Mamun et al, 2016, p. 381). Rather, student engagement is “a multi-faceted construct which usually encompasses several subsets; each of which has its own indicators” (Ding et al, 2018, p. 214). Nevertheless, it is widely accepted that the three different types of student engagement are categorised as: behavioural engagement, cognitive engagement and emotional engagement (Fredericks et al, 2004; Hu & Li, 2017; Reeve and Tseng, 2011). In this paper, and its specific focus on online teaching and learning, we have adopted Dixson’s definition of online student engagement, as

... students using time and energy to learn materials and skills, demonstrating learning, interacting in a meaningful way with others in the class (enough so that those people become ‘real’), and becoming at least somewhat emotionally involved with their learning (i.e. getting excited about an idea, enjoying the learning and/or interaction) (Dixson, 2015 p. 4).

Dixson (2010) reports that students find online activities where they can apply theories to case studies, do group work, discussion blogs and work on assignments that relate to recent events

encouraging. Furthermore, she also states that the active involvement of the instructor and a feeling of connection with the instructor creates a positive online learning environment for students (Dixon, 2010). Students value an online learning environment that caters sense of belonging, that is welcoming and provides meaningful learning experiences. Within that environment they feel connected and engaged, especially when collaborative learning exercises are included in the teaching practices, students' participation and their critical thinking skills increase (Young & Bruce, 2011). Facilitating discussions by using active teaching-learning processes assists students' engagement in understanding the key ideas for them. However, too much instructor participation in the discussions has a tendency to decrease student engagement (Dennen et al., 2007). Therefore, learning in the online space needs to involve student-to-student and student-to-instructor communication (Dixon, 2010).

Although the focus of this paper is on engagement in the online space, it must be acknowledged that because the students we were teaching did not choose to have their learning carried out entirely online, the experiences that we faced as teachers differs to the pre-COVID-19 (pre-2020) literature and research on online student engagement. In pre-COVID-19 times, students undertaking online learning, volunteered to do so, or at the least are aware that their learning will be delivered wholly/partly online. Research indicates that higher education students who enrol in an online mode of education are often non-traditional students, who do so because it provides flexibility (Oblinger, 2003; Redmond, 2018). For those who do not volunteer for online learning, "... an online environment might benefit certain types of engagement, but may also be somewhat of a deterrent to others" (Dumford & Miller, 2018, p. 452). Our students in 2020, like many others, were forced to transition online, or chose to withdraw from their studies. Furthermore, the COVID-19 pandemic did not only impact higher education students and their education, for many it also had impacts on their employment, living circumstances, family and carer's responsibilities (including higher education students who had children who were home-schooling), all of which had cascading effects on relationships, mental health and wellbeing. For us, as teachers who were previously teaching in face-to-face, on-campus settings, there was a real rush to become more aware of engagement that was specific to online contexts. This experience was not unique to us, "the fast transition to remote teaching during the COVID-19 pandemic made forethought and planning for course aspects that are related to engagement difficult" (Garris & Fleck, 2020, p. 3).

Rethinking Lectures for the Online Space

The approach to lectures differed between us. Smith used pre-recorded lectures to run asynchronously, and Kaya ran live lectures. Each of these approaches had its benefits and challenges, as explored in the following paragraphs.

Pre-Recorded Lectures

From week 4 of Semester 1, Smith created pre-recorded lectures in Zoom that were uploaded to Panopto, through Western Sydney University's (WSU) online platform, Blackboard. Pre-recorded lectures are an important 'part of providing flexible education environments that address the diverse needs of students in higher education' in a variety of ways, such as pace, place and time (Larkin 2010 p. 238). The most notable, positive aspect of pre-recorded lectures is the flexibility it allows for students to view the lecture, where to view the lecture, ability to pause and later resume the lecture, and the various ways it could be viewed (such as: computer, phone, streamed through the television, and audio). The additional benefit of pre-recorded lectures is the ability for students to replay lectures at any point in the semester and alter the speed of delivery (faster or slower) to suit their learning preferences. Panopto also has a

captions (subtitles) function. However, Smith identified frequent errors in their accuracy and so they were not used in her pre-recorded lectures to avoid confusion. Nevertheless, these features may be useful to students from non-English speaking backgrounds and/or international students, but they may present challenges for some students with learning disabilities.

The flexibility of pre-recorded lectures and online learning more broadly, requires that students possess digital competencies, which research suggests is not always evident. Therefore, the idea that students are what Prensky (2001) termed ‘Digital Natives’, “is by no means the universal student experience” (Kennedy et al., 2008 p.117). Furthermore, “simply because students have grown up with increasingly ubiquitous and advanced digital technologies does not mean that they naturally know how to study in online spaces” (Scull et al., 2020 p. 6). Smith’s experience teaching her unit online during Semester 1 supported these statements, that students are not homogeneous in their digital competence, nor does digital competency regarding everyday digital use mean that students know how to instinctively or easily navigate the university’s online platform. As a result of the varying digital competencies of students, additional time spent in tutorials was required to explain how to navigate the WSU’s online platform so that accessing all unit materials was understood. This experience resonates with previous studies that have highlighted that when students are learning online, they require assistance and support with time management and self-regulation (Cho and Shen, 2013; Dabbagh, 2003; Douglas, 2019; Kent, 2015; Scull et al., 2020). The main challenge that this posed was that time spent navigating the features of the WSU’s online platform took time away from teaching unit content in tutorials.

Using Panopto to create pre-recorded lectures had numerous beneficial features, such as the ability to edit lecture recordings, insert videos and quizzes, and have statistics collected on student views (including number of views and percentage of the lecture viewed), which is useful for units that have attendance requirements. Smith’s experience of creating pre-recorded lectures highlighted that the process: preparing (scaffolding/story boarding), recording and editing lectures was significantly more time consuming than presenting on campus, face-to-face lectures. While pre-recorded lectures allow “opportunity for the lecturer to listen to the recordings and reflect on lecturing styles, points of emphasis and content”, editing lectures can be time consuming, especially for early career academics who are new to lecturing and lack the confidence gained from experience (Larkin, 2010 p. 246). However, pre-recorded lectures removed student interruptions or disrupting behaviour (such as: talking, late arriving students, early exiting students, doors opening and closing, mobile phone alerts) which may assist inexperienced lecturers, or lecturers who view lectures as the transmission of knowledge or a ‘sage on the stage’, teacher-centred approach. Under different circumstances, when teaching staff know prior to semester commencing that pre-recorded lectures are the method of lecture delivery, there is time to prepare. Unfortunately, the rapid shift to the online space in March 2020 due to COVID-19 meant that making pre-recorded lectures available for students a week in advance created additional pressure. Lecturers’ experience of pressure and stress as a result of creating lecture content for the online space in 2020 is more accurately described as “emergency remote teaching ... put together in great haste to deal with an emergency situation” (Boud, cited in Baker, 2020).

A last point on the topic of pre-recorded lectures is that it is not easy to hold the attention of students for 90 minutes in the same way that an on campus, face-to-face lecture would, especially if there is no lecture attendance requirement. As previously discussed, on campus, face-to-face lectures offer students opportunities to be involved in the content that pre-recorded lectures cannot provide. This was observed when Smith reviewed lecture viewer statistics

through the ‘stats’ function in Panopto. Panopto’s ability to gather and report statistics on student lecture views does not determine whether the lecture was actually viewed by the student (students can play the lecture while they are not physically viewing the lecture). Nevertheless, the statistics provide a guide as to how much of the lecture was viewed by each student and at which point, they ceased viewing. Smith observed that while most students were initiating the lectures, there were many who did not complete viewing them to the end. This observation is supported by Professor David Boud, director of the Centre for Research in Assessment at Deakin University (Melbourne, Victoria), who stated that “you have to package up lectures that have been recorded and are too long, they’re not designed to be dealt with in that medium” (Boud, cited in Baker, 2020, para. 16). As a result of low lecture views, Smith began to divide 90-minute lecture recordings into three parts in the hope that students would find viewing them more manageable. Students were asked for their feedback, comparing their preference of a single, 90-minute lecture recording, to multiple, shorter recordings. The statistics on pre-recorded lecture views demonstrated that a greater number of students had viewed lectures when they were the latter, compared to a single, 90-minute lecture recording.

The previous paragraph mentioned that pre-recorded lectures remove student interruptions, but it is important to note that not all student disruptions are negative. When teaching on campus both Kaya and Smith invite student participation by asking questions, taking polls, asking students to speak to one another, and welcome questions from students who want further clarification on lecture content. This kind of student involvement during lectures assists lecturers in gauging what students know, what parts of the content they might be struggling with, and encourages engagement with content that pre-recorded lecturers cannot offer. The aforementioned information allows lecturers to pause and revise content which enhances understanding and the student learning experience. Similarly, encouraging students to share their experiences or answer questions provides richer discussions that are not achieved with pre-recorded lectures. In this sense, the challenge of pre-recorded lectures is that it may be “convenient for lecturers but not good for learning” (Boud, cited in Baker, 2020, para. 17).

Live Lectures (Online)

It is an optimistic expectation to wait for students to attend the live lectures and take notes in the same way they would do in a face-to-face lecture. Therefore, the ability to engage requires effective use of technology. Kaya delivered synchronous online lectures (also known as “live lectures”) through Zoom, where students attend at a scheduled time. The chat tool, screen annotation, polling, non-verbal and verbal feedback buttons and breakout rooms in Zoom create engagement when students are off-campus, and it also supports other teaching and learning functions, such as hosting office hours or small group discussions. Zoom-run live lectures can be accessed on laptops, desktops, tablets, smartphones, and even desk phones, giving students flexibility in how they attend live lectures. During these live lectures, Kaya included activities within the delivery of the lecture content. Such activities not only help students with assessment preparation, but it also encourages active involvement in live lectures for the purposes of creating more enjoyable and enriching lectures. Students learn more when they engage in an active learning process rather than passive audiences, and similarly active teaching practices increases attendance (Deslauriers et al., 2019), encourages interaction and engagement, supports peer collaboration, and develops positive students’ attitudes toward the subjects that they are studying.

Unlike walking into a lecture theatre on campus, or speaking into a lectern microphone, live lectures (online) require alternative ways to commence. Opening a 90-minute live lecture with a question prompts student attention and “sets the scene” of the lecture. Based on Kaya’s

experiences, it was evident that periodic questioning kept students' attention and contributed to an active learning process during live lectures. This is where Kaya found microteaching valuable. Microteaching focuses on the importance of delivering specific information within a limited timeframe. Thus, lesson planning in microteaching requires concise, appropriate and relevant content. It involves the steps of plan, teach, observe, re-plan, re-teach and re-observe. These steps enable us to modify the teaching-learning process to integrate skills learned from the three major phases in microteaching; knowledge acquisition, skill acquisition and integration, and feedback, all of which provide a valuable understanding in transferring the performance to the classroom (Remesh, 2013). Students' attention is around 10-15 minutes, then they start to drift (Felder & Brent 1999). Therefore, using microteaching techniques in live lectures, dividing the lecture content into 15 minutes sessions, and including periodic questioning, rather than delivering an entire lecture at once, was a strategy that demonstrated greater levels of student engagement, by way of attention and participation. An observation was that students would become familiar with other students, and these interactions would continue in online tutorials, especially when students were asked about their impressions and understandings of the lecture content.

Online Tutorials: How Can We Energise Students and Retain Engagement?

Online learning is not “slapping classroom content online” (O’Neil et al., 2008, p. 18), it must be purposeful and transformative (Budhai & Williams, 2016). A 2020 Monash University study that interviewed teaching staff who taught online as a result of the COVID-19 pandemic, similarly found that “online learning is a different type of learning, it’s not just a transfer across from face-to-face classes” (Scull et al., 2020 p. 4). Our experiences of teaching online support these statements, that an effective online pedagogy focuses on student-centred learning and applies active learning practices which include collaborative and individual tasks that encourage students to share and discuss ideas with their peers. Therefore, this section of the paper focuses on online tutorials, specifically what we identified as instrumental in maintaining quality teaching standards, and in encouraging student engagement and participation in the online space.

The INSPIRE model (Table 1) of expert tutoring points out that successful tutors are identified as intelligent, nurturant, socratic, progressive, indirect, reflective and encouraging (Lepper & Wolverson, 2002; Wood & Tanner, 2012) and we suggest that the model can be adopted as a strategy to support students during their online learning processes. Although the model was developed based on a study conducted in primary and secondary school mathematics, it can also meet the needs of students in higher education, and the effective tutoring strategies can be transferable to the large lecture setting and stimulate student engagement in both lectures and tutorials.

Table 1: The INSPIRE model of expert tutoring (Lepper & Wolverson, 2002; Wood & Tanner, 2012)

Characteristics of expert tutors	Results for students
Intelligent	Difficulty of the content optimally matched to students' level of understanding
Nurturant	Feeling accepted, supported, and free to explain their thinking
Socratic	Constantly thinking, doing, and responding
Progressive	Moving in small steps to higher competency through deliberate practice
Indirect	Working in a nonjudgmental atmosphere
Reflective	Articulating their thinking, explain their reasoning, and generalize to other contexts
Encouraging	Experiencing productive learning and gaining confidence in their abilities

Kaya designed her online tutorials as spaces where students can construct, explore, resolve, and confirm meanings through collaboration and reflection. In this process, Dewey's concept of reflective thinking (Sun & Chen, 2016) enabled students to work on questions, retrieve information and find their ways of resolution.

Critical and creative thinking are essential to developing analytical and evaluative skills and understandings in the Australian Curriculum (Ab Kadir, 2016). We argue that activities that foster critical and creative thinking include both independent and collaborative tasks and entail transition between ways of thinking. It is imperative to establish tutorial environments where students and teachers collaborate, actively discuss, and articulate activities and assessments for the purpose of students to demonstrate their critical and creative thinking (Reid & Petocz, 2004). In addition to designing activities that encourage and develop critical and creative thinking, the importance of motivation and retaining students must be discussed.

Motivating and Engaging Students

While lectures present information to all enrolled students in a more formal sense, tutorials are typically more dynamic, consisting of smaller groups where the lecture content and reading/s are integrated and discussed. Both authors exclusively used Zoom to conduct online tutorials in Semester 1, 2020, allowing for a range of strategies. One strategy that we both implemented in our online tutorial design was to begin by asking students if there were any questions based on the lecture content or readings that needed clarification. This open discussion time was a strategy that allowed additional time for late arriving students to join. A creative and engaging segue from this informal discussion to the tutorial was to sometimes include a game. Ding et al (2018, p. 214) state that "empirical studies examining gamification in promoting student learning are sparse", that most studies are quantitative, and that "only a few studies investigated the gamification approach from the educator's perspective".

A popular game-based student response system (GSRs) we integrated into some of our tutorials was Kahoot! Its platform, which includes a web-based creator tool, makes it easy to create a quiz with two to four multiple choice answers that have timed opportunities to answer. We integrated Kahoot! into our online pedagogy, because like other GSRs, it "enriched the quality of student learning in the classroom, with the highest influence reported on classroom

dynamics, engagement, motivation and improved learning experience” (Licorish et al., 2018, p. 1). Ding et al (2018, p. 214) explain that the “majority of the existing research reported that the gamification approach can have [a] positive influence on student learning, such as encouraging participation and bolstering interests in learning”. Based on our experiences implementing Kahoot!’s basic plan (which is free) into our pedagogy, we observed numerous positive effects, including its ease of use, creativity (allowing the insertion of images and video), providing real-time feedback for students and teachers, ability for students to play anonymously, creating a sense of community and fosters an entertaining environment, like that of a game show (Licorish et al., 2018, p. 4). Kahoot! with its simple user interface and step-by-step set-up makes the GRS extremely easy to use for both creators and players. The ability to attach images and/or video to the question design add layers of creativity to the GRS and provides opportunities for lecture or reading images/content to be reintroduced (memory and recall).

The following figures are examples of the Kahoot! questions that Smith posed in her tutorials following a lecture on several sociological theories (see Figures 1 - 3). The Kahoot! quiz required students to match the explanation with the most appropriate sociological theory. Considering the context (COVID-19) that resulted in online tutorials, Smith would joke that first prize was a roll of toilet paper (this was a commodity that was difficult to find stocked in Australian supermarkets); second prize was hand sanitiser, and third prize was a face mask.

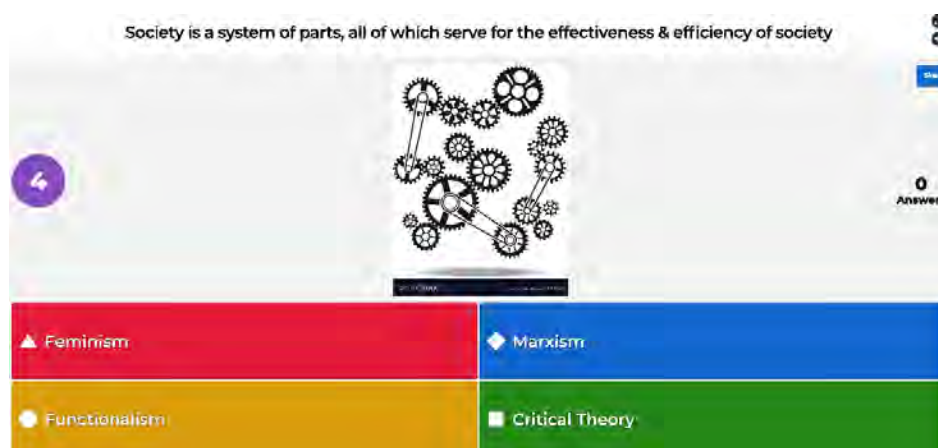


Figure 1: Kahoot! quiz question example 1, Semester 1



Figure 2: Kahoot! quiz question example 2, Semester 1 2020

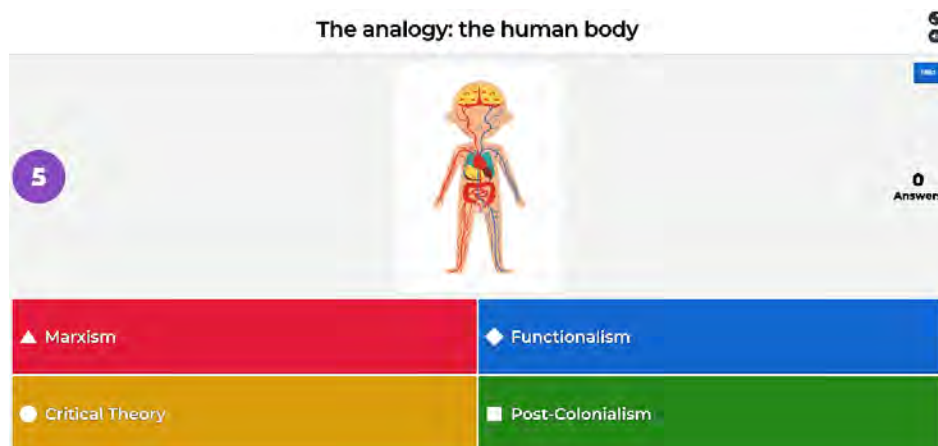


Figure 3: Kahoot! quiz question example 3, Semester 1 2020

Some have linked Kahoot!’s background colour scheme and music during play to that of a game show, which adds to the excitement, novelty and creativity of the GSRS in educational settings (Licorish et al., 2018; Wang, 2015;). It has also been observed that a large part of Kahoot!’s appeal for students is that it allows for students to participate anonymously, as they have the ability to select alternative names or aliases, therefore encouraging students to participate even if they do not feel confident that they may know the content well or will answer correctly. For some students, the anonymity when playing Kahoot! creates a sense of safety to participate without the fear of being shamed by others. Many students took this opportunity to adopt a pseudonym, and some adopted known pseudonyms, such as Karl Marx and the Australian Prime Minister. Aside from students engaging in creative pseudonyms, this contributes to the social aspect of the tutorial dynamic and more creative and humorous ways to be involved in the game. There is a cultural phenomenon in Australian (and New Zealand) society whereby students may be reluctant to answer questions or avoid opportunities to demonstrate their knowledge or understanding for fear of criticism of being perceived as a high achiever, or for standing out from the group, known as “Tall Poppy Syndrome” (Licorish et al., 2018). At the end of the game a podium is displayed with the names of the top three players (or teams). In some instances where the top players used pseudonyms, those students did not identify themselves to the class, perhaps because of the fear of being perceived by their peers as egotistical (Tall Poppy Syndrome). Therefore, based on these experiences implementing Kahoot! into online tutorials, offering students the option to adopt a pseudonym is an important feature to encourage participation.

Smith would preface the game by stating that playing Kahoot! is not a test and is not about making students feel as though they do not know the content; it is about testing your conscious and subconscious recall of the lecture and readings, seeing what you know well and what areas you may need to revise, and it contributes to your continued learning of the content. Often this further encouraged students to participate, to test themselves and what content they know well and what they may need to revise. This aspect was beneficial in providing real-time feedback for students and teachers. On the one hand students can quickly identify what areas they recall, and what areas they may need to familiarise themselves with in order to answer the questions correctly. And on the other hand, teachers are able to gather quick insight into what their students recall, and what areas may require further revision. If in the case that many of the students incorrectly answer one or several of the answers, an improvised adjustment to the tutorial lesson plan, to allow the teacher to revise those areas, is possible.

Similar to lectures, tutorials require preparation, regardless of whether they take place on campus or online. Unsurprisingly, we found that tutorial content for the online space had to be planned differently to face-to-face tutorials, with a particular intention to motivate engagement and enhance participation. This planning drew on the previously discussed CoI framework and the three elements: teaching presence, social presence and cognitive presence, with the aim of creating and “maintaining a collaborative online community of enquiry and effective learning processes in online education environments” (Kucuk & Richardson, 2019, p. 197). Planning (part of the teaching presence element) was particularly important in relation to designing breakout room activities, the timing of the activities and discussions with the whole tutorial after a breakout room activity. Breakout rooms have been identified as beneficial because they allow the teacher relief from presenting (Chandler 2016), but more importantly, they facilitate collaboration, interaction as well contribution to the content or the lesson plan (part of the social presence element). The University of Technology Sydney (UTS) Learner Experience (LX) Team provided pedagogic techniques for effective breakout rooms in Zoom. The LX Team emphasised the importance of assigning clear tasks for students in Zoom tutorials with consideration of matching the time and number of students to the task, providing students with links to shared documents in the chat for collaborative notetaking, keeping the same student groups, and the importance of monitoring group discussions by having the host (teacher) enter breakout rooms (LX Team, 2020).

Both authors found that most weeks at least 80% of enrolled students were present at any given (online) tutorial in semester 1, 2020. Kaya had up to 40 enrolled students, and Smith had up to 30 enrolled students when tutorials shifted online. Although there was a good tutorial attendance rate, the number of enrolled students in an online tutorial was the key challenging factor that we identified in influencing our tutorial lesson planning, specifically: the number of breakout room activities, the time for breakout room activities and the time allocated for whole-tutorial discussions. Based on the units that we taught, the ideal breakout room sizes comprised of at least three students and a maximum of five students. For Kaya, breakout rooms frequently contained ten students in order to allow time for each group to report back to the whole tutorial. As a result, students often reported that they did not feel that they had equal or enough opportunity to speak in their breakout rooms, and when reporting back to the whole tutorial. Other students reported being bored by activities in such large groups.

Smith had smaller online tutorial sizes; however, a key challenge that she observed was that many students elected to switch their cameras off. This visual withdrawing from tutorials in effect conflicts with a teacher’s ability to observe classroom practice which is a vital aspect in improving teacher practice that in turn improves student learning (Australian Institute for Teaching and School Leadership, 2017). In face-to-face tutorial settings observed visual cues from students include nodding and being able to see where eyes are focused (for example, their mobile phone, the floor, the board, the teacher, their peers). However, when these visual cues are not observable, as was the case when students had their cameras switched off, it impacted Smith’s ability to adjust her pedagogy, specifically to make “judgements about if, and when interventions are necessary, as well as decide what those interventions might be” (Rooney & Boud, 2019, p. 444). As research has shown, student engagement online is a key component of effective online learning, and when students do not have opportunities for face-to-face interaction, students tend to disengage from online discussions (Ding et al, 2018, p. 214). Although most students were wholly or partly listening (as tested by the teacher’s request for students to display an emoji such as a clap or thumbs up when prompted) it became clear that some students were either engaged in other activities or away from their device. This was evidenced in two primary ways, firstly when breakout rooms were formed some students would

remain in the main tutorial instead of accepting their breakout room allocation. These lingering students would be asked, both verbally and in the chat by Smith if they were experiencing technical issues, with many either not responding for several minutes or for the entire time of the breakout room activity. Secondly, when Smith would enter each breakout room to answer questions and check on the progress of an activity, some students would not be contributing to the group's discussion. Students did express (either to the whole tutorial when having to report their group's results, or privately to Smith in the Zoom chat or by email) that this was a frustrating aspect of online tutorials, that those who were present and contributing felt burdened with the responsibility of having to complete activities without the support and contribution of all group members. It became clear, early into the shift from face-to-face to online teaching and learning, that designing well thought out, problem-based learning activities would be key to motivating student participation in online tutorials.

Given that the pandemic is so recent, it is unsurprising that little research has been on effective strategies for improving student engagement in online tutorials. It was reported in one paper that teachers were frustrated with students in online tutorials who elected to turn their cameras off because they perceived that students were being disrespectful, and secondly, that students were appearing to attend but were not actively participating (Stafford, 2020). However, teachers' frustrated "assumptions ignore the complexities of online study in general, and specifically during this pandemic" (Stafford, 2020, p. 151). Indeed, for some students, turning their cameras off during tutorials improved their internet connectivity. For others, having their camera off was important for privacy reasons as they multitasked their children's home-schooling responsibilities, while for others, their home environments were not spaces that they felt comfortable sharing with their peers. Therefore, the suggestion by one teacher that "a student wouldn't hide their face in the physical classroom so why would they do it online?" ignores "the complexities of online study in general, and specifically during this pandemic" (Stafford, 2020, p. 151). However, it is important that educators strike a balance between giving students allowances in the COVID-19 pandemic context, and providing leniencies to students that only serve to further isolate and disconnect them (Dixson, 2015), the latter being a concern of online learning prior to the pandemic.

In terms of tools that were effective in student-led discussions and collaboration there were several that Kaya engaged with to complement online tutorials. Assigning activities by using technology and online tools activates students' teamwork skills and gives them the opportunity to practise their leadership and management skills. Sometimes students do not prefer to report back to the whole tutorial cohort, but rather they enjoy the discussions in their group and talking to the tutor when they join their breakout rooms. Kaya used various tools and platforms such as Google Docs, Google slides, Google Jamboard, Padlet, Lucidchart and Canvas during the online semesters. The use of Padlet demonstrated that being creative is more valuable than being high tech in tutorials. The following figure is an example of a Padlet created by students while they practised problem solving tools in business examples. Students were asked to work in their breakout room groups on mini-case scenarios, specifically identifying and analysing the problems. Similar to Kahoot!, Padlet allows students to participate anonymously, which as previously mentioned in relation to Kahoot! has positive effects on student participation.

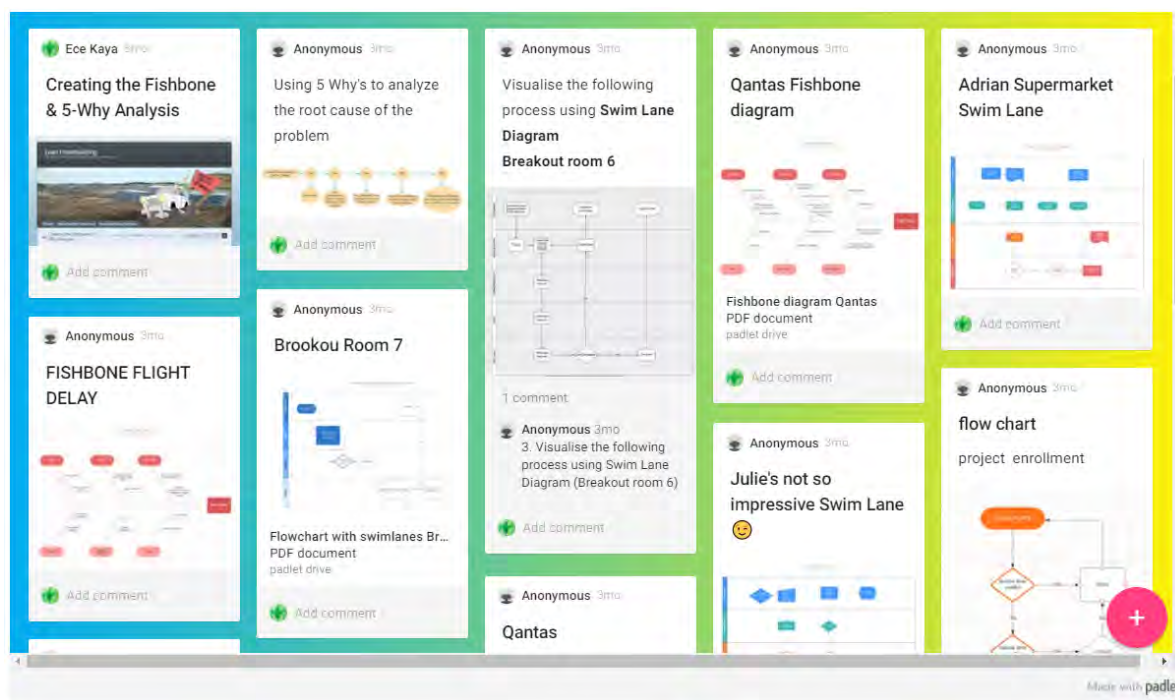


Figure 4: Example of Padlet

Google’s Jamboard (Figure 5) was another effective tool that allowed for students to collaborate with their peers in online tutorials. Jamboard can be used to create storyboards and write stories. Brainstorming has become a fun activity and allowed students to write their own notes, ideas as well as add images and figures.

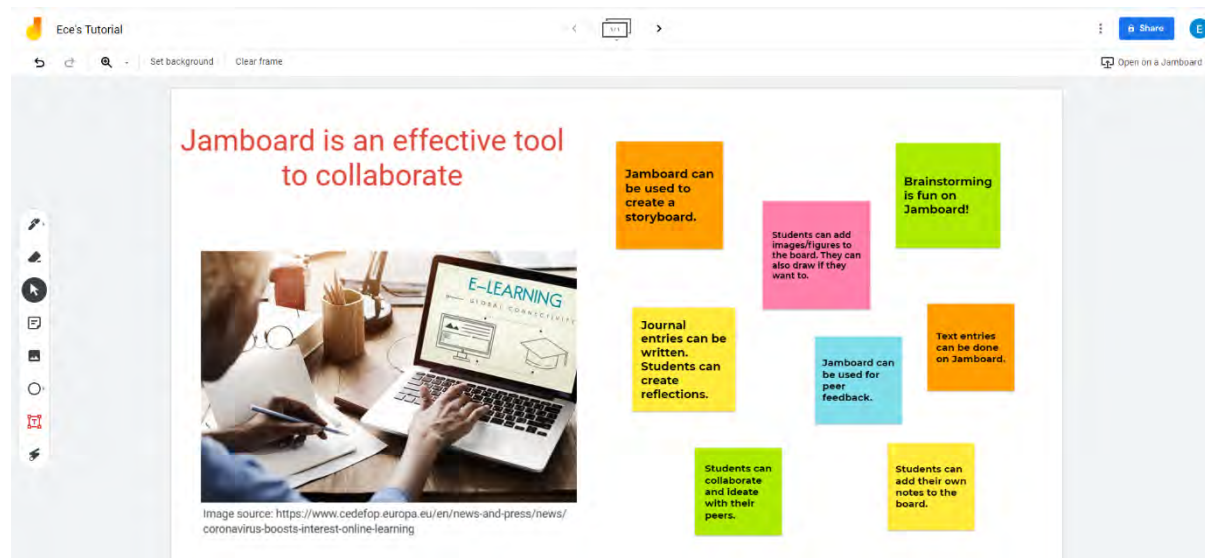


Figure 5: Example of Jamboard

Our experiences teaching tutorials online made us acutely aware that it is easy to unintentionally slip into a teacher-centred mode of tutorial delivery, especially when students are reluctant to turn their cameras on and/or do not engage by responding, verbally or through the Zoom chat function. It becomes easy for the tutor to fill the void of blank screens and silent

gaps with the answers, but doing so limits and disservices many of the pedagogical strategies that contemporary teachers identify as pillars of learning such as peer interaction, collaborative learning and inquiry-based learning, all of which support the diverse and dynamic ways that students learn.

Conclusion

This paper anticipated that our experiences might benefit those looking to integrate programs and tools in the online teaching and learning space, such as Panopto, Zoom, Kahoot!, Google Jamboard and Padlet that the authors applied in their teaching in order to respond to those challenges and create a positive online learning environment for students. It is worth noting that at the end of Semester 1 (2020) the student feedback that we each received about our teaching was overwhelmingly positive. Many students made specific mention to the inclusion of online tutorial activities and tools that made classes more enjoyable, interactive and helpful in solidifying course content. Students' explicit mention of the activities and tools that were incorporated into lessons, reaffirmed our view that teachers cannot simply transfer their on-campus lecture and lesson plans to the online space, online learning needs to be thought out and planned in different ways. At the time of writing this paper, Australia was recognised as being one of the most successful countries in their handling of COVID-19, having been ranked 8th in the world by the Lowy Institute (Dziedzic, 2021). Even with the commenced rollout of vaccines worldwide, the pandemic is far from over as many countries continue to struggle to manage transmission and infection rates. Consequently, this has an impact on the education sector and online learning may be part of the solution for many institutions in the present and near future. Therefore, it is essential that educators continue to share their online teaching experiences so that we can build our knowledge of digital pedagogical tools. Furthermore, educators who seek to explore and invest time into the ever-changing digital space, specifically online educational programs and tools, and incorporate them into their teaching will be able to vastly improve the learning experience and motivation of their students. This is especially important now as the education sector is in a continuing state of uncertainty as a result of the pandemic. Online education used to be an alternative for some students, but due to the abrupt change in circumstances as a result of the COVID-19 pandemic, online learning may have more longevity than educators had previously imagined. In fact, some universities are now looking to integrate more online teaching and learning, especially regarding lectures, as existing lecture theatres make social distancing an impossible task for universities to resolve in the near future. Western Sydney University (WSU) is incorporating HyFlex for some units in 2021- a hybrid learning environment with a flexible course structure that gives students the option of attending tutorials face-to-face, online, or both. Institutional changes to integrate a more hybrid teaching and learning environment justifies the need for further research and publications on the topic of online teaching and learning.

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