



RESEARCH PAPER

An Analysis of Technology-Based Training and Teaching at University Level

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ABSTRACT

Technology literate teachers provide technology enriched teaching and learning environment to the learners of 21st century. It is therefore the requirement of the time to equip the teachers with technological and pedagogical skills through technology-based trainings. This study aims to analyze the effectiveness of In-house technology training for enhancing technological and pedagogical skills of university teachers; and to evaluate the use of technology in teaching practices of university teachers after receiving in-house technology training. This case study employed mixed method and used purposive sampling technique as all 60 Teaching Assistant (TAs) were selected from context of Shah Abdul Latif University Khairpur on the bases of the criteria that they had never or rarely attended technology-based training before. Feedback form and observation check list were used as research instruments for data collection. The study revealed that in-house technology training enhanced technological skills of teachers and had a positive impact on technology integration in teaching practices. The study recommended that frequent technology related training for novice as well as for senior teachers be organized to enhance their technological skills and to promote technology integration in teaching to keep the pace with today's technological age.

KEYWORDS Pedagogical Practices, Technology, Technology-Training

Introduction

Education Integration of technology in teaching is emphasized globally, yet need dire attention in the context of Pakistan, specially neglected and remote areas of Sindh. Information and communication technology being part of the present significantly influences all domains of our life including education (Gnambs, 2021). Technology offers various tools that can be used in traditional as well as online teaching to support and develop proactive environment of classroom teaching (Jogezai *et. al.*, 2021). The current study has great importance as it addresses the evolving role of modern technology that influences teaching practices and for that acknowledged the contribution of technology-based training. As asserted by (Ali *et. al.*, 2024 and Beriswill *et. al.*, 2016) that technology based professional development opportunities provides teacher a platform to enhance their skills of technology where active learning must be addressed on priority. Taking into consideration the dire demand of this digital era, this research study emphasized the need of technological training to enhance technological skills of teaching assistant of Shah Abdul Latif University, Khairpur and to integrate technology in classroom teaching.

Literature Review

As education enters to new era of 21st century the integration of technology seems to be grew frequently in field of education. The youngsters, specifically the students at universities, are more acquainted with internet and other digital devices and extensively prefer the use of technology (Martins et. al., 2019). Paja et. al, (2020) mentioned that unlike orthodox methods of teaching, technology-based teaching techniques are more interesting and motivating enough to catch the attention of students through the use of modern technologies.

Rehman et. al., (2023) declared that to meet students' expectations teachers must employ technology in classroom teaching. It is advocated by Ali, et. al., (2024) and Okoye et. al, (2023), teachers should integrate a variety of technological tools and resources in their teaching. The number of cutting-age technologies i.e. projectors, smartphones, laptops, internet, smartboards, google meet, google classroom, zoom/video conferencing, artificial intelligence (AI), blockchain, and augmented and virtual reality will reshape the future of education soon. Psillos and Paraskevas, (2017) mentioned that mixture of modern technologies and innovative teaching practices are the base of technology enhanced pedagogical approaches. Study conducted by Shehzadi et. al., (2021) revealed that students' academic performance was found high on digital platform when compared to traditional ones. Similarly, Hussain, (2024) and Akram et. al., (2021) portrayed that technology-integrated teaching practices enhance quality of education. Sarhandi et. al., (2020) reported that the great potential of technology as a teaching tool strengthens the performance of students at schools.

It has become imperative for the teachers at all levels from primary education to university level to upgrade their skills and competencies, use ICT effectively in their teaching practices and contribute to high quality education (Guillen-Gamez et. al., 2018; Martin et. al., 2019). According to Al-Samarraie & Saeed, (2018) digital literate teachers can simply run online classes, but they lack the skills to use technology effectively in their teaching and that leads to ineffective delivery of content (Adnan, 2020; Alanazy & Alrusaiyes, 2021). Ifinedo et. al., (2020) affirmed that teachers use technology effectively in teaching practices only if possess all required technological knowledge and skills. It is further elaborated by Brown, (2015) that tame use of technology in traditional teaching is not fruitful rather they must transform the innovative technology enriched pedagogical practices. It is advised by Allman et. al., (2023) teachers staying updated with latest educational technologies and trends is their ongoing commitment.

The technological skills of teachers could be enhanced if the teachers were given technology training to use technological tools effectively in their pedagogy (Guillen-Gamez & Mayorga-Fernandez, 2020). Van Oostveen, (2017) declared professional development or specific training opportunities guide and support the teachers for developing their teaching.

Most teachers had never attended any kind of technology-based training (Al-Awidi and Aldhafeeri, 2017). Keeping the rapid growth of technology integration in education it is crucial to design and organize technology-related professional development trainings to equip the teachers with latest technological tends in teaching. Current study focused on developing technological skills of teachers through in-house technology training and its impact on teaching practices of teachers.

Material and Methods

According to Cresswell (2014), research methodology is the set of procedures carried out for investigating the specific research study comprised of the sampling process, selecting appropriate sample, adopt methods and techniques for data collection, analyzing and interpretation. Mertler (2016), and Cresswell (2011) asserted that a single set of data is not enough to answer different research questions. Current study therefore employed mixed- method because both quantitative as well as qualitative data, instruments, and analyzing procedures were followed to address the research questions.

Research Design

Burns and Grove (2003) defined that a research design is a thorough plan that guides the researcher to conduct and analyze a research study. Current study employed one-shot case study design because all sixty teaching assistants who had never availed opportunity for technology related training were purposively selected from the context of Shah Abdul Latif University, Khairpur and they all were given (the treatment/ intervention/ in-house technology training) over a period of four weeks based on the content to introduce the philosophy behind technology integration, creating students' engaging activities, planning interactive lessons and developing effective assessment strategies using cutting age technology in teaching and post results for given treatment was measured through classroom observations. The researcher randomly observed thirty-two lessons of different participants over a period of a month. As described by Campbell and Stanley (1966) that one-shot case study design or one-group post-test only design is used to measure only post results of one group of participants for dependent variable after giving a treatment. The resources i.e. time, expenditure and availability of participants were limited to organize in-house technology training at larger scale, one-shot case study design was therefore preferred for current study.

Population and Sampling

The study was conducted in the context of Shah Abdul Latif University, Khairpur and all sixty teaching assistants were selected purposively. Bryman (2012) stated that a researcher can choose purposive sampling technique when there is a specific criterion for selection of participants. Current study chose purposive sampling due to the reason that all sixty TAs had never availed the opportunity for technology related training therefore, considered suitable sample for current study to find how in-house technology training impact on teaching assistants technology related skills and its integration in their teaching practices.

Instrumentation

For current study two research tools i.e. Feedback form and observation checklist were used to collect the data. After receiving in-house Technology training all sixty participants filled in a feedback form about training sessions that was used to analyze to what extent the training session remained effective. Participants were asked to implement acquired skills in their classroom teaching and thirty-two lessons were observed randomly by the researcher using observation checklist to evaluate to what extent technology was integrated in teaching.

Data Analysis

Quantitative data collected through feedback form was analyzed using descriptive analysis techniques to analyze the effectiveness of in-house technology training. Quantitative data collected through observation checklist for evaluating the use of

technology in teaching was analyzed statistically using descriptive analysis technique whereas thematic analysis was used to analyze the qualitative data of TPACK observation Checklist and narrated thoroughly.

Results and Discussion

Table 1
Contribution to Learning

Statements	Formula	Responses					Total
		Poor	Fair	Satisfactory	Very Good	Excellent	
Level of skills/ Knowledge at start of course	%	40	50	10	0	0	100%
Level of skills/ Knowledge at end of course	%	0	6.7	51.7	41.6	0	100%
Level of skills/Knowledge required to complete the course	%	33.3	55	11.7	0	0	100%
Contribution of course to your skills/ Knowledge	%	5	8.3	50	36.7	0	100%

Table 1 represents the feedback of teaching assistants (TAs) regarding the contribution of technology training to their learning against the indicators i.e. Poor, Fair, Satisfactory, very good and excellent.

In Item.1 participants were asked to report their level of skills/ knowledge at start of training course. Data showed that (40%) of teaching assistants were at poor level, (50%) were fair, (10%) were satisfactory, while no one was at good and excellent level of skills/ knowledge at start of course.

Item. 2 asked the level of skills/ knowledge of participants at end of the training course. According to data (0%) of teaching assistants were at poor level, (6.7%) were fair, (51.7%) were satisfactory, (41.6%) were very good while no one was at excellent at level of skills / knowledge at the end of the course.

In response of Item.3 the teaching assistants reported their level of skills/ knowledge required to complete the training course as (33.3) were at poor level, (55%) were fair, (11.7%) were satisfactory while (0%) of participants were good and excellent at level of skills/ knowledge required to complete the training course.

In item. 4 the teaching assistant s were asked to mention the contribution of in-house technology training course to their skills/ knowledge. Data revealed that (5%) of participants were poor, (8.3%) were fair, (50%) were satisfactory, (36.7%) were very good while no one placed at excellent level for contribution of training course to their skills/ knowledge.

Table 2
Course Effectiveness

Statements	Formula	Responses					Total
		SDA	DA	N	A	SA	
Learning objectives were clear	%	0	0	3.3	45	51.7	100%
The training sessions will be useful in my work	%	0	0	6.7	45	4	100%
	%	0	0	11.7	50	38.3	100%

Topics covered in the sessions were very helpful							
The content covered in the sessions was relevant to my teaching	%	0	0	1.7	48.3	50	100%
I can utilize the newly learnt knowledge of effective technology integration in my classes	%	0	0	13.3	31.7	55	100%

Table 2 represents the feedback of teaching assistants regarding the In-house technology course' effectiveness under the indicators i.e. Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree.

In Item.1 teaching assistants were asked to report if the training learning objectives were clear. Data showed that (0%) of the respondents strongly disagreed, (0%) disagreed, (3.3%) were neutral, (45%) agreed, while (51.7%) strongly agreed that technology training learning objectives were clear.

In Item.2 teaching assistants reported that the training sessions will be useful in their work/ teaching. Data discovered that (0%) of the respondents strongly disagreed, (0%) disagreed, (67%) were neutral, (45%) agreed, while (4%) strongly agreed that training sessions will be useful in their work.

In item.3 teaching assistants reported that the topics covered in training sessions were very helpful. According to data (0%) of the respondents strongly disagreed, (0%) disagreed, (11.7%) were neutral, (50%) agreed, while (38.3%) strongly agreed that topics covered in the training sessions were very helpful in their work.

In item.4 teaching assistants were asked to report if the content covered in training sessions was relevant to my teaching. Data showed that (0%) of the respondents strongly disagreed, (0%) disagreed, (1.7%) were neutral, (48.3%) agreed, while (50%) strongly agreed that the content covered in training session was relevant to my teaching.

In Item.5 teaching assistants were asked to report that they can utilize the newly learnt knowledge effectively in their classroom teaching. Data revealed that (0%) of the respondents strongly disagreed, (0%) disagreed, (13.3%) were neutral, (31.7%) were agreed, while (55%) were strongly agreed that they can utilize the newly learnt knowledge effectively in their classroom teaching.

Table 3
Teaching Pedagogical Approaches in the Lesson

Pedagogical Approaches	Formula	Yes	No	Total
Leading	%	75	25	100%
Facilitating	%	51.1	46.9	100%
Class Control	%	96.9	3.1	100%

Table 3 represents the observations against the statement "Teacher pedagogical approach in the lesson" under different approaches i.e. leading, facilitating, and class control. According to the findings (75%) teaching assistants lead the class while (25%) of them failed in leading the class; (51.1%) teaching assistants were facilitating the students whereas (49.9%) failed to facilitate students; (96.6%) of teaching assistants had control over the class only (3.1) failed in class control.

Table 4
Teacher Use of Technology in the Lesson

Statements	Formula	Yes	No	Total
No Evident	%	25	75	100%

To present information	%	75	25	100%
To demonstrate a student task	%	6.3	93.8	100%
Groupwork resources	%	21.9	78.1	100%
Visualization/ modeling a concept	%	34.4	65.6	100%
Grading, attendance, material presentation	%	0	100	100%

Table 4 represents the observations against the statement “teacher use of technology in the lesson” under six different headings i.e. not evident, to present information, to demonstrate a student task, groupwork resources, visualizing or modeling a concept and grading, attendance, material presentation. According to the data (25%) of evidence was found where teachers use technology in lesson whereas (75%) failed to use technology; (75%) of teaching assistants used technology to present information while (25%) of them failed; (6.3%) of teaching assistants used technology to demonstrate the student task while (93.8%) failed; (21.9%) of teaching assistants used technology for groupwork resources while (78.1%) failed; (34.4%) of teaching assistants were using technology for visualizing or modeling a concept while (65.6%) were failed; and no one or (0%) of teaching assistants was found to use technology for grading, attendance and material presentations and (100%) were failed.

Conclusion

The current study highlighted the impact of in-house technology training and focused on effective use of technology in classroom teaching. In the light of the data collected through feedback form it is concluded that majority of TAs found themselves at lowest level (Poor) regarding level of skills at start of the course before attending the training session whereas, after attending in-house technology training sessions TAs ranked themselves at higher level (very good) regarding level of skills at the end of course and acknowledged that technology training course contributed in their learning and developing their skills/ knowledge (refer Table No.1) Likewise, ‘course effectiveness’ was also ranked at highest level (refer to Table No.2). It verified that in-house technology training remained effective for TAs to acquire technological skills that are useful for teaching practice. The recommendations of Irum, Munshi, Bhatti, and Jawad Awan, (2018) are aligned with the results of current study that teacher educators must provide facilities for effective use of technology specifically technology related trainings that enhance their technology skills and its integration in pedagogy.

The data collected through observation checklist to examine how acquired skills/knowledge/ technology is integrated in formal classroom teaching by the TAs after receiving technology training. The results showed that TAs were at high level in “pedagogical approaches” in classroom teaching (refer to Table No.3) while found at low level in “teacher use of technology in the lesson” (refer to Table No.4). Rehman et. al., (2018) revealed the same results that tutors had less knowledge for technology that enhance the teaching and learning approaches for a lesson and displayed poor skills and techniques to incorporate technology with content and pedagogy. A study conducted by (Sarhandi et. al., 2016) depicted the same results that participants being qualified in pedagogy, they were unable to incorporate technology effectively in their teaching. The failure partially occurred due to apparent misunderstanding of confusing the knowledge of an application and use of that application with pedagogical use, and partially due to lack of concrete guidance by the administration on what and how to integrate technology in regular teaching.

Above findings indicated that though majority of TAs were found at lower level (poor) in technology related skills before attending in-house technology training but after receiving training an encouraging ratio of TAs developed these skills at level of (good).

This showed that it is not a simple task to acquire all technological skills at once and implement all in sudden rather it needs continuous trainings and practice. The same idea was portrayed by (Sarhandi et. al., 2016; Sulaimani et. al., 2017) that use of digital tools in teaching effectively has never been an easy task for teachers around the world. Furthermore, technology related training for one time is not sufficient to enhance technology related skills for teaching instead teachers must provide training opportunities time to time to keep them updated. Similarly, the findings of the studies (Beriswill et. al., 2016 and Bob, 2010) exhibited that educators require professional development opportunities frequently to transform traditional teaching methodologies with technology-based strategies in pedagogy.

From the above discussion this is concluded that technology training is necessary factor to enhance technological skills of teaching assistants and at the same time these trainings helped TAs to integrate technology effectively in their classroom teaching.

Recommendations

This study recommended that comprehensive technology related professional development programs be planned and executed regularly for enhancing teachers' technology related competencies.

The population of current study was limited to the context of Shah Abdul Latif University, Khairpur. This study recommended that future research be conducted by extending sample size and population to make the results more generalizable.

This study focused on technology training and its integration in teaching, an extensive study therefore required to be conducted on technology integration in various dimensions of education.

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