AN INVESTIGATION INTO TEACHER EDUCATORS' TECHNOLOGY ANXIETY

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Abstract

The main purpose of the study is to examine the level of technology anxiety of teacher educators of Education Degree Colleges within the academic year 2022-2023. The specific objectives are to find out technology anxiety of teacher educators in terms of the level of educational qualification, teaching service and time to study online teaching-learning resources daily. Quantitative survey research method was used in this study. The samples are 236 teacher educators (20% of population) from Education Degree Colleges (EDCs) by using stratified random sampling method. The instrument used in this study was the questionnaire. The descriptive statistical analysis and inferential statistical analysis (independent samples *t* test and ANOVA) were employed to analyze the data. According to the results, the majority of the teacher educators falls under the high technology anxiety level. There was no significant difference of technology anxiety in educational qualification. There were significant differences in technology anxiety with regard to teaching service and time to study online teaching-learning resources daily. A key contribution of the current study is to enlighten the teacher educators about the hardware, software and technical issues to realize the effectiveness of the educational technology and feel assertive using it. Moreover, this study is invaluable as it allows teacher educators to see the weaknesses and needs to minimize their technology anxiety.

Keywords: Technology, Anxiety, Technology Anxiety, Educational Technology, Educational Technology Anxiety

Introduction

Modern day is the age of science and technology. The world of today is very dynamic. There have been enormous changes in the life style of human beings which may be attributed to the contribution of science and technology. The contribution of science and technology has been accomplished in almost all the spheres of human life including education. The word 'technology' antiquated taken from the Greek word 'techniques' which means an art and which is related with skill and dexterity. Educational technology as 'the development of as set of systematic techniques and accompanying practical knowledge for designing, testing and operating schools as educational systems' (Gagne, 1988). It has become an increasingly ultimate objective for improving the teaching and learning process of students.

Statement of the Problem

Organizations face changes more extensive and far reaching in implications than anything since the modern industrial revolution occurred in the early 1900s (Phillips, 2008). Technology is one of the central forces driving these changes. Organizations that want to survive in the 21st century must recognize the tremendous force of technology, carry out required organizational changes in the face of it, and learn to operate in an entirely different way.

The end of the last millennium was marked by rapid technological advancement and very great changes in many aspects of human activities, often referred to as indicative of the world moving into the knowledge age. Such changes have energenized much discussion about the role and processes of education as well as the role of information and communication technology (ICT) in teaching and learning in the new era.

The work of teachers changes because expectations of schools should achieve change. Normally, shifts are gradual and accumulative. Many of the commentators upon teachers and

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teaching, particularly those in the mass media, hold a simplistic view of teaching as a process of transmission. However, while the past change in education has been comparatively slow, at the same time social, economic, cultural and technological change in the community has been moving at considerable speed.

The present-day leaner community is tech savvy and spent huge amount of time engaged with electronic devices especially in internet. The magical world, 'internet', is able to supply any information as the consumer wish. In teaching-learning process both teacher and students have equal role to produce a fruitful result (Ajithkumar, 2017). Students prefer learning in multiple ways and modern devices and internet are inseparable to learning culture. But it is sad to say, still many teachers fail to organize technical rich classroom learning activities.

The world today is demanding skills and competencies that enable any individual to be skillful and perform at workplaces and at places of living. According to the report of Myanmar Comprehensive Education Sector Review (CESR) Series (1), the priority is to improve teachers' quality for promoting Teacher Education Department in line with the international level. Therefore, analyzing the use of ICT is one of the Continuous Professional Development (CPD) programs for teachers. In the present study, the anxiety of teacher educators regarding ICT has to be subjected to research.

Purpose of the Study

The main purpose of this study is to examine the level of teacher educators' technology anxiety of Education Degree Colleges. The specific objectives are:

1. To measure mean values of technology anxiety of teacher educators based on their level of educational qualification, teaching service and time to study online teaching-learning resources daily
2. To find out the differences in technology anxiety of teacher educators by their level of educational qualification, teaching service and time to study online teaching-learning resources daily
3. To make suggestions and recommendations for stakeholders of Education Degree Colleges based on the findings of the study

Research Questions

1. To what degree do teacher educators feel anxious about technology anxiety while using technology for teaching-learning?
2. How do teacher educators feel anxious about technology anxiety by their level of educational qualification, teaching service and time to study online teaching-learning resources daily?
3. Are there any significant differences in the teacher educators' technology anxiety about educational technologies in terms of their time to study online teaching-learning resources daily, their teaching service and their educational qualification?

Scope of the Study

The following points indicate the scope of the study.

(1) The study is geographically restricted to four Regions: Ayeyarwady, Yangon, Magway and Sagaing.

(2) The participants in the study are teacher educators from selected Education Degree Colleges within the academic year 2022-2023.

Definition of Key Terms

Technology: It was defined as "high-tech media utilized in instruction such as computers, e-mail, Internet, CDROMs, software, laser disc players, interactive CDs, digital cameras, scanners, digital camcorders, etc." (Othman & Maat, 2020).

Anxiety: It is "an unpleasant emotional state or condition which is characterized by subjective feelings of tension, apprehension, and worry, and by activation or arousal of the automatic nervous system" (Spielberger, 1972).

Technology Anxiety: It is a negative emotional state or a negative cognition experienced by an individual when he/she uses technology or technology equipment (Bozionelos, 2001).

Educational Technology: It is a combination of the processes and tools involved in addressing educational needs and problems, with an emphasis on applying the most current tools: computers and their related technologies (Roblyer & Edwards, 2000).

Educational Technology Anxiety: It is defined as a person's prejudices or fears about utilizing instructional technology or thinking about the outcomes of using instructional technology (Marcoulides, 1989).

Significance of the Study

This study is significant in many ways. First, pedagogues would also benefit from the study as the status of their anxiety about technology used. Second, study will be able to give out things that cause technology anxiety. This would inform the barriers and needs for weaknesses of ICT technology. Third, most studies described years of teaching experiences; however, this study analyses the differences among means of technology anxiety based on not only educational qualification but also time to study online teaching-learning resources daily. Finally, the findings of the study will be supported as a reference source for inspiration further studies on the teacher educators' anxiety regarding technology.

Review of Related Literature

Education has evolved as the result of technology. When integrating technology into the teaching and learning environment, it is vital to consider the developmental stage of the learner, human development from a cognitive perspective (based on the work of Piaget), (Thompson, 2019).

Cognitive Theories of Learning

In the 1960s, cognitive theories of learning gradually started to replace Behaviorism as a predominant view. Cognitive theorists claim that observable behaviors are not sufficient to descry learning because the internal thought processes are also part of learning. The cognitive perspective was massively influenced by the development of computer technology and telecommunications, and use the computer as a metaphor to understand what is happening in the human mind.

Information Processing

One of the early cognitive theories of learning and memory was Information Processing Theory of Atkinson and Schiffrin (1968). This theory considers the mind as a computer that receives inputs and performs processing activities on those inputs, alike to the way a computer

processes data. In this view there are three buckets: seeing, hearing, smelling. It starts in the sensory register known as memory stores.

Cognitive Theory of Multimedia Learning

Richard Mayer's Cognitive Theory of Multimedia Learning is a particularly useful theory for educational technologists because it endeavours to offer some prescriptive advice for designing media for learning. This theory suggests three main assumptions when it comes to learning with multimedia: there are two separate channels (auditory and visual) for processing information, each channel has a limited (finite) capacity, learning is an active process of filtering, selecting, organizing and integrating information based upon preceding knowledge.

Implications of Constructivism

Using technologies as constructivist tools is assumed that conceptions of education will change, that schools or classrooms will reform the educational process. In order for students to learn with technology, teachers must accept and learn a new model of learning. The teachers' roles transfer from dispensing knowledge to helping learners construct more viable conceptions of the world.

Philosophical Basis of Educational Technology

The works of Psychologists such as B.F. Skinner, Pressey and Watson greatly influenced the method and practice of educational technology (Ouyang & Stanley, 2014). The works of B.F. Skinner in the production of the teaching machines led to massive involvement of educational technologists in the production of more modern teaching machines. The instructional format used in teaching machines became appeared as programmed instruction (PI), and this new technology became a popular subject of educational research and development by the late 1950s.

Educational Technology

Educational technology can be identified as a complex, integrated process involving people, procedures, ideas, devices, and organization, for analyzing problems and devising, implementing, evaluating, and managing solutions to those problems, involved in all aspects of human learning (Force, 1977, as cited in Roblyer & Edwards, 2000).

Saettler (1990) urges the seeking precision to remember that "the historical function of educational technology is a process rather than a product. In accordance with specialists, educational technology can be explained by looking at the two major components of the concept "Technology in Education" and "Technology of Education".

Use of Technology in Education

A history of technology in education since 1920 placed the emphasis on radio and television, with computers as an afterthought (Cuban, 1986).

Technology in education is denoted application of machines, gadgets or equipment to improve the quality of education. It is "hardware" approach to educational technology. It means utilizing devices like computers, laptops and mobile phones for providing education. It involves the use of pieces of instructional materials: audio media, visual media, audio-visual media, broadcast / telecommunication media, projected media.

Use of Technology of Education

Technology of education relates to application of theories and laws/rules in education and related disciplines for the purpose of enhancing the quality of education. It is techniques and methodologies of the teaching learning process. This is certainly the software aspect of educational technology.

Differences between Technology in Education and Technology of Education

Technology in education, its origin lies in the application of physical sciences or engineering to education (Khin Zaw, 2001). It is related to teaching aids. Skilled personnel in hardware technology are needed. It is called relative technology.

Technology of education based on child psychology (age, ability and mental level). Its origination lies in the application of behavioral sciences to the problems. The use of this approach does not have need of the skilled personnel as in hardware technology. It is called constructive educational technology.

Anxiety

Anxiety can be expressed as an unpleasant emotional state which makes individuals feel weak and powerless when confronted with danger or threat (Aydın & Zengin, 2008).

Although computer-assisted instruction holds an important place in educational settings, not all teachers are capable enough to benefit from technology due to their anxiety (Rahimi & Yadollahi, 2011). Teachers who do not keep up with the latest educational technologies: talking motion pictures, overhead projectors and cell phones will almost certainly fall behind, and unfortunately, stay behind (Schmidt, Baran, Thompson, Mishra, Koehler, & Shin, 2009).

Educational Technology Anxiety

Educational technology anxiety can be defined as a person's prejudices or fears about utilizing instructional technology or thinking about the outcomes of using instructional technology (Marcoulides, 1989), or as teachers' discomfort, nervousness, and fear of dealing with ICT instruments, as well as uneasiness in anticipation of unfavorable outcomes from computer-related operations (Chang, 2005).

Hardware Approach

The hardware approach relates to the use of machines and other mechanical devices in the educational process. It adopts a product-oriented approach. It based on the concept of service, such as using technology in education (Silverman 1968, as cited in Jonassen, Howland, Moore, & Marra, 2003). While teaching in a big hall, a teacher uses a microphone for making voice audible, it may be said to approach such type of education technology for making teaching effective.

Software Approach

Software approach is characterized by task analysis, writing precise objectives in behavioral terms, selection of appropriate learning strategies, immediate reinforcement of responses and constant evaluation. It tries to adopt a process-oriented technique for production of suitable teaching-learning material, teaching-learning strategies, and evaluating techniques for the optimum results in the process of teaching and learning.

Research Method

Research Design

The present study intended to collect data regarding technology anxiety of teacher educators. The method selected for the study was one of the quantitative research approaches, survey research.

Instrument

The instrument using in this study was the questionnaire (Aruna & Kumar, 2015, as cited in Ajithkumar, 2017) for investigating teacher educators' technology anxiety. The inventory included three parts. Each dimension contains seven items. All items are composed of five-point Likert scale. The questionnaire is validated by eight experienced teacher educators of Department of Curriculum and Methodology, Yangon University of Education, 2022. Some items were revised for clarification and to avoid misunderstanding. Pilot study is conducted with the sample of 39 teacher educators from Education Degree College. The internal consistency of technology anxiety inventory was (0.93) by using Cronbach's Alpha and the main study was carried out in November, 2022.

Population and Sample Size

There are two strata: upper and lower, and 25 Education Degree Colleges (EDCs) in Myanmar. The total number of populations are 1179 (Male =164, Female =1015) teacher educators in teaching of 25 EDCs. For this study, the total number of participants is (N=236, 51% of upper and 49% of lower) from Education Degree Colleges. The samples in this study are teacher educators and selected by using stratified random sampling method. The number of participants is described in the following Table 1.

Table 1. Population and Sample Size

No.	Strata	No. of Education Degree Colleges	No. of Population	No. of selected Education Degree Colleges	Sample
1	Upper	13	598	2	120 (51%)
2	Lower	12	581	2	116 (49%)
Total		25	1179	4	236 (20% of population)

Note: EDC= Education Degree College

Data Analysis

In order to analyze the data collected, the descriptive and inferential statistical analysis were employed to answer the research questions. Descriptive statistics: mean, standard deviation and frequency; and inferential statistical analysis: independent samples *t* test and ANOVA were employed to find teacher educators' technology anxiety.

Findings

Frequency and percentage of teacher educators' technology anxiety level were shown in Table 2 and Figure 1.

Table 2. Frequency and Percentage of Teacher Educators' Technology Anxiety Levels at Education Degree Colleges (EDCs)

Technology Anxiety Level	Frequency	Percentage (%)
low	1	0.4
moderate	117	49.6
high	118	50.0

According to the result of Table 2, most of the teacher educators at EDCs clearly showed the high anxiety to technology.

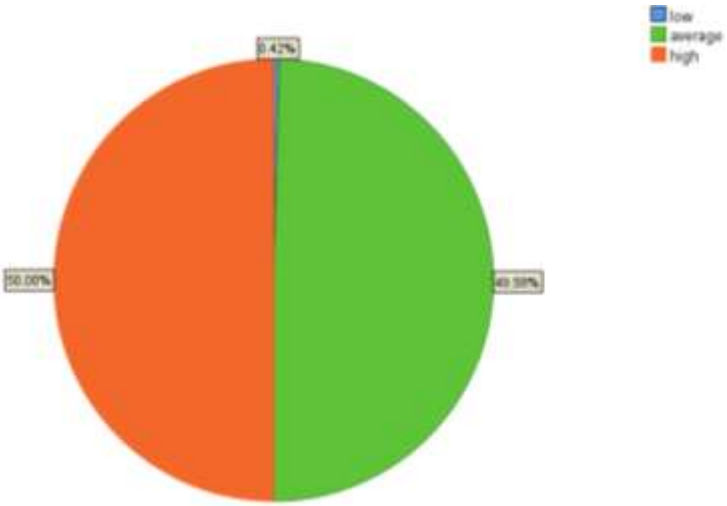

Figure 1. Percentages of Teacher Educators at EDCs by Technology Anxiety Level

As shown in Figure 1, most of the teacher educators at EDCs clearly showed the high anxiety to technology.

The following tables show findings for research question (2) and (3).

Table 3. Mean Values and Standard Deviations of Teacher Educators' Technology Anxiety Grouped by Teaching Service, N = 236

Variable	Teaching Service	No. of Teacher Educators	Mean	SD
Technology Anxiety	0-5 years	51	60.73	11.74
	6-10 years	55	58.29	13.95
	11-15 years	39	61.72	13.84
	16-20 years	44	64.41	14.69
	above 20 years	47	68.96	14.11

According to the result of Table 3, the teacher educators' group who experienced above 20 years teaching services (68.9574) had the highest technology anxiety level and the teacher educators' group who experienced 6-10 years teaching services (58.2909) had the lowest technology anxiety respectively by comparing mean values.

Table 4. One-Way ANOVA Results of Teacher Educators' Technology Anxiety Grouped by Teaching Service, N = 236

Variable	Teaching Service	Sum of Squares	*df*	Mean Square	*F*	*p*
Technology Anxiety	Between Groups	3273.858	4	818.465	4.385	.002**
	Within Groups	43115.951	231	186.649		
	Total	46389.809	235			

Note: **p<.01

According to Table 4, there was a significant difference between teacher educators grouped by Teaching Service.

Table 5. Results of Post Hoc Multiple Comparisons of Teacher Educators' Technology Anxiety Grouped by Teaching Service, N = 236

Variable	(I) Teaching Service	(J) Teaching Service	Mean Difference (I-J)	*p*
Technology Anxiety	above 20 years	0-5 years	8.23*	**.026***
	above 20 years	6-10 years	10.67*	**.001*****
	above 20 years	11-15 years	7.24	ns
	above 20 years	16-20 years	4.55	ns
	16-20 years	0-5 years	3.68	ns
	16-20 years	6-10 years	6.12	ns
	16-20 years	11-15 years	2.69	ns
	11-15 years	0-5 years	0.99	ns
	11-15 years	6-10 years	3.43	ns
	0-5 years	6-10 years	2.43	ns

Note: ***p<.001,*p<.05, ns = not significant

According to Table 5**,** the teacher educators' group who experienced above 20 years teaching services were higher in the level of technology anxiety than both of the teacher educators' group who experienced teaching services, 0-5 years and the teacher educators' group who experienced teaching services 6-10 years.

Table 6. Independent Samples *t* Test Results Showing Mean Values of Teacher Educators' Technology Anxiety Grouped by Educational Qualification N = 236

Variable	Educational Qualification	No. of Teacher Educators	Mean	SD	*t*	*df*	*p*
Technology Anxiety	Bachelor	73	65.3151	14.30800	1.963	234	ns
	Master	163	61.4540	13.81054			

Note: ns = not significant

According to Table 6, there was no significant difference between the teacher educators grouped by Educational Qualification.

Table 7. Mean Values and Standard Deviations of Teacher Educators' Technology Anxiety Grouped by Time to Study Daily Online Teaching-Learning Resources, N = 236

Variable	Time to study daily online teaching-learning resources	No. of Teacher Educators	Mean	SD
Technology Anxiety	not study daily	49	67.0612	15.83431
	15min-1hour	116	61.7672	12.54374
	above1hr-3 hours	37	58.9730	15.16847
	3hours and above	34	63.2941	13.94693

According to the mean values of Table 7, the teacher educators' group who do not study online teaching-learning resources daily had the highest technology anxiety level and the teacher educators' group who study online teaching-learning resources for above 1hr-3hours daily had the lowest technology anxiety level.

Table 8. One-Way ANOVA Results of Teacher Educators' Technology Anxiety Grouped by Time to study daily online teaching-learning resources, N=236

Variable	Time to study daily online teaching-learning resources	Sum of Squares	*df*	Mean Square	*F*	*p*
Technology Anxiety	Between Groups	1558.246	3	519.415	2.688	.047*
	Within Groups	44831.564	232	193.239		
	Total	46389.809	235			

Note: *p<.05

According to Table 8, there was a statistically significant difference between the teacher educators grouped by Time to study daily online teaching-learning resources.

Table 9. Results of Post Hoc Multiple Comparisons of Teacher Educators' Technology Anxiety Grouped by Time to study daily online teaching-learning resources, N=236

Variable	(I) Time to study daily online teaching-learning resources	(J) Time to study daily online teaching-learning resources	Mean Difference (I-J)	*p*
Technology Anxiety	not study daily	above 1hr-3hours	8.08825*	**.040***
	not study daily	15min-1hour	5.29398	ns
	not study daily	3hours and above	3.76711	ns
	15min-1hour	above 1hr-3hours	2.79427	ns
	3hours and above	15min-1hour	1.52688	ns
	3hours and above	above 1hr-3hours	4.32114	ns

Note: *p<.05, ns = not significant

According to Table 9, the group of teacher educators who do not study online teaching-learning resources daily was higher in the technology anxiety level than the group of teacher educators who do study online teaching-learning resources for above 1hr-3hours daily. However, no significant differences were found between the study groups daily.

Discussion

The study surveyed the anxiety of teacher educators while they employed technology in teaching. This present study highlighted inadequate consideration of technology in education and technology of education, allied communities of educational technology.

The teacher educators were grouped into three groups based on the scores obtained namely low technology anxiety, average technology anxiety and high technology anxiety. According to the results, 50 % of teacher educators had high technology anxiety among the participants selected for the study. Therefore, majority of the teacher educators falls under high technology anxiety group. It is expressed that teacher educators suffer from technology anxiety due to technical concerns. As continuous changing and upgrading of technology usually require newer and higher level of skills and knowledge (Rosen & Weil, 2000), the respondents felt that this resulted in added pressure. However, organization can help reduce the technology anxiety by providing good training, continuous learning and good technical and organizational support (Ajithkumar, 2017).

Another discussion in the study is that there is no significant difference of Technology anxiety in educational qualification. This means that teacher educators' technology anxiety is irrespective of the level of education. This finding is in line with (Kagizmali, Tatar & Zengin, 2013) who revealed that there was no significant difference in teacher educators' Technology anxiety according to the level of education. However, this finding is different from the study of (Erdogan & Sahin, 2010). They showed that there were significant differences in Technology anxiety of primary and secondary mathematics teachers. This might happen due to the fact that the difference between teacher educators and school teachers.

Moreover, the results of the current study show that there is a significant difference of time to study daily online teaching-learning resources on Technology anxiety. The group of teacher educators who do not study online teaching-learning resources daily was significantly highest level of technology anxiety by comparing mean scores. It is observed that teacher educators also suffer from technology anxiety due to the amount of time using technology and technical issues. This finding is also due to the fact that the technology has made their tasks more complex and they needed more time, not only to understand and use the technology, but to upgrade their technological skills (Awofala, Olabiyi, Awofala, Arigbabu, Fatade & Udeani, 2019). Teacher educators who have computer skills, computer literacy, application, and positive attitudes toward computers and network use are less anxious. Besides, technology-supported environments lessen teacher educators' anxiety.

The last discussion prevailed from the study is that there is a significant effect of teaching service on Technology anxiety. The study revealed that the teacher educators' group who experience 6-10 years teaching had the lowest technology anxiety level. This result is consistent with the exponential increase of teachers' functions affects the appearance of anxiety, especially in older people (Hassan, Yaakob, Halif, Aziz, Majid, & Sumardi, 2019). It is indicated that young teacher educators perceive that technology is unavoidable with regard to the whole teacher community in present day, moreover, online learning and the utilization of mobile devices are also

effective for lowering anxiety. On the other hand, the aged teacher educators hesitate to use technology in educational practices and have the desire to use classic teaching methods in their teaching-learning process.

Suggestions

According to the findings of the study, the following suggestions for responsible persons of Teacher Education, administrators and teacher educators are outlined.

1. The responsible persons should provide technical support, resources and access to learn how to apply technology for new curriculum and continuous professional development of teacher education through providing training courses.
2. The responsible persons should support to get internet access and sufficient technology facilities in the Campus.
3. The responsible persons should bring down the technology anxiety of teacher educators by providing hands on experience.
4. The administrators should supply teacher educators with knowledge of ICT through training courses from the beginner to the advanced stage like Lesson Study regularly.
5. The administrators should encourage teacher educators to create ICT-based lessons.
6. The teacher educators should employ theoretical and practical knowledge in educational technology.
7. The teacher educators need to keep in touch with modern teaching devices and regular practice in web-based technology.

Recommendations

1. The participants participated in this study are teacher educators at Education Degree Colleges. Sample EDCs, Department of Teacher Education were randomly selected. The only questionnaire survey method was used to investigate the status of teacher educators' Technology anxiety in this study.
2. A key contribution of the current study is to enlighten the teacher educators about the hardware, software and technical issues to realize the effectiveness of the educational technology and feel assertive using it.
3. In addition, it could also be fruitful to explore the technology anxiety of teacher educators who study online teaching-learning resources daily. This result is a strong and encouraging evidence, especially for these teacher educators who can be anticipated to a certain extent to have lower level of technology anxiety.
4. For further study, it is needed to examine the level of Technology anxiety of teachers at the Basic Education and Higher Education Sectors.
5. In the future, it is necessary to explore reasons and challenges of the teacher educators' technology anxiety and educational technology.

Conclusion

In the past few years, educational technology has become critical in education as well as in the professional growth of teachers. Moreover, teacher education is a delicate and deep process, and it is very important for teacher educators to continue their professional development. It is crucial role to carry out the development of teacher education to produce qualified teachers.

From the findings of the study, teacher educators need to take into account not only technology in education but also technology of education to reduce their technology anxiety. Therefore, this study is invaluable as it allows teacher educators to see the weaknesses and needs to minimize their technology anxiety.

In conclusion, the administrators, educators, specialists and those who are involved in the educational organization should take into consideration for reducing and overcoming technology

anxiety of teacher educators. Therefore, continuous improvement programs must be conducted regularly in line with new curriculum and today demands for teacher educators.

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