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APPLICATION OF MODERN TECHNOLOGY INTO THE CLASSROOM TEACHING-LEARNING PROCESS BY THE IN-SERVICE GRADUATE TEACHERS IN SRI LANKA

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Abstract:
Sri Lankan school system heavily depends on the government school system with the free education from primary school to university level (only for undergraduate level). By the end of the year 2016, the total number of government teachers in Sri Lanka was 232,555 and they were divided into several categories as graduate teachers (99,724), trained teachers (127,857), untrained teachers (2,426), trainee teachers (1887) and other teachers (661). The Ministry of Education is trying to promote modern technology in Sri Lankan education system in many ways. The objectives of the study were to check the gender wise in-service graduate teachers' qualifications with regard to modern technology, find out gender wise graduate teachers' resources related to modern technology, investigate the practical use of modern technology for classroom teaching-learning process and look into the possible challenges which may rise when in-service graduate teachers implement modern technology into classroom teaching. Data was collected by a questionnaire (whole sample 558 graduate teachers) and a semi structure interview schedule (10% of the total sample 56). Data was analyzed by using both methods qualitative (descriptive) and quantitative (percentages). Majority of the graduate teachers had followed at least one computer training programme. Majority of the teachers expressed their willingness to follow a computer course. Majority of the teachers possessed a mobile phone which could access the Internet. In addition to this many of them had own laptop or desktop. Majority of the graduate teachers used the Internet from home. Many teachers had used radio/ cassette recorders as modern technical devices. Many teachers said that they have electricity (87%) and computers (52%) in their schools. Even though, majority of the teachers said that, they were not given the phone (61%) or the Internet facilities (67%) from school. Following recommendations were made for the study; in-service graduate teachers should be given more opportunities and facilities for computer training, graduate teachers should be encouraged to use available modern technical devices for the classroom and they should be given necessary training to use them appropriately, teachers should be given more opportunities to use the Internet in schools.

Keywords: modern technology, teaching-Learning process, graduate teachers in Sri Lanka

1. Introduction

Sri Lankan school system heavily depends on government school system with the free education from primary school to university level (Only for undergraduate level). In addition to this, rapidly growing private and international schools also can be seen in Sri Lanka. By 2016 there were 10,162 government schools and they were categorized as 1AB Schools (1016), 1C Schools (1805), Type 2 Schools (3408) and Type 3 Schools (3933) (Basic Information in Government Schools-2016). According to the Gazette (No.1985/38) Extraordinary of the Democratic Socialist Republic of Sri Lanka dated on 23rd October, 2014, Sri Lanka Teachers' Service had been categorized into three classes as Class 1, Class 2 and Class 3, as well as Class 2 & 3 further can be divided into sub grades as Class 3- Grade II, Class 3- Grade I (c), Class 3- Grade I (b), Class 3- Grade I (a) and Class 2- Grade II, Class 2- Grade I. In the same gazette General responsibilities of the service are mentioned as follows "*The teachers should perform the activities of implementing the learning – teaching process in government schools, activities related to conducting examinations and evaluation at national level and others, subject parallel activities of schools and the activities decided to be implemented at school level with regard to the education process by the Government in order to create citizens with sheer partialities through a higher quality education according to the National Education policy*."

By the end of the year 2016, the total number of government teachers in Sri Lanka was 232,555 and they were divided into several categories as graduate teachers (99,724), trained teachers (127,857), untrained teachers (2,426), trainee teachers (1887) and other teachers (661). Ministry of Education is trying to promote modern technology in Sri Lankan education system in many ways; by providing necessary facilities and equipment, for instance, the internet facilities (school net) and computers (labs) for schools, teacher training programmes (computer training - ICDL), Nenasa Education television telecast from 2005 (for eleven subjects). The National E-learning Portal for the General Education or e-thaksalawa (e-library/past question papers/new syllabus-subject contain for all the grades/entertainment-songs and educational games) which is available in the official website of the Ministry of Education, with the computer technology and e-learning projects a Digital Learning Experience Centre had been established in the Ministry of Education of the Sri Lanka aiming to empower the school community (children and teachers) with new technology. It has conducted demonstration programs on how to teach a lesson in a classroom using new devices. The Ministry of Education has done a lot of things to promote modern technology within the Sri Lankan school system but yet many challenges will have to be faced in the future.

2. Literature review

Educational technology is playing an important role in the classroom teaching-learning process in all the fields. As Lukaš (2014) mentioned rapid development and lack of monopoly in the technology field have resulted in a sudden price reduction of the informatics goods. As a result, technology can be used in all segments of a human life. The Centre technologies- Houston (2015) has identified ten benefits of technology in the classroom application.

First one is instructors: they can Personalize the Education Experience, the second one is Instant Access to Knowledge, the third one is Student Preference, the fourth one is Student Workplace Readiness, the fifth one is Trend toward Blended Learning Environment, the sixth one is Teacher Support, the seventh one is Proven Student Engagement, the eighth one is Tools are improving at an Alarming Rate, the ninth one is Website Creation and Access are Cost-Effective, and tenth one is the Teaching Industry is Ready for Emerging Technology. But to acquire such benefits both teachers and students need to have relevant tools and facilities and they should utilize them appropriately.

Lukaš (2014) said that "*integrating technology in a classroom and educational process does not imply only to equip classrooms and offices with modern technological equipment, but also to improve and readjust the curriculum in order to fully use the available IT tools. Using technology in a classroom must be efficient, transparent and simple*". Furthermore, it says adjustment should be done in the curriculum also in order to refocus on the development of technological skills of the teachers and students. According to the Klopfer at al. (2009), the evolution of digital games and the emergence of social networking technologies are more than just entertainment. They are being shown the tremendous potential they have to impact the way we think, learn and interact. The term "Gamification" is being used to indicate that how students learn by playing games.

Murati & Ceka (2017) said today's children are using an Information and Communication Technology (ICT) and digital tools at a very young age as well all the professionals need to have sound knowledge in information technology. Furthermore, they said "*computer skills and additional equipment are needed, because they create great opportunities for teachers and inspire curiosity, imagination and interest of student*". So that integrating modern technology into classroom teaching-learning process is a need of the time. When attention is focuses on the Sri Lankan educational context, it has good potential human resources (teachers) quantitatively and qualitatively around the country. The following Table 1 shows the provincial wise student teacher ratio according to the teachers' categories.

Table 1: Student teacher ratio by the category of teachers

Province	Student/Graduate teacher ratio	Student/Trained teacher ratio	Student/Untrained teacher ratio	Overall teacher ratio
Western	40	48	2901	22
Central	42	28	478	16
Southern	41	33	1676	18
Northern	39	25	340	15
Eastern	55	30	1008	19
North Western	43	32	1139	18
North Central	41	30	1304	17
Uva	38	26	283	15
Sabaragamuwa	37	29	972	16
Sri Lanka	42	32	833	18

Source: School Census Preliminary Reports 2016

According to the above table, highest overall teacher ratio is 22 at the Western province and the lowest ratio 15 at the Northern and Uva provinces. Even though student/ graduate teacher ratio is higher than the overall ratio, a significant difference can be seen among the provinces; for instance highest student/graduate teacher ratio is 55 at the Eastern province and the lowest ratio is 37 at Sabaragamuwa province. The teachers were given opportunities to take part in training programmes in Computer and ICT. For example International Computer Driving License (ICDL) certificate and a teacher Training on Java Language (First batch in 2014) for ICT teachers (www.cssl.lk). In addition to this the Ministry of Education has taken various measures to provide Facilities (School net) and equipment (computers) to promote modern technology among the schools for example planning the establishment of 1,000 Mahindodaya Technological Laboratories (Education First, 2013). However still there is a lot of challenges to overcome. As Liyange (2014) mentioned some reasons for the snail's pace progress of Educational technology in Sri Lanka - "*poor socio-economic situation, shortcomings of co-ordination, lack of connectivity and failure to make an impact by the developments in this area*" . Furthermore, he said "*Relatively short life-span of most hardware and software and rapidly evolving communication technologies have made decision making on ICT investment quite challenging*". Three main phases was introduced by the Liyange (2014) to transfer the conventional education system into a technology enhanced education; namely first phase - Limited Technology Phase, Second phase - Moderate Technology Phase and third phase Complete Technology phase. According to him, Sri Lankan education system is still in the Limited Technology Phase.

3. Objectives

1. Inquire into gender wise in-service graduate teachers' qualifications with regard to modern technology;
2. Find out gender wise graduate teachers' resources related to modern technology;
3. Investigate the practical use of the modern technology for classroom teaching-learning process;

4. Inquire into the possible challenges which will arise when in-service graduate teachers implement the modern technology into the classroom teaching.

4. Significant of the study

As was mentioned in the introduction and the literature review it is very important to use modern technology for the classroom teaching - learning process. The Ministry of Education in Sri Lanka has been trying to promote modern technology among the government schools by providing necessary facilities and teacher training. Even though, Sri Lanka is still in the Limited Technology Phase Sri Lanka should move towards the Moderate Technology Phase. So it is important to find out how far it has been successfully activated within the education system and to recognize the hindering factors and underlying possible reasons. Finally to make suggestions to overcome possible hindering factors which exist when applying modern technology more effectively to the classroom teaching – learning process.

5. Research methodology

5.1 Sample

This research focuses only on the government school system as the Sri Lankan school system is heavily dependent on government schools as well for the convenience of the researcher. Population of the study was in-service graduate teachers of the Sri Lanka teachers' service. The sample of the study was in-service graduate teachers who had been randomly selected from the government schools in six (6) districts in Sri Lanka. Namely, Ambalantota, Galle, Ambalangada, Ampara, Gampaha, and Bandarawela. Sri Lanka has 9 provinces and 25 districts (coins.lakdiva.com). Schools were selected using stratified random sampling method by a list of schools available in the Internet (Wikipedia.org, 2007). Stratification was done according to the status of the schools. Two percent of schools from each type were selected for the research according to the state schools mentioned in the 2016 school census preliminary report. The following table shows the status of the Sri Lankan state schools in two different years (statistics selected only from year 2008).

Table 2: Number of government schools by the status in the year 1997 and 2008

According to the status of the school (type of schools)	No. of schools in 1997	Percentages for the year 1997 (%)	No. of schools in 2008	Percentages for the year 2008 (%)
1AB	590	6	697	7
1C	1867	18.	1937	20
Type 2	3744	36.	4166	43
Type 3	4157	40.	2861	30

Source: School Census Preliminary Reports (2016)

The following Table 3 shows the summary of the sample of this research. Three graduate teachers were selected from each school and ten percent (10%) of the total sample was interviewed. 1AB schools- G.C.E. (A/L) science or/and maths subjects stream should available. 1C school – G.C.E (A/L) Arts or/and commerce subjects stream should be available. Type 2 and type 3 schools- G.C.E. (A/L) subjects streams are not available (G.C.E (O/L) subjects streams and/or below)

Table 3: Selected sample of schools and graduate teachers

School types	No. of selected schools (2% from 2008) (Island wide)	Selected schools from each district (6 districts)	No. of graduate teachers selected from six district (three teachers from each school)	No. of graduate teachers selected for the interview
1AB	2/100x 0697 = 14	14/6=2.33 -**02**	2x6x3 = **36**	10/100x36=3.6- **04**
1C	2/100x 1937 = 39	39/6=6.5 -**06**	6x6x3 = **108**	10/100x108=10.8- **11**
Type 2	2/100x 4166 = 83	83/6=13.83 -**14**	14x6x3 = **252**	10/100x252=25.2- **25**
Type 3	2/100x 2861 = 57	57/6=9.5 -**09**	9x6x3 = **162**	10/100x162=16.2- **16**
Total		-**31**	**558**	**56**

5.2 Data collection instruments

Major data collection instrument was a questionnaire. The questionnaire was given to the whole sample (558 graduate teachers). In addition to this semi structure interview schedule was also used to conduct interviews for the 10% of the total sample (10/100x558=**56**).

5.3 Data analysis

Data was analyzed by using both methods qualitative (Descriptive) and quantitative (percentages)

6. Findings and conclusions

Findings had been presented according to the objectives. The data was analyzed gender wise (male and female). It is clear that majority of the random sample was female because majority of the Sri Lanka Teachers' Service was female. In year 2009 male graduate teachers – 62484 (29%) and female graduate teachers – 153479 (71%) were in Sri Lanka Teachers' Service (Kelleher 2011)

6.1. Investigation of gender wise in-service graduate teachers' qualifications with regard to the modern technology

Table 4: Computer Training programme

Male								Female							
Followed		Not Followed		Not responded		Total		Followed		Not Followed		Not responded		Total	
No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
78	49%	50	31%	31	20%	159	100%	298	74%	38	10%	63	16%	399	100%

Above Table 4 shows the gender wise graduate teachers' computer training programmes. Majority of the graduate teachers had followed at least one computer training programme (male - 49% and female – 74%), even though, there were a considerable amount of teachers (male – 31% and female – 10%) who had not followed a computer training programme. In addition to this, a considerable amount of non-responses could be seen (male – 20% and female – 16%)

Table 5: Willingness to follow a computer course

Male								Female							
Willing		Not willing		Not responded		Total		Willing		Not willing		Not responded		Total	
No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
102	64%	12	08%	45	28%	159	100%	211	53%	56	14%	132	33%	399	100%

Table 5 explains about the willingness of the graduate teachers to follow a computer course. Majority of the teachers expressed their willingness (male – 64% and Female 53%) to follow a computer course. A considerable amount of teachers did not respond to this question (male – 28% and female – 33%). Male teachers' willingness is high than the female teachers. Reasons were found out by the interview why teachers are willing to follow a computer course. These are the reasons found out by the interview; to expand knowledge and skills further (Acquire latest technical knowledge), as many activities/functions can be done more easily with the computers, to be successful in personal studies and professional life, and willingness to use/teach with latest technology, to use as a refresher course, and to move forward with the modern world. Reasons found out by the interview why teachers are not-willing to follow a computer course; being busy with the official and personal life/limited time and some do believe that they may not receive any economic value for the time they spend on such courses.

6.2. Find out the available resources of the graduate teachers related to the modern technology

Table 6: Ways of obtaining Laptop, Desktop and Mobile phone (devices)

Different ways	Male		Female	
	No.	%	No.	%
Own Laptop/desktop	80	50%	312	78%
Own tab/Mobile phone	159	100%	380	95%
Relatives/friends Device/s	2	1%	25	6%
School/Institute Device/s	25	16%	75	19%

According to the Table 6 Majority of the teachers (male – 100% and female – 95%) have own mobile phones which can be accessed the Internet. In addition to this many of them have own laptop or desktop (male – 50% and female – 78%). Some teachers have mentioned using more than one device and different devices in different ways.

Table 7: Sources of obtaining the Internet facilities

Sources	Male		Female	
	No.	Percentage %	No.	Percentage %
Home	104	65%	285	71%
School	18	11%	40	10%
Internet café	12	8%	15	4%
Other	6	4%	12	3%
Not responded	19	12%	47	12%
Total	159	100%	399	100%

As was mentioned in the Table 7 majority of the graduate teachers were used the Internet from home (male – 65% and female – 71%) followed by the schools. A considerable amount of the teachers had not responded for this question (12% of the total sample). Reasons were revealed by the Interview with regard to the lack of use/ not use the Internet by some graduate teachers. One reason was lack of skills or no skills to use them. Another reason was no/limited opportunity to use them.

6.3 Investigate the application of the modern technology for classroom teaching-learning process

Table 8: Technical instruments used by the teachers in the classroom teaching-learning process

Instrument/s	Male		Female	
	No.	Percentage	No.	Percentage
Radio/cassette	59	37%	210	53%
Television	25	16%	91	23%
Projector	18	11%	102	26%
Computer	25	16%	179	45%
Mobile phone	10	6%	31	8%
Not responded	31	19%	25	6%

According to the Table 8 majority of the teachers had used Radio/ cassette recorders (37% of male and 53% of female). Even though majority of the teachers had mobile phones, the least used instrument was the mobile phone (6% of Male and 8% female).

Female teaches had used modern devices more than the male teachers. Reasons for lack of use and/or not use the technical instruments had been discovered at the interview. These reasons are absences or lack of facilities (enough space and resources)/ Lack of/no training to use these instruments/ Difficult to take students to separate places from the classroom/Time management problem/ Difficult to obtain resources (Computer lab etc.)/ Instruments are not functioning properly or defect/ Lack of motivation.

6.3 Investigation the possible challenges which rise when in-service graduate teachers implement the modern technology in the classroom teaching

Table 9: Availability of resources in schools

Resources	Available		Not available		Not responded	
	No	%	No	%	No	%
Electricity	487	87%	30	6%	41	7%
Phone	170	30%	340	61%	48	9%
The Internet	152	27%	371	67%	35	6%
Computer	289	52%	252	45%	17	3%

Majority of the teachers said that they have electricity (87%) and computers (52%) in their schools. Even though, many teachers said that they were not given the phone (61%) or the Internet facilities (67%) from school. In addition to the limited resources, more challenges were recovered through the interviews. Many teachers said that the Internet connection is very slow so that it is difficult to work with the Internet (specially the school net). Some teachers said that though they had computers in their schools it is difficult to find time and/or the monopoly of some IT teachers' were barriers to use computers in the schools. Moreover, some teachers said, though they had electricity in their schools some classrooms were not given the connection so that it is difficult to use electronic devices in the classroom and students should be taken to computer lab or media room where these facilities are available.

7. Recommendations

- In-service graduate teachers should be given more opportunities and facilities for computer training.
- Graduate teachers should be encouraged to use available modern technical instruments in the school.
- Teachers should be given more opportunities to use the Internet at schools, so that the Internet facilities should be provided to schools as much as possible.

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