

TEACHERS' PERSPECTIVES ON TRANSFORMING CURRENT TEACHING LEARNING ENVIRONMENT TO SMART CLASSROOM ENVIRONMENT

S. Kugamoorthy

Faculty of Education, The Open University of Sri Lanka

ABSTRACT

The successful transformation of Smart Classroom practices depends on teachers' positive attitude and mind settings. Therefore, this study tries to identify teachers' perceptions on transforming the current teaching-learning environment into smart classrooms environment. Quantitative and qualitative research approaches were used in this study within a framework of a survey research design. The target population of this study consists of teachers from various schools in the Colombo district. Teachers following PGDE programme at the Colombo Regional Centre of the Open University of Sri Lanka, in 2018/2019 academic year were selected as a convenient sample for this study. Primary data of this study was collected using a questionnaire which focused on collecting data on three identified key areas: (1) teachers' awareness on the concept of smart classroom (2) teachers' perceptions on the benefits of integration of smart classroom practices and (3) teachers' perceptions about the challenges and issues in integration of smart classroom practices in Sri Lankan schools. Teachers' responses to the questionnaires were analyzed using frequencies and percentages. This study revealed that even though the concept of smart classroom practices is new to teachers in Sri Lanka, they have an awareness of the concept of a smart classroom and have positive perceptions of smart classroom practices. They perceived that smart classroom practices may yield several benefits including changing the traditional way of teaching, providing updated subject information, enhancing effectiveness of the teaching and learning process, increasing students' interest in learning, incorporating changes happening in the IT world and building up of skills and attitudes of the students to cope with challenges emerging from the world of work. Therefore, this study suggests that relevant stakeholders should take more initiatives to construct smart classrooms and ensure their maximum utilization in the schools.

Key Words: Smart classroom practices, Transforming teaching and learning environment, Smart classroom environment

INTRODUCTION

Information communication technology plays a major role in education. Sri Lankan government realized that emerging facilities of Information Communication Technology (ICT) make a positive impact on classroom teaching and learning. Therefore, since 1994 the Ministry of Education has been implementing a number of initiatives to integrate different techniques of ICT into the teaching-learning process. The performance report of the Ministry of education confirmed that arrangements were made to design the major plan on the use of the ICT for learning and teaching process (Ministry of Education, 2018). The successful integration of ICT for learning and teaching is depending on the updated information gained and practiced the techniques of ICT by the teachers in Sri Lankan schools. In 2017, under the directions of the Minister, the Ministry of Education has planned to introduce Smart Classrooms in 25 selected schools as a pilot project in order to empower the school community to face the challenges of updating the system of education in line with the transformation of the modern world (Ministry of Education, 2017). However, it appears that teachers' awareness on any new practices in education may have an impact on the effectiveness of those practices. For example, Marton (1986) claims that exploring the ways in which teachers perceive some phenomena in a learning situation could be used to answer certain questions about thinking and learning. Based on this point of view this study tries to identify how far teachers in Sri Lanka have awareness on the concept of the smart classroom and their perceptions on the integration of smart classroom practices in the current teaching and learning processes.

REVIEW OF LITERATURE

Concept of Smart Classroom

The concept of the smart classroom is interpreted in different ways in different research studies. In general, smart classrooms are equipped with a different type of hardware and software modules (Xie, Shi, Xu & Xie, 2001).

Therefore, smart classrooms are technologically and electronically enhanced classrooms which are the tools used for teaching to the students by the method of E-Learning (Manohari & Shenbhagavadivu, 2018). Yang, Pan, Zhou & Huang (2018) also confirmed that digital device and Internet were the basis for equipping smart classroom. These classrooms are equipped with high tech devices such as interactive whiteboard, computer devices, and internet facility. Internet facility is essential to conduct the teaching-learning process in the smart classrooms. This facility helps to update, store, distribute and share up to date information instantly with students.

Theory of Connectivism: Implications for Smart Classroom

Principles of learning theories describe that concept formation and development is depending on the interactions between the person and the environment. Principles of connectivism tried to explain the importance of connections among individuals for learning. Siemens (2005) describes that personal knowledge is comprised of a network, which feeds into organizations and institutions, which in turn feedback into the network, and then continue to provide learning to individual. He further explained that this cycle of knowledge development (personal to network to organization) allows learners to remain current in their field through the connections they have formed (Siemens, 2005).

Theory of Connectivism formulated basic rules of connective learning. Connective learning emphasizes the importance of learning in the network, according to which, learning is a process of connection with specific stations or source of information. Hence, it appears that a person can gather information and develop his or her knowledge and skills through the interaction with a variety of devices and people in a network. Therefore, in the digital age, interaction between the information communication technologies may influence an individual's learning processes and knowledge construction. As such, the theory of connectivism has great implications in the learning of individuals in the digital age and has brought a lot of revival in contemporary pedagogy. More specifically, its principles are widely used to develop technology enhanced learning approaches including e-learning practices and online education. In these circumstances, educational institutions have realized the importance of designing new methods of instructions connected with ICT. Thus, principles of theory of connectivism has set the stage for the introduction of smart classroom practices.

Awareness of Smart Classroom

Even though the concept of a smart classroom is not new to Sri Lankan teachers and students, the practical construction of the first Smart Classrooms was launched by the year 2017 only. The first smart classroom was opened at the Sri Jayawardenepura Maha Vidyalaya, Kotte (Sunday Observer, 2017). At the launch, the Minister stated; "Sri Jayawardenepura Kotte Boys School is the only school that has a fully integrated smart classroom solution. These are not just classrooms with smart boards, but use an intuitive learning platform connecting teachers and students". He expressed his views on the present delivery of the education system also. He mentioned that "education is not about learning content; it is about being able to apply what we learn to solve real-world problems. So, it's time to move from content-based to problem-solving education". The main purpose of setting up the smart classroom is that the technology can enrich the teaching-learning process to cope with emerging challenges by providing updated information and using technology to enhance the learning abilities of students.

Smart Classroom Practices – Benefits and Challenges

A smart classroom is the one, which is equipped with latest tools and technologies that are based on the internet. Various web-based tools are also being used to enhance teaching and learning experiences. Therefore, it is understood that in the broadest view, smart classrooms are helped to go beyond the traditional way of the teaching-learning process. Uskov, Howlett & Jain (2016) mentioned that smart classrooms can create multiple opportunities for students to learn the material in a variety of ways. Besides, they also can give access to materials in a variety of ways. Research done in India by Manohari & Shenbhagavadivu (2018) confirmed that smart classrooms are helped to deliver the updated instructions or information by using standard internet technology. The principal of the Sri Jayawardenepura Maha Vidyalayam in Sri Lanka stated that due to smart classroom practices students can read and learn while taking handwritten notes on the same screen. It is a unified learning solution for students with smart content delivery and unlimited content availability in multi-media form. He further mentioned that after implementing the smart classroom concept, they have seen the tremendous progress of children in that particular smart classroom and students are much more enthusiastic to learn in the classroom and even at home with minimal

supervision (Sunday Observer, 2017). Further, Manohari & Shenbhagavadivu (2018) also described the smart classroom as the creation of a new dimension of learning. Meanwhile, the Principal of Sri Jayawardanepura Maha Vidyalayam has expressed his concern about the unethical use of information technology among students. In this point of view, he mentioned that teachers may face several challenges to control the students. Hence, to minimize such problems school should take measures to control the unethical usage of web sites (Sunday Observer, 2017). Therefore, teachers need to understand the learning environment of the smart classroom and they have to change their teaching style and design appropriate teaching-learning situations. These changes can ensure the forward movement with the new concept of smart classroom teaching and learning. Otherwise, schools may face challenges to fit within the new educational technology culture.

OBJECTIVES OF THE STUDY

The main objective of this study was to identify teachers' perspectives on transforming the current teaching-learning environment in the smart classroom environment. To achieve the main objective, the following specific objectives were formulated.

1. To identify teachers' awareness of the concept of a smart classroom.
2. To examine teachers' perception of the benefits of the integration of smart classroom practices in the teaching-learning processes.
3. To examine teachers' perception of the challenges and issues in the integration of smart classroom practices in the teaching-learning processes.
4. To draw suggestions to improve integration of smart classroom practices in Sri Lankan schools.

METHODOLOGY

Quantitative and qualitative research approaches were used in this study within a framework of a survey research design. The population of this study was the teachers who are following the Postgraduate Diploma in Education (PGDE) Programme in the academic year 2018/2019. The target population of this study consists of teachers from various schools in the Colombo district. Teachers following PGDE programme at the Colombo Regional Centre of the Open University of Sri Lanka, in 2018/2019 academic year were selected as a convenient sample for this study. Out of the 90 teachers registered for this programme in Tamil Medium, 85 teachers physically attended the Day School, when the researcher visited on a particular day was selected as the sample for this study. Primary data of this study was collected through a questionnaire. The questionnaire was of the structured type and focused on collecting data on four identified key areas: (1) teachers' awareness on the concept of smart classroom (2) teachers' perception on the benefits of integration of smart classroom practices in the teaching-learning processes (3) teachers' perception about the challenges and issues in integration of smart classroom practices in the teaching-learning processes and (4) suggestions from the teachers to improve the integration of smart classrooms practices in Sri Lankan schools. Teachers' responses to the questionnaire were analyzed using frequencies and percentages. Open-ended data were analyzed qualitatively using codes and categories supplemented with elementary quantitative techniques such as percentages.

RESULTS AND DISCUSSION

Respondents

The respondents of this study were 85 teachers following the PGDE study programme from the Colombo Regional Centre of the Open University of Sri Lanka. Their background information is presented in Table 1.

Table 1: Background Information of the Respondents

School Type			Gender			Year of services			Awareness of Smart Classroom			Smart Classroom Teaching Experience		
	#	%		#	%		#	%		#	%		#	%
1AB	26	31	Male	24	28	< 05	63	74	Yes	81	95	Yes	06	07
1C	21	25	Female	61	72	6 -10	18	21	No	04	05	No	79	93
Type2	25	29				> -10	04	05						
Type3	13	15												

All participants (N=85) were graduate teachers who teach the various type of schools in the Colombo district. They comprised 72% females and 28% males. Among the respondents, 74% had less than 5 years of teaching experience whereas 21% had 6-10 years and only 5% had more than 10 years experience. The respondents' awareness of smart classroom was 95%, but only 7% of the teachers having the teaching experiences in the smart classroom. It reveals that even though 95% of the teachers heard about the concept of smart classroom only 7% of the teachers got the opportunities to teach in smart classrooms. This finding emphasizes the need for the Ministry of Education to take more effort to establish at least one smart classroom for each school. Then only Sri Lankan students also can move forward to meet the challenges of the technological world.

Teachers Perception of Smart Classroom

To get the responses of their perceptions on smart classroom an open-ended question was asked to write their understanding about the smart classroom. The following perceptions were expressed by the respondent teachers.

Table 2: Frequency of Coded Statements that Supported the Theme Teachers' Perceptions of Smart Classroom

Coded Statements	Frequency	%
A classroom with ICT facilities.	57	67
Teaching-learning process conducted with the integration of the electronics equipment.	46	54
A classroom with audio and video teaching aids.	15	18
A classroom where electronics equipment playing a major role in the student-teacher interaction.	12	14
A classroom where a teacher wants to prepare the lesson very well.	08	09
A classroom which was organized to help G.C.E (O/L) failures.	04	05
A classroom which is helping to enhance the effectiveness of the teaching-learning process at a maximum level.	28	33
A classroom which is constructed to enhance the quality of education.	18	21
A classroom which is designed to enhance the ICT skills of the students	21	25
A classroom help to show the real-world situation by using multimedia	14	16
A classroom which is helping to give up to date information by using ICT facilities	42	49
A classroom which is helping to reduce the traditional way of the teaching-learning process	46	54
A classroom which is helping to enhance the technical knowledge of students	43	51
A classroom which helps the students to meet the challenges of the changing world.	44	52
A classroom which helps to change the process of education to update the changing process happen in the world of education	45	56
A classroom which is helped to use modern teaching techniques	23	27

The percentage analysis of the above coded statements is indicated in table 2. More than 50% of the responded teachers have understood that information communication technology is playing a major role in the smart classroom practices. Most of them have expressed their perceptions in line with the ICT facilities such as classrooms with ICT

facilities (67%), teaching-learning process conducted with the integration of the electronics equipment (54%), classroom which helps to provide up to date information by using ICT facilities (49%) and classroom which helps to enhance the technological knowledge of students (51%). It is noted that teachers have understood the importance of smart classroom practices. More than 50% of the teachers are having positive perceptions. They have perceived that smart classroom practices would help students to meet the challenges of the changing world (52%) and 56% of the respondents have a clear awareness of the smart classroom practices and perceived that these smart classrooms would help to update the changes take place in the world of education, and also 54% of the respondent teachers have accepted that smart classroom practices can reduce the traditional way of teaching-learning process and would facilitate modern teaching techniques (54%). But only 33% of the teachers perceived that smart classrooms are would enhance the effectiveness of the teaching-learning process at a maximum level. It is noted that in average more than 50% of the respondents realized the meaning of the smart classroom concept. However, it is unfortunate to observe that 05% of teachers who have more than 10 years of experience perceived that these classrooms are specially organized to help the students who failed their G.C.E (O/L) examination Therefore, the Sri Lankan Government has to give opportunities for senior teaching professionals when they organizing training programmes on smart classroom practices.

The frequency of Coded Statements that Supported the Theme ‘Teachers Perception on Benefits of Smart Classroom Practices’

To get teachers perception on the benefits of smart classroom practices an open-ended question was asked. The open-ended question is allowed the teachers to give any opinion related to the benefits of smart classroom practices. Based on their responses the benefits are summarized under three major categories namely teaching, learning, and innovative changes.

Table 3: Frequency of Coded Statements that Supported the Theme ‘Teachers Perception on the Benefits of Smart Classroom Practices in Teaching’

Benefits in Teaching	Frequency	%
Changes in the traditional way of teaching	49	58
Integration of new techniques of ICT could help to teach easily	38	45
Can use attractive teaching methods	47	55
Can develop Innovative teaching aids	45	53
It is possible to give updated information related to subjects	49	58
Can show the real-world situations and experiences in the classroom environment	42	49
Can design the teaching environment in an attractive way	24	28

Table 3 shows that nearly half of the respondent teachers accepted that smart classroom practices would help them to change the traditional way of teaching (58%) and also they have expressed that smart classroom practices will help to show real-world situations and experiences in the classroom environment (49%). Further, they have indicated that smart classroom practices will give opportunities to integrate techniques of ICT in the teaching process therefore, 45% of the respondent teachers perceived that they could conduct the teaching process easily by using attractive teaching methods (55%), by developing innovative teaching aids (53%) and also they perceived that they could give updated information related to the subject they teach (58%). But it is noted that only 28% of the teachers perceived that they could attractively design the teaching environment. It seems that most of the teachers may feel attractively designing teaching-learning environment as the facilities in the smart classrooms are not enough to address the needs of all students.

Table 4: Frequency of Coded Statements that Supported the Theme ‘Teachers Perception on the Benefits of Smart Classroom Practices in Learning’

Benefits in Learning	Frequency	%
Increasing students’ interest in learning	46	54
Joyful learning environment	42	49
Improvement of academic achievement	13	15
Attractive learning environment	09	11

Can improve students involvement in self-learning practices	42	49
Help to keep the information in long term memory	19	22
Make students learn with active participation	18	21
Can help for visual learning	11	13
Learning is taking place by doing	21	25
Can help to minimize learning difficulties face by students	17	20
Easy to make understanding about the difficult concepts	14	16
Easy to concentrate	12	14
No need to carry more books	02	02
The student could learn anywhere anytime by using technology facilities	09	11

Table 4 shows that 54% of the teachers responded to this study perceived that smart classroom practices would help to increase the students' interest in learning and they expressed that the learning environment of the smart classroom is joyful (49%). Only 11% of the teachers perceived that the smart classroom learning environment is attractive meanwhile 49% of the teachers believed that smart classroom practices going to improve students' involvement in self-learning practices. The above table clearly showed that teachers perceptions related to the benefits of learning in a smart classroom vary widely.

Table 5: Frequency of Coded Statements that Supported the Theme ‘Teachers Perception on Innovative Changes to Cope with Changing Scenario of ICT World’

Innovative changes	Frequency	%
Transforming to new innovative teaching and learning practices	62	73
Quality of teaching-learning processes is enhanced with the new ICT based technology	47	55
Can incorporate the successful changes taking place in the IT world	42	49
Can face the challenges emerging from ICT integrated practices	30	35
Can enhance the connections with the world-class education	36	42
Can change the skills and attitude of the students to cope with challenges emerging from the world of work	39	46
Can provide the new information from time to time and keep the students with updated knowledge	32	36
Can enhance the knowledge and skills on how to handle the ICT equipment	28	33

Table 5 shows that on average the respondent teachers are having positive perceptions towards the innovative changes that may result from the implementation of smart classroom practices in the Sri Lankan education system. Therefore, it is showed that in future Ministry of Education need to come forward and need to take more and more innovative practices related to the implementation of the smart classroom practices. Then only as a developing country, we can change the teaching professionals to cope with the changing scenario of the ICT world and we can create our students to fit into the ICT world.

Teachers Perception of Challenges in Smart Classroom Practices

To get the teachers perception on challenges and issues that may be faced by the school and teachers in the implementation of smart classroom practices, an open-ended question was asked. Teachers were requested to indicate the challenges under the two categories; (1) the challenges that may be faced by the schools and (2) the challenges that may be faced by the teachers. The following challenges and issues were perceived by teachers.

Perception of Challenges Face by Schools

- Smart classrooms are not properly organized
- Not having enough equipment
- No proper maintenance system
- No official person to maintain the electronic equipment
- Lack of space and resources

- Preparing a time table for all classes to use the smart classroom that is available for the whole school
- Protection of the equipment

The above challenges and issues perceived by the teachers indicate that schools in Sri Lanka face challenges especially related to infrastructure facilities of the smart classrooms. The reason for this finding may be twofold. First, the integration of smart classroom practices is still in its' young age as the Ministry of Education gave its consideration to organize the smart classrooms in Sri Lankan school from 2017 only. Secondly, structuring and organizing smart classrooms are also ongoing processes in the Sri Lankan schools and still need improvement.

Perception of Challenges Face by Teachers

- Subject teachers not having enough IT knowledge
- Not enough knowledge to work with digital types of equipment
- Not having enough knowledge about the smart classroom activities
- Challenges face from the students who have more knowledge in using digital equipment
- Giving opportunities to use smart classroom only for very limited teachers
- No facilities to prepare the lessons at home electronically
- Number of the students in one class is not manageable with the available number of equipment
- Not providing enough training to use digital equipment
- Handling the students with learning difficulties in the smart classroom
- Need to spend more time rather than teaching to handle the equipment
- Not to cope with the students who are practicing with digital equipment is very fast

The above challenges and issues perceived by the teachers show that teachers did not have enough confidence to use techniques of smart classroom practices. The main reason for this situation may be the lack of opportunity to conduct the teaching-learning processes in the smart classroom environment. Because among the respondents, 93% of the teachers expressed that they don't have smart classroom teaching experiences. Therefore, to enhance the self-confidence on using techniques of smart classroom practices, in Sri Lanka, Ministry of Education should give more consideration on the structuring of smart classrooms and arrange training programmes to get experience with modern ICT based equipment and processes to enrich their involvement in the smart classroom practices.

Conclusions and Recommendations

Even though the smart classroom teaching and learning practices are new to the teachers in Sri Lanka, this study revealed that they have enough awareness about the concept of the smart classroom and have positive perceptions regarding the smart classroom practices. According to the theory of connectivism, teachers have understood the importance of the interactions, and they also have understood that smart classroom practices may yield several benefits to enhance the interactions by using digital devices in the teaching-learning processes. They also perceived that smart classroom practices would make innovative changes in the Sri Lankan education system and build the capacity to use techniques of ICT to cope with changes happening in the information technology world. They have perceived many challenges and issues related to infrastructure facilities and opportunities to use smart classrooms in their teaching processes. It can be suggested that the Ministry of Education and other stakeholders those who involve in the implementation of smart classroom practices, need to take more and more initiatives to structure the smart classrooms in the schools with the essential equipment. Further, some more measures should be taken to enhance the effectiveness of smart classroom practices.

- Construct more smart classrooms to transform the teaching-learning process from traditional to smart classroom practices.
- Construct more smart classrooms to give opportunities for teachers to integrate smart classroom practices in different subjects and different grades of students.
- Need to identify the proper mechanism to monitor and maintain the electronic equipment.
- Organize training workshops for teachers to get used and practice with digital equipment effectively.

Overall, it can be concluded that smart classroom practices are essential in the Sri Lankan education system to enhance the ICT skills among the teachers and students to minimize the gap between Sri Lankan education practices

and world-class education practices. Then only we can prepare our students to meet the challenges emerging from the present world.

REFERENCE

Harsha, S. (2017). *Sri Lanka launches first grade-wide Smart Classroom*, Retrieved from <http://www.ft.lk/it-telecom-tech/Sri-Lanka-launches-first-grade-wide-Smart-Classroom/50-672418>

Marton, F. (1986). Phenomenography - A research approach investigating different understandings of reality. *Journal of Thought*, 21(2), 28-49).

Ministry of Education (2017). *A report on Pilot Project on Smart Classroom*, Retrieved from http://www.moe.gov.lk/english/index.php?option=com_content&view=article&id=1666:a-pilot-project-of-smart-class-room-is-commenced&catid=344&Itemid=771

Ministry of Education, (2018). *Annual Performance Report-2017*, Monitoring, and Performance Review Branch, Policy Planning and Performance Review Division, Ministry of Education, Isurupaya, Battaramulla.

MuraliManohari, G. &Shenbhagavadivu, T. (2018). *A Study on Scope of Smart Classrooms in the Government Schools Functioning in and Around Coimbatore*. Retrieved from https://www.researchgate.net/publication/327211975_A_STUDY_ON_SCOPE_OF_SMART_CLASS_ROOMS_IN_THE_GOVERNMENT_SCHOOLS_FUNCTIONING_IN_AND_AROUND_COIMBATORE

Siemens, G. (2005). Connectivism: a learning theory for the digital age. *International Journal of Instructional Technology and Distance Learning*, 2(1), 3–10.

Sunday Observer (2017, October,08). Retrieved from <http://www.sundayobserver.lk/2017/10/08/features/cloud-smart-classroom-sri-lanka-revolutionising-classroom-teaching>

Uskov, Vladimir L., Howlett, Robert J., Jain, Lakhmi C. (Eds.) (2016). *Smart Education and Smart e-Learning*, Retrieved from <https://www.springer.com/in/book/9783319198743>

Xie, W., Shi, Y., Xu, G., & D. Xie, D. (2001). *Smart Classroom - an Intelligent Environment for Tele-education*, DOI:10.1007/3-540-45453-5_85, Retrieved from https://www.researchgate.net/publication/220763472_Smart_Classroom_-_An_Intelligent_Environment_for_Tele-education/references

Yang, J., Pan, H., Zhou, W. & Huang, R. (2018) *Evaluation of smart classroom from the perspective of infusing technology into pedagogy*, Retrieved from https://www.researchgate.net/publication/327878469_Evaluation_of_smart_classroom_from_the_perspective_of_infusing_technology_into_pedagogy