DOES SMART CLASSROOM AN EFFECTIVE TECHNOLOGY FOR TEACHING: A RESEARCH ANALYSIS

By

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ABSTRACT

The purpose of the study was to investigate the elementary school students' perception towards the traditional over smart classroom instruction. In the present study, hundred elementary school students from two Indian schools have been randomly selected as the sample of the study. The learners' perception scores were analyzed by chi-square and Univariate factor analysis techniques. It was found that traditional instructional strategy, and the teachers' knowledge, modes of transaction, skill of presentation, use of the blackboard, illustration with examples, questioning, reinforcement, and the feedback was comparatively better than smart class instruction.

Keywords: Blackboard, Depth of Knowledge, Feedback, Questioning, Reinforcement, Skill of Presentation, Smart Class, Teaching Process, Traditional Class.

INTRODUCTION

In this technology era, there is no difficulty to deliver quality education in a limited time, but still teachers are under pressure to determine what and how much knowledge they have to deliver in the classroom. In recent days, teachers are teaching with smart classroom besides the conventional black board and as a result, they do not use chalk and talk approach in a regular classroom. Anyhow, the author felt this practice is no doubt good, but at the same time, this might reduce the students' capacity of imagination to solve problem and to reconstruct new ideas. The audience's heart touching presentation is the most respecting and rewarding aspects of the teachers (Nir & Bogler, 2008). However, a good lecture covered the most material in the least amount of time (Banilower & Shimkus, 2004; Clarke & Hollingsworth, 2002). That is why; the traditional method of teaching has been imparted knowledge for many years. After the cognitive psychologists' interpretation on interactive and social classrooms, all teachers attracted towards discourse, group activities and community practice (Cochran-Smith, 2005; Grierson & Tiffany, 2009; Jacob & Lefgren, 2004). Nevertheless, it is true that the quality of teaching depends on the teachers' wisdom and their depth of knowledge. Teachers may be knowledgeable, but how much they assimilate this knowledge with the students' previous knowledge, is remarkable. On the other hand, the students should be equally eager to learn from the teacher (Cohen & Hill, 2000; Little, 1993). Several studies suggested, online instruction and computer-based instruction are the effective traditional classroom models (Smart & Cappel, 2006). An effective teaching process and learning environment of the classroom mostly depends on teacher's responsibility. Teachers' enthusiasm of teaching is the determinant of students' interest of learning (Glazerman, Dolfin, Bleeker, Johnson, Isenberg & Lugo- Gil, 2008). The teachers have the capacity to cultivate love and interest among the students on the subject, and they can create and promote a positive environment and learning attitude among the students (Mulholland & Wallace, 2005). Smart classroom is the technology based live internet; full video capability regulated synchronous lectures (Marzano, Pickering & Pollock, 2001; Thomas, 2002). A lecture method examines the idea in breadth and depth, and it suggests a strategy for history teachers on how to deal with the challenges in the history courses (Pearcy, 2011). A smart classroom focuses on technologies enhanced teaching and learning process. It was found a smart classroom technology provides positive teaching outcomes and the quality of teaching and learning improved because of the innovation (van den Blink, 2009). Teachers of English, Mathematics, science,

and social studies of developing countries are receiving grants for the smart classrooms developing (Jena, 2011a; Ozer Kendig, 2010; Slotta & Aleahmad ,2009).

In a study, student compared their perception regarding smart classroom and the traditional classroom and found, student feedback was overwhelmingly positive regarding the preference for the smart classroom (Tornabene, 1998). College leaders usually think tech-filled smart classrooms, but the literature found "a dean at Southern Methodist University is proudly removed the computers from the lecture halls" and this researchers suggested why laptops, iPods, or other cool gadgets are thrown into the mix (Young, 2009). However, multimedia is the ultimate content provider (Embi & Hussain, 2005). Ghani (2009) found that the use of technology in the classroom enabled students to progress through the lessons for own pace, and it maximizes student achievement, which is the main goal of the program. Similarly, the individualized approach enabled students to master the objectives at their own speed. (Rescigno, 1988). Solvie, 2004; Tissenbaum & Slotta, 2009 found that smart classrooms engages students and teachers with Web approaches support a community of learners in developing knowledge. The smart classroom environment is an online database of student generated activity. In a study "the Smart Classroom: Merging Technologies for Seamless Tele-Education" it was found that, most of the cases, live instruction catches students' attention and interest much more effectively than static materials of traditional classes (Shi, Xie, Xu, Shi, Chen, Mao, and Liu, 2003). Not only that, the smart classroom activity designs also increase the depth of students' conceptual understanding by breaking down learning goals into manageable sections (Lui, Tissenbaum,& Slotta, 2011) and at the same time and in same class collaborative learning can be implemented (Yau, Gupta, Karim, Ahamed, Wang, and Wang, 2012b). Through open Smart Classroom Web Service technology in Smart Space, single classroom can communicate even different between different countries (Suo, Miyata, Morikawa, and Ishida, 2009). However, Hennessy, Deaney, Ruthven, & Winterbottom, 2007; Smith, Hardman & Higgins (2006) found the impact of interactive Whiteboards on teacher-pupil interaction is high and it is a helpful technique for the national literacy and numeracy strategies. Blau,Koohang, Eshet-Alkalai, Caspi, Eden, Geri, & Yair (2011) found that, the participants' abilities to apply the multimedia principles and the level of their digital design skills was very high. IWB programs should pro-mote interactivity among students, and they used last IBW files for further review. Literature found that smart classroom screen adversely affects the eye of students and the study recommended limiting the children's screen time (Robinson & Borzekowski, 2011). The SMART Boards with kindergarten children have been used successfully over the past 8years is an innovative way to enhance teaching and learning and facilitate assessment in primary Science (Lee Mowbry, 2011) and facilitates collaborative learning among college students and it greatly enhances collaborative learning will be presented (Yau, Gupta, Karim, Ahamed, Wang, and Wang, 2011a).

Now classrooms are shaped and mediated by technology and the smart classroom technology directly excites and engages students in class (Linn, Husic, Slotta, & Tinker, 2006; Tissenbaum, 2009) and the use of the interactive whiteboard as an instructional tool has a beneficial effect on student engagement in classroom lessons and leads to improved student behavior (Morgan, 2008). But, Manny-Ikan , Dagan, Tikochinski, & Rachel Zorman, 2011 found that the integration of technology into instruction posed some difficulties and challenges like; sense of over-burdening among teachers. Like American universities, other developed countries have been implementing smart classroom technologies to enhance instruction and learning through smart boards, and audio systems to assist in learning. Nevertheless, literature found, this hi-tech climate now minimized the creativity and interaction among students and instructors. The researcher also argued that returning to less tech-rich learning environment challenges students to use their creativity, ultimately improving student learning (Weiss, 2009; Wenglinsky, 2002).

Purpose

The purpose of this study is to investigate learners' perception towards the effect of traditional instructional strategy over smart classroom strategy. Literature found that depth of content knowledge of the teacher is crucial for the instruction; it may be traditional or smart instructive.

Question may arises, does the depth of the content knowledge of the teacher is necessary for smart classroom or traditional sessions? Here, not only the teachers' modes of transaction, their skill of presentation, use of the blackboard, illustration with example, questioning, and skill of reinforcement but also the feedback is important aspects of the curriculum transaction. The second purpose of the study was to investigate what the other factors responsible for the effectiveness of smart classroom as well as traditional instruction.

Significance

Based on literature, most found smart classroom instruction has a better impact on the perception of the learners' than the traditional approach (van den Blink, 2009). If so, how traditional methods had been acting a greatest impact before these technologies in education. Many scientist, mathematician, psychologist, philosophers were brought up in those days without technology in instruction. Especially, for traditional learning, a literature has much supported and indicated the positive direction (Young, 2009). Now it is in question, whether traditional method has certain impact on present learning and learners' emotion. Evidence showed, traditional method of teaching was the significance and meaning making over technology based education for learning (Nir & Bogler, 2008; Smart & Cappel, 2006). This is experimented and investigated in this study through evaluation of the pupils' perception scores over smart classroom instruction and it has wide range of educational implications at all levels of learning.

Research Questions

- Does the traditional instructional strategy, depth of content knowledge, modes of transaction, skill of presentation, use of black board, illustrated by example, questioning, reinforcement, and feedback is comparatively better over smart instruction?
- If traditional method is better, what the other factors are responsible and crucial for the implementation of effective smart classroom instruction?

Methodology

Participants

The whole elementary schools and the students were the population of the study. Out of those, 40 & 60 students were randomly selected from two elementary schools of India as the samples of the study. School-1, students (n=40) was counted as the traditional group with conventional treatment and (n=60) of school-2 were treated with smart classroom facility.

Design of the Study

A case study was conducted to compare the smart classroom teaching with traditional classroom teaching learning process and students' perception outcomes. Here, quantitative methods were used to assess the students' perception outcomes towards traditional as well as a smart class session. The present study was a case study by mean of observing the present status of learners' perception towards smart and traditional teaching-learning process. The result of the study is difficult to generalize to the whole population of the study to draw the conclusion. Its generalization is over to the reader, to determine, whether the findings are applicable to the instructional learning or not. The case study was carried out over a four-week period. During the first two weeks, school-1 (n=40) studied the first subject matters by conventional learning method, while school-2 (n=60) studied the same subject matter for the same time for the smart classroom method. During the second two-week, school-1 studied a new subject matters for two weeks using the smart classroom method, while school-2 (n=60) studied the same subject matter for the same time period using a conventional learning method (Table1). At the end of the instruction, a student's classroom perception scale was administered to gather data on how students perceived their classroom environment.

Students' Classroom Perception Scale

The Students' classroom perception scale has nine sub areas and three options based Likert type scale (Jena, 2011b). These subscales were instructional strategy, depth

		1st Two Weeks Instruction	2nd Two Week Instruction
School-1	Student (n=40)	Conventional classroom instruction	Smart classroom instruction
School-2	Student (n=60)	Smart classroom instruction	Conventional classroom instruction
	Total(N) =100		

Table 1. Design of the Study

of content knowledge, modes of transaction, skill of presentation, using the blackboard/smart board, illustration, questioning, reinforcement, and feedback. The entire item's reliability ranged from .81-.79. Moreover, respondent takes 10-12 minutes to respond to the items. Good, satisfactory and poor like responses were scored by 2, 1 and 0 respectively.

Procedure of Data Collection

The school-1, students (n=40) studied the first subject matter using conventional learning method while school-2 students (n=60) studied the same subject matter for the same time by smart classroom method. During the second two-week, school-1 students (n=40) studied a new subject matter using the smart classroom method, while school-2 students (n=60) studied the same subject matter for the same period by using the conventional learning method. Both groups were covered the same concepts in respiration and photosynthesis. In the traditional sessions, demonstration cum discussion & lecture methods were used followed by formative evaluation and home assignment while in the experimental session, students were exposed with smart classroom instruction. During smart classroom instruction, both off line and off online classroom transaction were used on concept respiration and photosynthesis with the proper procedures for creating interest motivation towards learning. At the first week of February 2011, the students' classroom perception scale was administered with clear direction to gather data. However, verbally the researcher advised on how to response the items to the students who were acquainted with both smart as well as traditional classroom learning. Therefore, learners felt easer to respond the questionnaire. The filled the questionnaire was collected within a couple of days, due to absentees among students. All this research work was carried on with the proper permission of the authority of these schools. The hundred data sheet was taken from the students of these schools. The data were scored, and analyzed by Chi-square and univariate analysis of factors technique to find out the result of the study.

Analysis and Result

With reference to Tables 2a & 2b, 25 (62.5%) students reported that traditional instructional strategy was suitable for the learners and better over smart class. 16.6% students from smart class, perceived poor instruction by the teacher than traditional students. However, traditional instructional

	Good	Satisfactory	Poor	χ^2	P-value for difference
Follow-up instructional strategy					
Smart	20(27)	30(24)	10(9)	8.56	P<.01
Traditional	25(18)	10(16)	5(6)		
Depth of content knowledge					
Smart	22(28.2)	27(25.2)	11(6.6)	11.06	P<.00
Traditional	25(18.8)	15(16.8)	0(4.4)		
Modes of transaction					
Smart	28(34.8)	12(12.6)	10(6.6)	6.83	P<.03
Traditional	30(23.2)	9(8.4)	1(4.4)		
Skill of presentation					
Smart	25(33.0)	20(18.0)	15(9.0)	15.4	P<.00
Traditional	30(22.0)	10(4.0)	0(6.0)		
Using blackboard /smart board					
Smart	20(27.0)	30(21.0)	10(6.0)	12.04	P<.00
Traditional	25(18.0)	5(14.0)	0(4.0)		
Illustration					
Smart	28(37.8)	22(16.2)	10(6.0)	18.21	P<.00
Traditional	35(25.2)	5(10.0)	0(4.0)		
Questioning					
Smart	21(27.6)	21(18.6)	18(13.8)	7.92	P<.01
Traditional	25(18.4)	10(12.4)	5(9.2)		
Reinforcement					
Smart	22(28.2)	27(22.2)	11(9.6)	6.51	P<.03
Traditional	25(18.8)	10(14.8)	5(6.4)		
Feedback					
Smart	20(27.0)	30(24.0)	10(9.0)	8.56	P<.01
Traditional	25(18.0)	10(16.0)	5(6.0)		

Table 2a. Chi-square Test Between Smart and Traditional Classroom Transaction Perception of Students

Factors	Respective mean perception scores	Difference	P
Inefficient smart classroom	31.5 - 29.5	3	p>.05
teacher(n=31)/efficient teacher(n=29)	46.2 - 14.2	32	P<.01
Teacher active(n=46)/student activities (n=14)	31.3 - 29.3	2	P>.05
Live classroom(n=29)/dead classroom(n=31)	40.2 - 20.2	20	P<.01
Self pacing(n=20)/no self pacing(n=40)	30.5 - 30.5	0	P=.37
Less interaction(n=30)/more interaction(n=30)	30.3 - 30.3	0	P=.33
Less illustration(n=30)/more illustration(n=30)	32.2 - 28.2	4	p>.05
More feedback(n=32)/less feedback(n=28)			
Time consuming(n=44)/time effective(n=16)	44.4 - 16.4	28	P<.05
Suitable for all students (n=19)/unsuitable(n=41)	41.1 - 19.1	22	P<.05

Table 2b. Univariate Analysis of Factors Having a Possible Impact for the Dull Smart Classroom

strategy was comparatively better than smart instruction (x^2=8.56 df=5 p<0.01). Students' frequency of perception regarding teacher's depth of content knowledge was analyzed and found smart classroom students' perception was better only (n=22 out of 60 respondents) whereas traditional classroom students (n=25, 62.5%). The traditional classroom students' perception regarding teachers' depth of content knowledge was significantly better than the smart classroom teachers depth of content knowledge (x^2=11.06 df=5 p<.05). But, (30,75%) students of traditional class recognized teachers' modes of transaction were better and effective while 46.6% smart class students perceived smart class transaction was better. Therefore, smart class transaction was significantly better than that learners perceived (x^2 =6. 83 df=5 p<. 05). The students of smart class (41.6%) perceived that teachers' skill of the presentation was better while, 75% students of traditional class perceived teachers were comparatively better in their skill of presentation. At the same time, 25% students have been given poorer remark for the teachers' skill of presentation in smart class. Comparatively, the frequency of quality perception regarding the skill of the presentation was higher among traditional students (x^2=15. 4 df=5 p<. 05) which was significantly better than smart classroom students. Similarly, teachers' skill of using blackboard found better among traditional students' response (62.5%), while 33.3% students of smart classes' perceived, smart board was better for them. Comparatively, traditional use of the blackboard was better than the smart board (x^2=12. 04 df=5 p<. 05). It was found 35 (87.5%) traditional students perceived better illustration with example, while 46.6%, student perceived better in the smart class, which is significantly lower. The chi-square value (x^2=18. 21 df=5 p<. 05) was significant. Traditionally instructed student's perception towards questioning skill of teachers is effective and good. The comparative effectiveness was higher in traditional class than the smart class (x^2=7. 92 df=5 p<. 05). 62.5% of students of traditional class perceived that traditional classroom teachers provide sufficient reinforcement to the students who is more than smart class is 36.6% and traditional class teacher's reinforcement for the student' is significantly different from smart class (x^2=6. 5 df=5 p<. 05). 62.5% of traditional class students remarked that teacher's feedback to the students during instruction was better than smart classroom (33.3%). The chi-square value (x^2=8. 56 df=5 p< .05) was significant. Of the 60 subjects from smart classroom and 40 from traditional classroom students, 25 (62.5%) reported that traditional instructional strategy was suitable for the learners and better over smart class 20 (33.3%) student response. Not only that, 16.6% students from smart class perceived poorer follow up instructional strategy by the teacher than traditional. However, traditional instructional strategy was comparatively better than smart instruction (x^2=8.56 df=5 p<0.05). During traditional and smart classroom session, students' frequent perception regarding teacher's depth of content knowledge was analyzed. It was seen, teachers' depth of content knowledge was significantly better than the smart classroom teachers (x^2=11.06 df=5 p<.05). 40 students of traditional class recognized that, teachers' modes of transaction were better and effective as classroom (30,75%). It was found that traditional modes of transaction were better than smart class transaction (x^2=6. 83 df=5 p<. 05). The students' (41.6%) of smart class perceived that teachers' skill of the presentation was better while, 75% students of traditional class perceived comparatively better. At the same time, 25% students have been given poorer remark for the teachers' skill of presentation in smart class. Comparatively, the frequency of quality perception regarding the skill of the presentation was better among traditional students (x^2=15. 4 df=5 p<. 05) which was significantly better than smart classroom students. Similarly, teachers' skill of using blackboard found better in traditional students' response (62.5%) than 33.3% students of smart classes. Traditional use of the blackboard was significantly better than the smart board (x^2=12. 04 df=5 p<. 05). Teachers' illustration with example was better in traditional class than smart modes of transaction. 35 (87.5%) traditional students perceived better illustration with example, while 46.6%, student perceived better in smart class. The chi-square value (x^2=18. 21 df=5 p<. 05) was significant. Traditionally instructed student's perception towards questioning skill of teachers was effective and better. 62.5% of students of traditional class perceived that traditional classroom teachers provide sufficient

reinforcement to the students than smart class (36.6%). Traditional class teacher's reinforcement to the student' is significantly different from smart class (x^2=6. 5 df=5 p<. 03). 62.5% of traditional class students remarked that teacher's feedback to the student during instruction was better than smart classroom (33.3%). The chi-square value (x^2=8. 56 df=5 p< .01) and there was a significant difference in perception between traditional and smart classroom students (Figures1& 2).

It was found that smart class teaching habit was ineffective. From the analysis of the data, it was found, traditional class was more effective than smart classroom even in the information and technology world. Now the question arose, why this happens? Whether any factors responsible for that? If so, what are these? Table-1b interpreted these factors having a possible impact for the ineffective smart classroom.

Inefficient Smart Classroom Teachers

Out of 60 students of smart class, 31 students supported teachers were efficient in the class whereas 19 students reported not all teachers' are inefficient. The mean difference is (31.5-29.5=3 p>.05) was not significant. The concepts efficient teacher, students know or not actually the researcher realized from the other related factors. A teacher were given the instruction to the student with live instructional facilities was welcome. Smart class student has been reported that teacher's instruction quality was just limited. Only 33.3% has given their response well, whereas 50% and 16.6% students were satisfied and has given bad remark respectively (Table 1a).

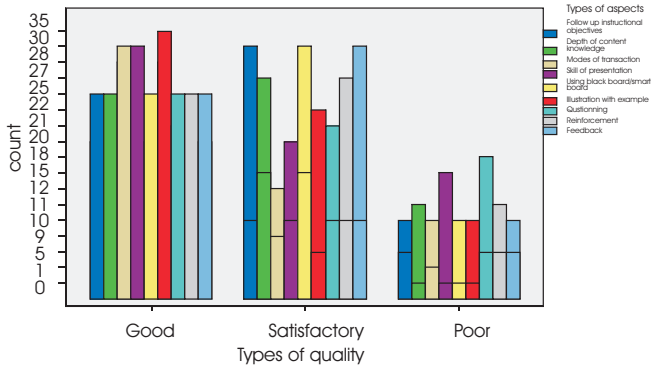

Figure 1. Distribution of Quality and Types of Class

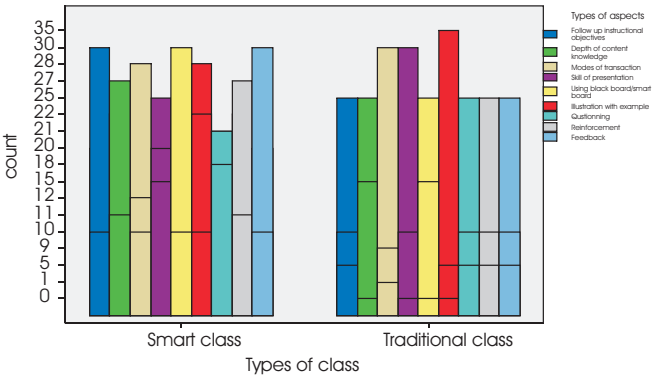

Figure 2. Distribution of Quality and Types of Factors Affecting the Class

Teacher Active

Smart classroom was a teacher active process that 46 students supported this factor whereas only14 students reported disagree. The mean difference (46.2- 14.2=32 p<.01) was significant. In this study, active classroom era students have no freedom to think or to construct anything. Out of 60 traditional students, 25 students perceived better instruction and the skill of presentation but most perceived satisfactory and poor performance of the teacher in smart classroom transaction.

No Self Pace

There was no opportunity for self pace in learning in the smart class because of teacher active process. 20 students supported it provide self pace whereas 40 students reported disagree and it does not provide a self pace to the learners. Learners have no opportunity to take more or less time to share, or construct knowledge in the classroom. The mean difference (40.2-20.2=20 p<. 05) was significant and smart classroom did not provide self pace to the learners to learn.

Time Consuming

With reference to time factor, it was found that 44 students supported this factor whereas 16 students reported disagree. During instruction learners realized, each concept takes a long time The mean difference in the response to time factor (44.4-16.4=28 p<.01) was significant. Therefore, smart classroom was time consuming and teacher active process.

Unsuitable for All Students

The smart class learners or participants reported this approach was not suitable for learners and it did not encourage inclusion in education. Out of 60 students, 19

students only supported this factor whereas 41 students reported disagree. The mean difference of their response (41.1-19.1 =22 $p<.05$) was significant. Most of the smart classroom students perceived smart class technology based instruction was not suitable for all students.

Discussion

From the recent study, the researcher concluded that traditional instructional strategy, teachers' depth of content knowledge, their modes of transaction, skill of presentation, use of the blackboard, illustration with example, questioning, reinforcement, and their feedbacks are comparatively better than smart class instruction. Out of different factors for the failure of smart, class instruction; the teacher active, no self-pacing, time-consuming and unsuitable technique for instruction to the students like factors were significant. The researcher concluded that traditional instructional strategy is better than smart classroom strategy. This was supported by the researchers (Tornabene, 1998). The lecture model is comfortable for both students and professors (Young, 2009). In the recent decades, many researchers in the world have studied different projects regarding students' perception towards teachers' depth of knowledge that is why the recent study is widely validated. The lack of pedagogical content knowledge of teachers' affects the teaching-learning process because teachers' mastery and use of content knowledge in the classroom indicates the depth of subject matter (Pearcy & Duplass, 2011). Student perceived that traditional classroom blackboard was better and more formative whereas the smart board was the reflection of the predetermined knowledge of the teacher. Traditional classroom student perceived teachers' skill of presentation, and their illustration with examples which were better than smart modes of transaction and that was supported by (Tornabene, 1998). The traditional methods of instruction in the classroom with all aspects of teaching had merit. Teachers' knowledge of subject matter, attitude to the work with his teaching skill has a significant relationship to students' academic performance. Traditionally instructed student's perception towards questioning skill of teachers was effective and better. The recent result was supported by (Young, 2009), and they found the lecture model is comfortable for both students and professors. Moreover, laptops, iPods, or other cool gadgets are thrown into the mix. During instruction, raditional classroom teachers provide sufficient reinforcement to the students and this result was supported by Embi & Hussain, 2005. The traditional class students remarked that teacher's feedback to the student during instruction was better than smart classroom. Out of different factors for the failure of smart class instruction; the teacher active process, no self-pace, time consuming and unsuitable for students like factors were mostly responsible for the failure of the effective smart class instruction. Teachers' teaching atmosphere with repeated asking questions, providing feedback to the learners, constructing by gathering information are necessary for the learner and teacher who is not possible in online or smart lecture.

Conclusion

The teacher's traditional instructional strategy was perceived effective by the university students. Therefore, teachers should aware, and they should increase their overall depth of knowledge of the flexible teaching-learning process. The university teachers' depth of content knowledge perceived by the students was significant. Therefore, university teachers should recurrent their depth of content knowledge. They should try to read different reference books, attend refresher courses, seminars, conferences, etc. That is why, policy makers and educationists should take precautions to reorient or recurs frequently to the teachers to transact curriculum through smart classroom. University students need more feedback from their teachers for their better understanding, and if it is not possible through smart class instruction, the teacher should try frequently for lecture. Lacks of pedagogical content knowledge of teachers' affect the teaching-learning process because teachers' mastery and use of content knowledge in the classroom indicate the depth of subject matter. That is why teachers should keep attention to the students' understanding. Frequently, faculty may require using this technology to complete the required courses. Teachers' need to use smart classroom technology must arrange complete orientation/training for the appropriate use of that technology at least 48 hours

prior to Smart Classroom use. In order to standardize the smart classrooms, teachers should be trained to operate multimedia hardware and software. The teacher should have basic knowledge on PC, USB-PC Wireless adapter, ceiling-mounted video data projector, audio system. They should know to connect the use of wall-mounted screen, a smart USB to the serial adapter for laptop. Teacher should use key span presentation remote control, Microsoft Office Suite software, smart software, and internet explorer. University faculty can schedule one-on-one training and equipment orientation sessions for Smart Classroom use. Manny-Ikan et al 2011 suggested there is a need to focus on the pedagogical training of the teachers. The researchers emphasized on the ways that technology can assist interactive teaching in order to help and relieve the over-burdening of teachers. The accessibility to the technology should be extended to more teachers and students by adding smart classrooms to every school in the project.

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