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Implementation and Effects of Smart Classroom in One Chinese University

Chengfeng Lei
Lyceum of the Philippines University, Philippines
Corresponding Author email: *395028582@qq.com*

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Abstract

Aim: This study investigates how smart classrooms are used and their effects in one Chinese institution to put forward a practical action plan..
Methodology: To ascertain the association between the variables in this study, questionnaires were employed as part of the descriptive research approach. With 458 participants, this study was done in one university in China.
Results: According to the findings, 115 of the respondents were bachelors, 125 were normal electives, and 135 people had experience in a smart classroom. According to respondents, the implementation of smart classrooms in terms of facilities, operations, management, and operations is good. Participants in the survey concur that the use of smart classrooms affects their intellect, abilities, mood, and comprehension. Regarding educational background, participation in the course, and previous experience learning in a smart classroom, there were no appreciable differences in the responses. Ability and emotion had a strong correlation that might be used to create a successful smart classroom. Additionally, there were notable differences in the operational skills of cognition, ability, and emotion.
Conclusion: According to respondents, the implementation of smart classrooms in terms of infrastructure, operations, management, and operations is good. Participants in the survey concur that the use of smart classrooms affects their intellect, abilities, mood, and comprehension.

Keywords: *smart classroom, effects and implementation of smart classroom, technology*

INTRODUCTION

Technology is seen as a significant influence behind educational innovation and improvement. The major objective of converting a standard classroom into a smart classroom would have a significant impact on how ideas are transmitted from teacher to pupils. This will alter how the educational system responds to society's constant change, although technology is thought to be a strong driver behind innovation and reform in this area. The major objective of converting a standard classroom into a smart classroom would have a significant impact on how ideas are transmitted from teacher to pupils. This will alter how our educational system approaches adapting to the constant change in our society, instead choosing to accept it and use it as a chance to advance as an organization.

A physical, face-to-face classroom is a smart classroom. It incorporates cutting-edge educational technology into the classroom and is dedicated to enhancing teachers' capacity to support students' learning and participation in formal education, teaching, and learning experiences that go well beyond what is possible in a typical classroom. Scholars have also discussed the key technical aspects of various types of smart classrooms in prior studies that are relevant, which typically include interactive whiteboards or similar digital display interfaces (such as touch screens), large projection displays, wireless display and shared screens, cameras and recording and broadcasting equipment, which support synchronous and asynchronous video transmission, Near Field Communication system, Internet of things equipment. Education management software is frequently used in conjunction with other technologies and hardware in smart classrooms to address related issues. As an illustration, learning management systems are used to offer individualized learning experiences, allowing students to choose their learning time, place, topic, and pace.

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In the belief that the use of technology in schools may improve instruction and advance learning results, several governments have expanded their spending in educational technologies since the late 1990s, according to Huang et al. (2016).

With an annual growth rate of 7%–8% from 2015 to 2020, China's spending on smart education was comparatively consistent. By 2022, China's education IT spending is anticipated to reach CNY 343.6 billion, according to ASCKI. From CNY 98.4 billion in 2011 to CNY 274.4 billion in 2020, or an increase of 8.72% annually, smart education has risen quickly in China. The smart education market is now exhibiting a consistent growth pattern, as can be seen.

Traditional methods, however, proved insufficient for today's demands (Finch 2018). The majority of Chinese classrooms still have the same design as when they were first created (Yang et al., 2013). With time, classroom technology changed. Technology such as film strips, overhead projectors, desktop computers, interactive whiteboards, smart phones, and tablets have steadily been employed in classrooms since the introduction of the chalkboard in 1890. The manner of classroom instruction has shifted from "blackboard & chalk" to "computer & projection" with the introduction of modern technologies. Although the use of technologies in the classroom had somewhat improved teaching, there were still many problems in the modern classroom.

There have reportedly been some difficulties implementing smart classrooms, according to numerous accounts from professors. They assert that because of their abuse and overuse, the normal path of instruction has been sacrificed. As a result, this research was conducted to contribute to future studies with the same concept and to provide a better and more concrete assessment of the implementation and effects of smart classrooms in Chinese universities.

Objectives

The study evaluated the use of smart classrooms and its results in one Chinese institution. In particular, it sought to

1. described the respondents' demographic profile in terms of their educational background, course experience, and learning in a smart classroom;
2. assessed the implementation of the smart classroom in terms of application, operation skills, and management and operation;
3.identified the effects of the smart classroom;
4.tested the variance of responses on the implementation.
5. Identified the relationship between implementation and effects of small classroom

Hypothesis

Based on research questions above, the hypotheses were gived as follows.

Hypothesis 1: There is a significantly positive relationship between student readiness and their satisfaction
Hypothesis 2: The small classroom is effective.
Hypothesis

METHODS

Research Design

Because of the nature of the investigation, the researchers used a descriptive research approach. A descriptive study is an accurate and meticulous account of a population, circumstance, or phenomena. Instead than focusing on the why, this strategy focuses on the what, where, when, and how. Researchers were able to more easily learn about and evaluate the deployment and impacts of smart classroom in one Chinese university thanks to the use of descriptive research.

Population and Sampling

There were 458 Chinese students and professors in all. The sample size is 210, with a confidence interval of 95% and a 5% margin of error. From each segment, participants were picked at random. Each participant was required to complete a questionnaire that posed a number of questions on the smart classroom's implementation and effects.

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Instrument

Data collection for this study involved using a survey questionnaire. Said instrument was approved by industry professionals.

Data Collection

With the use of SPSS and a questionnaire, the data were collected and evaluated.

Treatment of Data

With the use of various statistical techniques, the collected data were presented, examined, and interpreted using tables, graphs, and charts. The respondent profile was described using frequency and percentage distribution. The labor values and productivity of female sailors were calculated using the weighted mean and rank.

Ethical Considarations

Before starting the inquiry, the author of this dissertation sought the agreement of the school principals. The participants were then made aware of the goal of the study before the survey began and were able to provide voluntary responses to the questionnaires. Because they did not include their names on the questionnaires, the survey's participants' confidentiality was assured. Participants' personal information and any disclosed data were handled with the utmost confidentiality. In the end, the ideas and works of the referential authors that were used in this study were correctly acknowledged and noted in the references.

RESULTS and DISCUSSION

Regarding respondents' educational backgrounds is shown in Table 1; the majority of respondents (54.8%) were bachelors, with a frequency of 115. People with bachelor's degrees seem to comprehend the value of having a degree more than those with master's degrees, with a frequency of 95 and a total of 45.2%.

Regular electives have a total frequency of 125 with 59 under course participation. Total percentage is 5%. Auditing came next, with an overall frequency of 85 and a total percentage of 40.5.

Participants in this study were carefully selected in a contemporary classroom environment in order to emphasize the value of educational background, course participation, and past experience.

Participants in this study were carefully selected in a contemporary classroom environment in order to emphasize the value of educational background, course participation, and past experience.

Table 1. Percentage Distribution of the Respondents Profile

Educational Background	Frequency	Percentage (%)
Bachelor	115	54.8
Masteral	95	45.2
Course participating in		
Regular Elective	125	59.5
Auditing	85	40.5
Have you ever had any experience in learning in a smart classroom before?		
Yes	135	64.3
No	75	35.7

The Implementation of Smart Classrooms

Table 2. Summary Table on the Implementation of Smart Classrooms

Indicators	Weighted Mean	Verbal Interpretation	Rank
1. Facilities	3.57	Implemented	2

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2. Operational Skills	3.71	Implemented	1
3. Management and Operation	3.28	Moderately Implemented	3
Composite Mean	**3.52**	**Implemented**	

Legend: 4.50 – 5.00 = Highly Implemented; 3.50 – 4.49 = Implemented; 2.50 – 3.49 = Moderately Implemented; 1.50 – 2.49 = Slightly Implemented; 1.00 - 1.49 = Not Implemented

With a total composite mean of 3.52 and executed as verbal interpretation, Table 5 summarizes the implementation of smart classrooms in terms of facilities, operational skills, management, and operation. Additionally, it displays the relative importance of each item in the table, with operational abilities receiving the highest weighted mean (3.71) and being used for verbal interpretation. Facilities (3.57) and administration and operation (with a weighted mean of 3.28 and moderate verbal implementation) were ranked second and third, respectively. This suggests that maintaining a smart classroom's overall implementation for teachers and students will require strong operational abilities.

Brown et al. al. (2018), the idea of operation management is relevant to all successful firms worldwide. This feature, which covers a wide range of topics, is acknowledged as one of the most important elements that influences how decisions are made and how people evolve. The topic stresses the use of technologies and other tactics in addition to a focus on production and value-adding activities. Aside from that, the widely accepted idea also encompasses supply chains, logistics, marketing, funding, education, and delivery management. The future will bring commercial firms with more advanced resources than the present, it is claimed.

The Effects of Smart Classrooms

Table 3. Summary Table on the Effects of Smart Classrooms

Indicators	Weighted Mean	Verbal Interpretation	Rank
1. Cognition	3.90	Agree	2
2. Abilities	3.67	Agree	3
3. Emotion	3.96	Agree	1
4. Comprehension	3.23	Moderately Agree	4
Composite Mean	**3.69**	**Agree**	

Legend: 4.50 – 5.00 = Strongly Agree; 3.50 – 4.49 = Agree; 2.50 – 3.49 = Moderately Agree; 1.50 – 2.49 = Disagree; 1.00 - 1.49 = Strongly Disagree

Table 3 shows an overview of the effects of smart classrooms, with a composite mean of 3.69 and an agreement as a verbal interpretation.

The majority of respondents (3.90 weighted mean) and respondents who agreed that emotion is a verbal interpretation of the information presented. Following linguistic interpretation, cognition (3.96), skills (3.67), and comprehension (3.23) all scored above average. This is a very clear illustration of how the classroom has an impact on students' emotions and how learning takes precedence over comprehension. Studies have demonstrated that emotional intelligence protects against suicidal ideas and attempts, stress, and depression, as well as helps to improve general health and life satisfaction (Reyes-Wapano, 2021).

The relationship between emotional intelligence and psychological well-being has come under scrutiny; in other words, whether adolescents have high or poor emotional intelligence may influence or not their psychological well-being. Mental health and quality of life are favorably correlated with psychological well-being (Jovanonic, 2015; Singh, Ruch, & Junnarkar, 2015). The cornerstone of the index, which also includes the senses of sight, hearing, speech, ambulation, dexterity, emotion, cognition, pain, and discomfort, is psychological well-being, which has also been

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given importance. According to the study's findings (Roamin, Marleau, and Baillot, 2018), physical appearance can also be a factor that raises the risk of psychological wellbeing as well as mental health.

Table 4. Difference of Responses on the Effects of Smart Classroom When Grouped According to Profile

Educational Background	λ2c	p-value	Interpretation
Cognition	5423.5	0.928	Not Significant
Abilities	5424.5	0.931	Not Significant
Emotion	5447.5	0.972	Not Significant
Comprehension	5215	0.562	Not Significant
Course Participating in			
Cognition	4774.5	0.209	Not Significant
Abilities	4800	0.234	Not Significant
Emotion	5010.5	0.478	Not Significant
Comprehension	4907	0.335	Not Significant
Experience in learning in a smart classroom			
Cognition	4829.5	0.577	Not Significant
Abilities	4919	0.733	Not Significant
Emotion	5058	0.991	Not Significant
Comprehension	4904	0.699	Not Significant

Legend: Significant at p-value < 0.05

Table 4 illustrates the comparison of responses on the effects of smart classroom when grouped according to profile. Since all estimated p-values were higher than the alpha threshold, no significant difference was discovered. The outcome demonstrates that the impact was the same for all responder categories.

The conclusion that the finding is not significant may prompt a future researcher to reconsider changing some of the factors or population sample used in this study. This also implies that the profile characteristics chosen have no direct influence on the respondents' opinions or familiarity with smart classrooms. Smart classrooms can be described in a variety of ways.

In line with Phoong et. al., (2019), smart classrooms as teaching and learning activities created to employ technology with the goal of bringing a solution to low educational quality and enhancing learners' capacities to be self-reliant in their studies. With this manner of instruction, both students and teachers found the educational system to be incredibly welcoming and alluring. According to (Tatnall 2014), at that time, teachers and students started using computers as a new technology, but because it was a revolution in education that required ongoing, extensive professional training, its effectiveness was not flawless.

Developed nations have long used smart classrooms because they have the resources to do so. They can buy materials, give instructors ongoing professional development training, and build the infrastructure necessary to support the installation of smart classrooms (Hilliard, 2015).

Table 5. Difference of Responses on the Implementation of Smart Classroom When Grouped According to Profile

Educational Background	λ2c	p-value	Interpretation
Facilities	5269	0.658	Not Significant

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Operational Skills	5067	0.364	Not Significant
Management and Operation	5231.5	0.597	Not Significant
Course Participating in			
Facilities	4726	0.174	Not Significant
Operational Skills	5204	0.8	Not Significant
Management and Operation	5204.5	0.802	Not Significant
Experience in learning in a smart classroom			
Facilities	4264.5	0.058	Not Significant
Operational Skills	4643	0.317	Not Significant
Management and Operation	4379.5	0.105	Not Significant

Legend: Significant at p-value < 0.05

Table 5 compares comments about the use of smart classrooms when they are classified by profile. Since all estimated p-values were higher than the alpha threshold, no significant difference was discovered. The outcome demonstrates that the implementation was the same across the responder groups.

None of the items related to educational background were significant when compared to verbal interpretation since the p value was higher than the alpha threshold. This indicates that, in terms of profiles, facilities, operational expertise, management, and operation were not taken into account when implementing the smart classroom. Researchers refer to the favorable outcomes for those who are not those who are making decisions about education and skills when they talk about social returns from education and skills. In addition to "market outcomes" like productivity or wages, these returns can also take the shape of "non-market outcomes" like health, civic engagement, and, more broadly, social capital.

Immanuel Kant underlined that the growth of reason and the formation of character are fundamental to education (Bayrak, 2014). Humans are rational beings in Kant's view, hence education must be designed to foster human reason and the growth of moral character because these qualities are present at birth but must be developed via education (Kant, 1992). Another idealist, Georg Wilhelm Friedrich Hegel, supports Immanuel Kant's belief that education should be a means of fostering intellectual and moral growth. Hegel's notion of "Bildung" is a reflection of his educational philosophy. The word "bildung" can mean "education," "development," or "upbringing." He sees education's primary goal as the development of the mind or soul. It is viewed as a social and historical process that involves intellectual and spiritual development.

Additionally, taking the course was rated as equally unimportant to verbal interpretation. It simply implies that, if you set out to succeed, you can succeed in any program you are in. It doesn't matter if someone is superior or not. In the research on R. 2016 (Sumitha). The findings showed that the most important variables affecting students' academic success are low entry grades, family support, housing, student gender, previous assessment grade, student internal assessment grade, GPA, and students' e-Learning activity.

Relationship between the Implementation and the Effects of Smart Classroom

Table 6. Relationship between the Implementation and the Effects of Smart Classroom

Facilities	rho	p-value	Interpretation
Cognition	0.122	0.077	Not Significant
Abilities	.148*	0.032	Significant
Emotion	.174*	0.011	Significant

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Comprehension	0.028	0.689	Not Significant
Operational Skills			
Cognition	.173*	0.012	Significant
Abilities	.201**	0.003	Significant
Emotion	.187**	0.007	Significant
Comprehension	0.099	0.153	Not Significant
Management and Operation			
Cognition	0.064	0.354	Not Significant
Abilities	0.076	0.274	Not Significant
Emotion	0.107	0.121	Not Significant
Comprehension	0.099	0.153	Not Significant

Legend: Significant at p-value < 0.01

The link between the use of smart classrooms and their results is shown in Table 6. When the results were grouped by educational background, it was found that there were significant differences in the participants' abilities ($p = 0.032$) and emotions ($p = 0.011$). According to the test that was conducted, it was discovered that individuals who complete a bachelor's degree have greater implementation, which implies that the results vary statistically. Researchers came to the conclusion that respondents considered abilities and emotion while deciding how to deploy smart classrooms. To assess a smart classroom, one must be emotionally stable and possess the necessary management skills. For example, a recent review by Granziera et al. 2021) shows that in the teaching profession, work engagement predicts important outcomes like teacher efficacy, satisfaction, and well-being.

For instance, according to Perera et al. (2018), work engagement is positively correlated with instructors' job satisfaction, which in turn affects students' academic progress and growth. The physical and financial advantages of low absence or high efficacy are also linked to teachers' work engagement (Bakker and Bal, 2010; Taris et al., 2017). Studies on the relationship between job engagement and personal and professional correlates of engagement are required in order to improve teachers' work-related quality of life and efficacy since work engagement influences teachers' personal and professional well-being.

Additionally, there was a considerable difference when people were categorized based on the courses they had taken. Those who select regular electives are responsible for this notable discrepancy. The respondents' ability to participate effectively also depends on the elective they have selected. This implies that the software you were in when learning in a smart classroom also matters.

Courses in general culture and electives were included to the curricula because they will be useful for both developing intelligent, well-rounded individuals and producing ethical generations. 2018's most recent modifications are the inescapable outcomes for the same goal today. In addition to the required courses, students favor elective courses for a variety of reasons. Kutlu et al. provide an explanation of the causes behind this. The following are the factors that affect a course: its format, its schedule, its instructors, its teachers' relationships with students in real life, its homework and projects, its classroom, its friends' preferences, its usefulness in real life, its duration, and the number of students who choose it. The assessment of the course (exam), distribution to the students of the materials created by the teaching staff, attendance, and the grade needed to pass the course in previous terms. As can be seen, there are a variety of factors influencing student, course, and faculty preferences for elective courses. It is clear from the literature that studies on optional courses typically try to ascertain opinions of the program, teaching staff, teachers, or students.

CONCLUSION

The study's findings led the researchers to draw the following conclusions:

1. A total of 115 respondents were bachelors, 125 were normal electives, and 135 were students who had experience in a smart classroom.

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2. According to respondents, the implementation of smart classrooms in terms of infrastructure, operations, management, and operations is good.
3. Participants in the survey concur that the use of smart classrooms affect 4. The biggest problem that the majority of respondents had was with self-management, which was followed by problems with complexity and technological sufficiency. The third-ranked challenge was students' isolation, while the least problematic ones were those related to technical knowledge and proficiency.
4. Regarding profile factors like educational background, course participation, and prior experience in a smart classroom, there was no discernible difference.
5. Ability and emotion had a strong correlation that might be used to create a successful smart classroom. Additionally, there were notable differences in the operational skills of cognition, ability, and emotion.
6. The administration may employ an action plan about the implementation and results of smart classrooms for further institutional improvement.

RECOMMENDATIONS

The following recommendations are made in light of the study's results and conclusions:
1. To make sure that a qualified teacher is organizing a smart classroom well, the involvement of the school administration may be taken into consideration.
2. In order to make sure that the activity is compatible with the smart classroom, the teachers could use an interactive activity.
3. The administration could offer instructors a number of training sessions to help them completely comprehend and operate a smart classroom.
4. Future researchers are urged to investigate other variables for a better study outcome. Along with their early educational experiences in private or public schools, it may also emphasize their standing in the community.
5. Future researchers may select additional variables to fully accomplish a relationship between the variables in their article.
6. After it has been put into action, the suggested plan for implementing smart classrooms more effectively may be assessed, implemented, and evaluated.

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