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EFFECT OF INNOVATIVE LEARNING SPACES AND TECHNOLOGY INTEGRATION TO INNOVATIVE TEACHING COMPETENCIES AMONG PUBLIC ELEMENTARY SCHOOL TEACHERS

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ABSTRACT

The focus of the study is the Effect of Innovative Learning Spaces and Technology Integration to Innovative Teaching Competencies among Public Elementary School Teachers. This research provides a comprehensive understanding of the interaction between innovative learning spaces, technology integration, and the competence of public elementary school teachers, ultimately contributing to the on-going debate on educational enhancement and reform. The study employed a descriptive-quantitative research design, utilizing a survey questionnaire distributed to randomly-selected public elementary school teachers in San Narciso 1 District, San Narciso, Quezon. The study revealed that when innovative learning spaces are designed to be conducive classrooms, flexible in seating arrangements, engaging with technology, and supportive of collaboration, these learning spaces encourage teachers to venture and adapt to various learning styles. Additionally, as teacher become more competent with technology, they develop confidence and improve their teaching competence. This leads to more innovative and effective teaching. The study strongly recommends that schools and educational institutions continuously improve their teachers' innovative teaching competence by providing support to make their classrooms beneficial for students and by offering training and resources for technology integration.

Keywords: Innovative learning spaces, Technology integration and Innovative teaching competencies.

1. Introduction

The pursuit of academic success in the ever-evolving field of education is driven by innovative strategies that cater to the diverse needs of students. It is impossible to exaggerate the importance of teachers, especially in the context of public elementary schools. A paradigm shift in the educational ecology is evident as we move through the twenty-first century, as reflected in the growing emphasis on creative learning environments and the ongoing enhancement of elementary school teachers' instructional skills. Schools need to adopt new teaching strategies that will engage students and help them develop 21st-century abilities. (Pearlman, 2010) Despite the widespread consensus that students require critical thinking abilities as well as the capacity for effective communication, innovation, and problem-solving via cooperation and negotiation, pedagogy has rarely changed to meet these demands.

It is just as important to re-evaluate pedagogy for the twenty-first century as it is to pinpoint the new competencies that students of today must acquire. (Luna Scott, 2015) Many studies have indicated that cultural and structural systems influence the initial formation of social practices, while individual systems shape the diversity of this formation. The findings highlight the importance of assisting teachers' sense-making in terms of subject teaching conceptions, professional identity, the affordances and constraints of the space, and confidence in and capacity to construct and manage effective learning experiences within the space when implementing educational changes. (Lai et al., 2020)

The correlation between teaching competency and innovative learning spaces presents an interesting area for research, as it captures the mutual influence of physical settings and teachers' instructional capacities. In the context of public elementary education, where infrastructure and resources can vary, it is crucial to recognize and capitalize on this relationship to create an atmosphere that supports students' holistic development. The role of innovative educational environments in supporting learning in the 21st century has attracted the interest of the Organisation for Economic Co-operation and Development at both the global governance level and the national policy level internationally (Benade, 2022). For the most part, although innovative learning environments have a positive impact on teacher mindsets, there are intervening variables—the most significant being assessment regimes—that prevent teachers from engaging with or changing their practices in innovative learning environments (Bradbeer et al., 2019). The overwhelming weight of the evidence suggests that technologically enhanced learning environments have a positive and significant impact on student learning, even in the absence of other influences (Brooks, 2011).

The ability of teachers to use innovative and creative teaching strategies to engage students and enhance learning outcomes is referred to as innovative teaching competency. The use of digital tools and resources in the teaching and learning process is known as technology integration. The rapid advancement of technology has transformed the way teachers and students are taught, as it enables both groups to acquire new skills and information with ease (Santoso, 2019).

Many teachers believe that technology integration in the classroom is a helpful tool to enhance student engagement and offer personalized learning. They recognize that technology can make lessons more engaging while also providing students with access to a vast array of resources and diverse learning tools. However, some express worries about its difficulties, such as technical glitches, student distraction, or the need for further training. While many teachers are willing to use technology, they often emphasize the importance of balancing digital technologies with traditional teaching approaches to achieve good learning outcomes. Although teachers understand the necessity of incorporating technology into the everyday teaching and learning process, they often face several challenges when effectively integrating technology into their curricula. While some hurdles are resource-related, others derive from fundamental attitudes and practices within the current educational system (Su, 2009).

This research shed light on how innovative learning spaces and technology integration affect the teaching competency of public elementary school teachers by delving into the complex dynamics of this connection, through an analysis of the interactions between physical environments built for contemporary pedagogies and instructors' skill in implementing cutting-edge teaching strategies. The researcher identify potential synergies that could significantly enhance the quality of education for both teachers and students. Research on the correlation between innovative learning environments, technology integration, and teacher abilities is crucial because it reveals how these aspects interact to enhance educational outcomes. Understanding this link can help create more effective learning environments where technology enhances student engagement and individualized learning. At the same time, teachers' skills ensure that these tools are utilized to their maximum potential.

1.1 Statement of the Problem

The focus of the study is the Effect of Innovative Learning Spaces and Technology Integration to Innovative Teaching Competencies among Public Elementary School Teachers

Specifically, this answers the following questions:

1. What is the perception of the respondents to the learning spaces in their school in terms of;

- 1.1. Classroom design;
- 1.2. Availability of Technology;
- 1.3. Flexible seating arrangement; and
- 1.4. Collaborative spaces?

2. What is the perception of the respondents to Technology integration in terms of;

- 2.1. Access to digital tools;
- 2.2. Frequency of technology use;
- 2.3. Teacher training in technology; and
- 2.4. Student connections to technology?

3. What is the level of the Innovative Teaching Competence of the teachers in terms of;

- 3.1. Teacher's ability to integrate technology into lessons;
- 3.2. Creativity in lesson planning;
- 3.3. Student engagement; and
- 3.4. Academic performance?

4. Is there a significant relationship between Innovative Learning Spaces and Innovative Teaching competence?

5. Is there a significant relationship between Technology Integration and Innovative Teaching competence?

6. Singly or in combination, do innovative learning spaces and technology integration significantly predict the innovative teaching competence?

Methodology

The purpose of this chapter is to describe the research. The research methodology that was used and the explanation of the study's methodology, providing the context, theoretical basis, data gathering methods, and information analysis techniques, were presented

This research study used a descriptive quantitative research design. Descriptive quantitative research design is an organized technique for collecting and analyzing numerical data to quantify variables and uncover patterns, connections, or trends. It frequently uses methodologies such as surveys, experiments, or current data analysis, along with statistical tools, to analyze the data. This approach is designed to yield objective, measurable, and replicable results, enabling researchers to test hypotheses, establish descriptive correlations, and generalize their findings to a larger population. To answer and fully emphasize the result of examining the correlation between innovative learning spaces, technology integration and innovative teaching competence among public elementary school teachers.

This study is conducted within the elementary schools of San Narciso District 1, San Narciso, Quezon. The researcher chose the respondents to ensure easier access and coordination, allowing for more efficient data collection and follow-up, reducing logistical challenges like travel and communication delays and neighbouring schools often share similar socioeconomic, cultural, and educational contexts, making it easier to draw meaningful comparisons and identify trends that are relevant to a specific region or community.

A total of 121 teachers participated in the study. The respondent profile consists of a predominantly female group, mostly in the 30 years old and below age bracket, and early-career teachers, primarily designated as Teacher I. A strong majority hold bachelor's degrees or are pursuing graduate degrees, demonstrating enthusiasm for professional growth. There is a significant representation from San Narciso CES, suggesting either its size or active participation.

The study utilized the random sampling technique. Random sampling is employed in research to ensure that every individual or unit in a population has an equal chance of being selected, thereby helping to eliminate bias and increase the generalizability of the findings. By using random sampling, researchers can obtain a representative sample that accurately reflects the characteristics of the broader population, enabling more accurate and reliable conclusions. This method minimizes the impact of human judgment in the selection process, thereby making the research results more valid and applicable to the entire population. Additionally, random sampling enhances the objectivity of the study and reduces the likelihood of systematic errors or skewed data.

The study used researchers' instruments to collect the information required to answer the research questions. For the Quantitative Component, surveys or Questionnaires were utilized. A questionnaire is more suitable for quantitative research, as it collects standardized data from a large number of respondents, enabling researchers to quantify opinions, actions, or attributes. Closed-ended questions have a standardized style that promotes consistency and objectivity, making statistical analysis and identifying trends or patterns easier.

The researcher secured the necessary authorization from school heads to conduct the study and collaborated with all relevant parties to ensure the effective distribution of the questionnaire.

1. Phase one: Gathering foundational information, including literature, studies and relevant materials.

2. Phase two: Conducting the actual data gathering

An approval letter from the research adviser was prioritized, and the questionnaire was edited and submitted accordingly. The researcher personally visits each school to obtain a signature and approval from the school head, allowing the study to be conducted on their premises. The researcher asked one teacher from each school to be responsible for collecting and distributing the Google form links to their co-teachers for completion. They were also asked to monitor the status of how many of their teacher had responded to the survey questionnaire. Open communication through various flat forms, such as Facebook, emails, messengers, text, and calls. The collected data was treated and organized using Microsoft Excel.

The researcher used the following statistical treatment to address all the questions raised in the statement of the problem declared in Chapter 1.

To examine the respondents' perception of innovative learning spaces in terms of classroom design, technology availability, flexibility in seating arrangements, and collaborative spaces, the mean and standard deviation were used.

To examine the perception of the respondents to technology Integration in terms of access to digital tools, frequency of technology use, teacher training in technology, and student engagement, mean and standard deviation were used.

To identify the respondents' level of innovative teaching competencies in terms of the teacher's ability to integrate technology into lessons, creativity in lesson planning, student engagement, and academic performance, the mean and standard deviation were used.

Furthermore, to prove the two hypotheses set in the study – whether innovative learning spaces and technology integration are significantly related to innovative teaching competencies – the Pearson Product-Moment Correlation Coefficient was used.

Lastly, regression analysis was used to determine if singly or in combination, innovative learning spaces and technology integration significantly predict the innovative teaching competence.

Results and Discussion

This chapter presents the findings of the study with corresponding analyses and interpretations derived from the statistical treatment of the data. The study's outcome formed the basis for the conclusions and recommendations presented in this report.

Table 1

Indicators	Mean	SD	Verbal Interpretation
Classroom design	3.48	0.59	Observed
Availability of Technology	3.20	0.67	Observed
Flexible seating arrangement	3.55	0.54	Highly Observed
Collaborative spaces	3.45	0.59	Observed
Overall	3.42	0.60	Observed

Legend: 3.50-4.00 Highly Observed, 2.50-3.49 Observed, 1.50-2.49 Less Observed, 1.00-1.49 Not Observed

Table 1 presents a summary of respondents' perceptions of learning spaces based on its four indicators. The record shows that all indicators are observed with an overall mean of 3.42. The flexible seating arrangement is the highest-rated indicator (3.55), followed by classroom design (3.48) and collaborative spaces (3.45), both of which are interpreted as observed. Although interpreted as observed, the availability of technology garnered the lowest mean score (3.20).

Flexible seating arrangements, being a highly observed indicator, suggest that they are recognized as a significant indicator of effective learning spaces. Compared to classroom design, availability of technology and collaborative spaces, it signifies a strong preference for adjustable learning environments. The prioritization of flexible seating over other factors also implies that comfort, movement, and choice are crucial in impacting student engagement and academic performance. The teacher must let the nature of the task determine the classroom seating arrangement (Havig,

2017). However, the availability of technology shows a lower mean of 3.20. The reason for this manifestation might be rooted in the school's location. The availability of technology can be a challenge for many schools, particularly with the latest devices and technology in the classroom.

Indicators	Mean	SD	Verbal Interpretation
Access to digital tools	3.15	0.81	Observed
Frequency of technology use	3.40	0.67	Observed
Feacher training in technology	3.35	0.63	Observed
Student connections to technology	3.54	0.56	Highly Observed
Overall	3.36	0.67	Observed

Legend: 3.50-4.00 Highly Observed, 2.50-3.49 Observed, 1.50-2.49 Less Observed, 1.00-1.49 Not Observed

Table 2 presents a summary of respondents' perceptions regarding technology integration, including access to digital tools, frequency of technology use, teachers' training in technology, and student connections to technology. The evidence indicates that teachers' perception of technology integration has an overall mean of 3.36. Students' connections to technology have the highest collected mean of 3.54 and are interpreted as highly observed. Followed by frequency of technology use (3.40), then teacher training in technology (3.35). Access to digital tools garnered the lowest mean score of 3.15. This phenomenon can be attributed to students' motivation when technology is integrated into their learning activities. As mentioned by Heafner (2004), Technology empowers students by engaging them in the learning process. The nature of the task is to transition from a teacher-centered to a student-centered approach. Given the flexibility of technology to diversify tasks, the activity was designed to build students' prior knowledge and address student interests.

The summary of the respondents' perceptions on technology integration shows that, among the four sub-variables, students' connection to technology has the highest tendency as a determinant of effective technology integration. The results show that when technology is used in the classroom, students are more inclined to engage in discussions. However, despite the significant impact of student connections to technology, access to digital resources yielded the lowest mean. Although digital resources (Smart TVs and projectors) provided by the school were effectively utilized by the teachers, having less access to more digital resources like the internet may hinder the maximization of their usability.

Table 3

Summary Table on the Level of the Innovative Teaching Competencies

Indicators	Mean	SD	Verbal Interpretation		
Teacher's ability to integrate technology into lessons	3.47	0.57	Competent		
Creativity in lesson planning	3.54	0.52	Highly Competent		
Student engagement	3.63	0.52	Highly Competent		
Academic performance	3.60	0.55	Highly Competent		
Overall	3.56	0.54	Highly Competent		

Legend: 3.50-4.00 Highly Competent, 2.50-3.49 Competent, 1.50-2.49 Less Competent,

As outlined in Table 3, the summary table on the respondents' level of innovative teaching competence, which assesses teachers' ability to integrate technology into lessons, creativity in lesson planning, student engagement, and academic performance, indicates that teachers are highly competent, with an overall mean of 3.56. Among all four sub-variables of innovative teaching competencies, student engagement achieved the highest mean (3.63). Followed by academic performance (3.60), then creativity in lesson planning (3.54). The teacher's ability to integrate technology into lessons garnered the lowest mean of 3.47.

The high rating of teachers' innovative teaching competence across cleverness in lesson planning, student engagement and academic performance emphasizes teachers' ability to design engaging and imaginative lessons. It strongly suggests a direct correlation between the teachers' innovative methods and improved students' learning outcomes, as measured by academic performance. In short, teachers who excel in creating a stimulating learning experience that leads to significant student achievements. However, though interpreted as competent, the teachers' ability to integrate technology into lessons gathered the lowest mean score of 3.47. It can be connected to the technology available and provided in the school. Teachers only maximize the technology they have and integrate what they are provided.

Table 4

Test of Significant Relationship between Learning Spaces and Innovative Teaching Competencies

	_	Learning Spaces	Innovative Teaching Competence
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Table 2

	Teacher's ability to integrate technology into lessons	Creativity in lesson planning	Student engagement	Academic performance
Classroom design	0.427**	0.379**	0.403**	0.417**
Availability of Technology	0.619**	0.428^{**}	0.422**	0.365**
Flexible seating arrangement	0.403**	0.403**	0.458^{**}	0.454^{**}
Collaborative spaces	0.430**	0.393**	0.414^{**}	0.398**

**. Correlation is significant at the 0.01 level (2-tailed).

As shown in Table 4, a significant positive relationship exists between learning spaces and innovative teaching competence. Enhanced learning spaces correlate strongly with increased innovative teaching. A well-designed, technology-rich space, flexible and collaborative spaces encourage teachers to experiment with diverse pedagogical approaches. Positive student responses in stimulating learning spaces reinforce the use of innovative teaching methods. Ultimately, well-designed learning spaces foster a supportive classroom that values experimentation and risk-taking teaching. This inclined with the understanding that a learning spaces like this reflects the work context students are likely to encounter. And that these contexts may enhance their learning experiences. The findings implied that a significant achievement of the space has been to enhance teachers' awareness of the goals and expectations associated with a curriculum that focus on skills acquisition. This development has also enabled those who opted to utilize the space to investigate how best to engage students within it. (Campbell, 2020).

Schools play a crucial role in providing innovative teaching by supporting well-designed learning spaces. The positive significant relationship between learning spaces and innovative teaching competence underscores the need for educational institutions to prioritize the development of flexible, technology-integrated, and collaborative environments. Classrooms not only inspire teachers to adopt diverse and creative teaching methods but also enhance student engagement and learning outcomes. By aligning classroom settings with real-world work environments, schools can prepare students for future challenges while simultaneously supporting teachers in delivering meaningful and dynamic instruction.

Among all variables of learning spaces, availability of technology have the strong correlation with teachers ability to integrate technology into lessons (0.619**). Solidifying the argument that teacher could only use available technological resources in their lesson. However, the availability of technology has a weak, significant relationship with academic performance (0.365**). Providing the idea that teachers may be highly competent in innovative teaching in terms of academic performance, even with limited access to technological resources. **Table 5**

	Innovative Teaching Competence						
Technology Integration	Teacher's ability to integrate technology into lessons Creativity in lesso planning		Student engagement	Academic performance			
Access to digital tools	0.593**	0.470^{**}	0.340^{**}	0.339**			
Frequency of technology use	0.738**	0.666**	0.701^{**}	0.587^{**}			
Teacher training in technology	0.743**	0.580^{**}	0.551**	0.602^{**}			
Student connections to technology	0.685^{**}	0.673**	0.797^{**}	0.613**			

Test of Significant Relationship between Technology Integration and Innovative Teaching Competencies

**. Correlation is significant at the 0.01 level (2-tailed).

As shown in Table 5, a positive and significant relationship exists between technology integration and innovative teaching competence. Interest is mounting regarding the incorporation of technology into the classroom settings. A variety of initiatives have been launched to develop inservice teacher training processes that will enhance this integration. (Guzmann & Nussbaum, 2009) Effective technology integration significantly enhances innovative teaching competence. Teachers who use technology can implement various and engaging learning activities that cater to the diverse learning styles of their students. Access to digital tools, the frequency of technology use, teachers' training in technology, and students' connection to technology all boost innovative teaching competence. Access to vast technological resources expands teaching possibilities beyond traditional methods. Therefore, a strong positive relationship exists between skilful technology use and the ability to create innovative and effective teaching practices.

The integration of technology to enhance innovative teaching competencies among teachers should be prioritized by schools. There is a positive and significant relationship between technology use and teaching innovation, suggesting that when teachers are supplied with proper training and access to digital tools, they are more capable of designing engaging and diverse learning experiences fitted to various student learning styles. This highlights the importance of ongoing professional development programs that focus on technology use, as well as investments in modern technological infrastructure. By offering a technology-rich environment, schools cannot only empower teachers to innovate but also create more relevant and integrated learning experiences for students.

Among all variables of technology integration, teachers' training in technology has a strong and significant relationship with teachers' ability to integrate technology into lessons (0.743^{**}) . It is justifiable to say that the level of teachers' ability to integrate technology into lessons is based on how well they are trained and knowledgeable in using technology. However, access to digital tools has a weak correlation with student engagement (r = 0.340^{**}), suggesting that teachers can still be effective in engaging students even with limited access to digital tools. These findings suggest that the strong connections between technology integration and innovative teaching competencies of teachers are driven by how well teachers utilize technological resources in their lesson planning and delivery.

						-		
1	0.849	0.722	36.3	8	112	<.001		
			_	95% Co	nfidence	Interval		
Predictor	Estimate	SE		Lower		Upper	t	р
Intercept	0.804	0.191		0.425		1.182	4.206	<.001
Technology Integration								
Frequency of technology use	0.199	0.077		0.046		0.351	2.575	0.011
Teacher training in technology	0.169	0.070		0.030		0.308	2.410	0.018
Student connections to technology	0.368	0.066		0.237		0.499	5.573	<.001

Table 6.

F

Overall Model Test

df1

df2

p

Test of Significant Predictors of Innovative Teaching Competencies from Innovative Learning Spaces and Technology Integration

R²

Model

R

The regression analysis presented in Table 6 examines how various aspects of technology integration predict innovative teaching competence. The overall model is statistically significant with an F-value of 36.3 (df1 = 8, df2 = 112, p < .001), indicating that the set of predictors significantly explains variation in innovative teaching competence. The model has a high R² value of 0.722, indicating that 72.2% of the variance in innovative teaching spaces and technology integration can be explained by 72.2% of the variance in innovative teaching competence.

Among the predictors related to technology integration, three variables the frequency of technology use, teacher training in technology, and student connections to technology are statistically significant. "Student connections to technology" has the highest standardized estimate ($\beta = 0.368$, p < .001), suggesting it is the most influential predictor in the model. This is followed by "frequency of technology use" ($\beta = 0.169$, p = 0.011) and "teacher training in technology" ($\beta = 0.169$, p = 0.018). The confidence intervals for all three predictors do not include zero, further confirming their statistical significance. These findings suggest that fostering strong student-technology connections, ensuring frequent tech usage in instruction, and providing teacher training are all critical for enhancing innovative teaching competence.

Recommendations

In light of the findings and conclusions of the study, the following recommendations are offered:

1. Based on the research results, the researcher suggests that schools should provide their teachers with digital resources to enhance their innovative teaching competence, specifically in terms of integrating technology into lessons.

2. Based on the research results, the researcher suggests that schools should provide more accessible digital tools to enhance student engagement through the integration of technology.

3. Since the research demonstrated a significant relationship between innovative learning spaces, technology integration, and innovative teaching competencies, the researcher suggests that schools must continuously improve their teachers' innovative teaching competence by providing support to make their classrooms beneficial for students and by offering training and resources for technology integration.

4. Another study that expands on the scope and variables may be conducted to examine further the correlation between innovative learning spaces, technology integration, and innovative teaching competence.

5. Future research could investigate the mediating role of student engagement in the relationship between technology integration and innovative teaching competence, aiming to understand better how technology use translates into effective teaching practices.

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