Cultivating Third-Grade Students' In-Class Learning Experiences and Performance through Technological Simulations in Science Classroom

Eunice Morales Tuñacao

eunice.tunacao@deped.gov.ph
Laguna State Polytechnic University Sta. Cruz Laguna 4009 PHILIPPINES

Abstract

The study aimed to determine the utilization of technological simulation in cultivating the learning experiences and performance of third grade students in science classroom. Specifically, it aimed to determine the level of utilization of Technological Simulation, the students' in-classroom learning experiences as well as the students' performance. In addition, the significant difference in the students' performance in their Diagnostic and Achievement Test, and the significant effect of Technological Simulation on students in-class learning experiences were measured.

The use of technological simulation was investigated using a quasi-experimental approach, which demonstrated its main impact on students' science performance and in-class learning experiences. Purposive sampling technique was used to select the ninety-three (93) grade -3 pupils of Sampaguita Village Elementary School. Diagnostic and achievement tests and survey questionnaire in the form of a checklist were used to evaluate the use of technological simulation and in teaching Science and its effect on the students' learning experiences and performance.

The gathered data, revealed that students had very high level with regards to the utilization of Technological Simulation and to the students in-classroom learning experiences. Furthermore, data showed that the students' Science performance is very satisfactory. Moreover, there is a significant difference between the students' performance in diagnostic and achievement tests. Lastly, the utilization of Technological Simulation has no significant effect in cultivating the classroom learning experiences of third graders.

These are the conclusions drawn based on the study's various findings. A significant difference was found between the students' performance in their diagnostic and achievement test; thus rejecting the hypothesis. This development indicates that students have learned and understood the scientific concepts better, leading to higher scores in the achievement test compared to their initial diagnostic test scores On the other note, the utilization of Technological Simulation has no significant effect on students' learning experiences; thus accepting the second hypothesis. This underscores that it does not directly affect the potential of technology to augment traditional teaching methods as it fosters a direct instruction where students tend to get more focused in relation to students' learning experiences.

In light of the findings and conclusions, the following recommendations emerged. Teachers may offer detailed instructions on how to use these kinds of simulations to improve students' communication skills and motivation, as they include more investigative exercises relevant to simulation in their curricula in order to encourage student cooperation, critical thinking, and interactive learning. Students may take advantage in these engaging science exploratory activities, as they can incorporate them into their foundational knowledge. Consequently, educators may adapt the academic performance task in science from the level of their understanding in a specific science concept.

Keywords: technological simulation; students' performance; utilization

1. Introduction

A successful science education system promotes the conditions required for the highest potential science learning. We must assemble everything in order to accomplish this. Teachers must incorporate lesson preparation, different principles, varied ideas, and learning methodologies in order to create a learning environment that is focused on the requirements of each individual student. Through the use of methods, exploration, and comprehension of scientific knowledge, these tactics help students become involved in science. Students become co-initiators of their own education through student-centered learning (SCL), which involves the learners in possibilities regarding what, when, and how they learn.

Exploration and curiosity are natural human traits that help us make decisions, practice critical thinking, and think critically about everything. An effective science education system fosters the conditions necessary for the best potential science learning. Active learners are more likely to aid learning processes. To do this, everything needs to come together. In order to establish a learning environment that is focused on the needs of each individual student, teachers must include lesson preparation, various principles, varied ideas, and learning approaches. These strategies assist children in developing an interest in science through the application of methodologies, inquiry, and comprehension of scientific knowledge. Through student-centered learning (SCL), which involves the learners in the options on what, when, and how they learn, students become co-initiators of their own education. Active engagement is encouraged, in experiment-based learning, which is frequently more interesting and memorable than passive learning techniques. When students have first-hand experiences with concepts, they are more likely to recall and comprehend them. As per the findings of Galan et. al (2017) that, experiment-based learning is an essential part of inquiry-driven education with numerous advantages.

On the other hand, scientific experiments use technological simulations extensively. Without affecting actual processes, they are utilized to optimize and increase industrial process efficiency. Computer simulations are now widely used in several study fields and have become a key component in the growth of science research. Through their ability to inform us what might be or might have been, simulations give us a modal comprehension of reality, which is useful knowledge about the outside world. Simulations provide us a modal comprehension of reality, which is helpful knowledge about the outside world, by letting us know what might be or might have been They produce information that has boundaries are located within the larger framework of experimental and model-building procedures. When experiments are conducted with simulations incorporated into the process,

In all of these cited evidences and influences everything must work in harmony for this to happen as to which this study is contemplating to do so. Therefore, bring about to tackle "Cultivating third-grade students' in-class learning experiences and performance through technological simulations in science classroom.

1.1 Statement of the Problem

Specifically sought to answer the following questions.

1. What is the level of utilization of Technological Simulation in terms of its:
   - 1.1 Collaboration;
   - 1.2 Communication Skills;
   - 1.3 Motivation;
   - 1.4 Resilience;
   - 1.5 Persistence; and

1.6 Time Efficiency?

2. What is the status of students' in-classroom experiences in connection with:
   2.1 Engagement; and
   2.2 Interactivity?
3. What is the level of Students performance in terms of:
   3.1 Diagnostic Test; and
   3.2 Achievement Test?
4. Is there a significant difference in the students' performance in terms of Diagnostic Test and Achievement Test?
5. Is there a significant effect in the utilization of Technological Simulation in student's learning experiences?

2. Methodology

Quasi-Experimental design was used in this study to measure the effectiveness of technological simulation for grade three learners' with regards to their classroom learning experiences and performance. In this approach, the researcher used technological simulation which will be measured through its collaboration, communication skills, motivation, resilience, persistence, and time efficiency. On the other hand, these variables were correlated to the third grade students' classroom experiences and performance. Diagnostic and Achievement test were given to the respondents and the outcomes will be measured, covering the selected topics in science which comprises, Sense Organs, Parts of the Plants and Identifying Living and Non-Living things as for the basis of this study. Additionally, this study will also gather information such of numerical data as display in a quantitative research.

3. Results and Discussion

This chapter enumerates the different results and discusses the results that were yielded from the treatment of the data that was gathered in this study.

Level of Technological Simulation

In this study, the characteristics of Technological Simulation include collaboration, communication skills, motivation, resilience, persistence and time efficiency and statistically measured using mean and standard deviation.

Level of Technological Simulation in terms of Collaboration

The results emphasize the crucial role of proficient teamwork, communication, and knowledge exchange in optimizing the educational benefits obtained from these tasks. While students strongly agree on the benefits of collaboration, slight variations in responses regarding data collection efficiency indicate potential areas for further exploration and improvement in collaborative practices. Students strongly agreed that technological simulation enhanced communication and collaboration among team members and it facilitate the sharing of ideas and knowledge within the team obtaining the highest mean *(M=4.51, SD= 0.76)* and leads collaborative efforts which improve the efficiency of data collection during technological simulation *(M=4.44, SD= 0.79).*

This also implies that data collecting efficiency is increased by cooperative efforts made possible by technological simulations. This means that students can gather, evaluate, and understand data more successfully and quickly when they collaborate within the simulation environment than when they work alone. Higher quality results and insights from the simulated operations may result from this efficiency.

Table 1 *Level of Technological Simulation in terms of Collaboration*

STATEMENTS	***MEAN***	***SD***	***REMARKS***
Technological Simulation enhanced communication and collaboration among team members.	4.51	0.73	Strongly Agree
Technological Simulation facilitates the sharing of ideas and knowledge within our team.	4.51	0.76	Strongly Agree
Technological Simulation fosters a sense of teamwork and unity among team members.	4.49	0.69	Strongly Agree
The team feels adequately supported in the use of technology for experimental purposes	4.45	0.74	Strongly Agree
Collaborative efforts improve the efficiency of data collection during Technological Simulation.	4.44	0.79	Strongly Agree
Weighted Mean		*4.48*	
SD		*0.68*	
Verbal Interpretation		*Very High*	

The weighted mean of 4.48 and standard deviation of 0.68 indicates a very high level of technological simulation in terms of collaboration. This means that collaboration in technological simulation allows the students to share their diverse perspectives and knowledge, leading to a deeper understanding of the subject matter. Teamwork skills cultivated through collaboration are invaluable in today's interconnected world where success often depends on the ability to work effectively within a team. By engaging in technology collaboratively, students not only deepen their understanding of the subject matter but also learn how to cooperate, delegate tasks, and leverage diverse perspectives to achieve common goals.

Table 2. *Level of Technological Simulation in terms of Communication Skills*

STATEMENTS	***MEAN***	***SD***	***REMARKS***
The efficiency of technological simulation processes is enhancing through clear communication.	4.41	0.70	Strongly Agree
Working on technology simulation has enhanced my written communication skills.	4.38	0.78	Strongly Agree
Working on technology tasks has helped me develop better listening skills.	4.42	0.78	Agree
Technological projects have provided opportunities to enhance my ability to communicate in a collaborative work setting.	4.43	0.79	Strongly Agree
Overall, participating in technological simulation has positively influenced my communication skills	4.43	0.73	Strongly Agree
Weighted Mean		*4.41*	
SD		*0.70*	

Verbal Interpretation	*Very High*

According to Table 2, the students' overall weighted mean of 4.41 and standard deviation of 0.70 indicate that they possess a very high degree of qualities. This means that using technology simulation to help students develop their communication skills is important. Teachers can help students become skilled communicators by providing opportunities for them to practice and hone their skills in a motivating and encouraging learning environment. Proficiency in communication is a crucial component of academic achievement, career advancement, and personal development. By engaging in technological simulation, students have the opportunity to practice and refine various aspects of communication, including verbal, written, and interpersonal skills.

It shows that the students strongly agreed that technological simulations have provided opportunities to enhance their ability to communicate in a collaborative work setting *(M=4.43, SD= 0.79)* and participating in technological simulation has positively influenced their communication skills *(M=4.38, SD= 0.78).* The data underscores how technological simulation effectively enhances students' communication skills in collaborative work environments. It also shows the beneficial influence of participatory technological simulation on overall communication abilities. Educators can capitalize on these inherent communicative opportunities within investigatory projects to empower students, fostering their confidence and effectiveness as communicators. Investigations always entail a variety of communication opportunities. Students conduct experiments, gather data, analyze it, and report their findings.

Table 3 *Level of Technological Simulation in terms of Motivation*

STATEMENTS	***MEAN***	***SD***	***REMARKS***
The use of technological simulations enhances my motivation to learn	4.39	0.75	Strongly Agree
I feel excited about using technological simulations as part of my learning experience	4.39	0.75	Strongly Agree
Technological simulations inspire me to explore and understand concepts in greater depth	4.52	0.72	Strongly Agree
The integration of technological simulations in learning increases my overall motivation	4.42	0.73	Agree
I feel a sense of accomplishment when successfully navigating through technological simulations.	4.41	0.77	Strongly Agree
Weighted Mean		*4.42*	
SD		*0.65*	
Verbal Interpretation		*Very High*	

Table 3 discloses the level of Technological Simulation in terms of its Motivation attained a weighted mean score of 4.42 and a standard deviation of 0.65 and was *Very High* among the respondents. These results imply that respondents widely agree on the motivational impact of technological simulations. This underscores the perceived effectiveness of such simulations in encouraging motivation among learners, emphasizing their potential significance in educational environments for improving engagement and learning outcomes.

On the other hand, the lowest mean score of responses with *(M=4.39, SD=0.75)* yet was remarked *Strongly Agree.* The results indicate a positive perception among students regarding the impact of technological simulations on motivation. The elevated mean scores imply that students commonly view these simulations as effective tools for fostering deeper exploration of concepts and boosting enthusiasm for learning. Despite one statement yielding a slightly lower score, it still underscores a favorable view of the motivational advantages associated with integrating technological simulations into the learning experience.

Table 4 displays the level of Technological Simulation in terms of its Resilience which attained a weighted mean score of 4.46 and a standard deviation of 0.62 and was Very High among the respondents which indicates that students are well-equipped to navigate and overcome challenges encountered during the use of simulations for learning purposes. Students *strongly agreed* to which technological simulations makes them feel more capable in tackling challenging science topics *(M=4.42, SD=0.70)*, they set clear goals for myself when using technological simulations to study science *(M=4.48, SD=0.73)*.

These findings highlight the multifaceted benefits of technological

Table 4 *Level of Technological Simulation in terms of Resilience*

STATEMENTS	*MEAN*	*SD*	*REMARKS*
Technological simulations make me feel more capable in tackling challenging science topics.	4.42	0.70	Strongly Agree
I enjoy exploring innovative ways to apply knowledge gained through technological simulations to real-world scenarios.	4.48	0.72	Strongly Agree
I set clear goals for myself when using technological simulations to study science.	4.44	0.79	Strongly Agree
I see challenges in studying science through technological simulations as opportunities for growth.	4.45	0.74	Strongly Agree
Collaborating with peers enhances my resilience in studying science through technological simulations.	4.48	0.73	Strongly Agree
Weighted Mean		*4.46*	
SD		*0.62*	
Verbal Interpretation		*Very High*	

Simulations in science education. By fostering feelings of capability, enjoyment, goal-setting, resilience, and collaboration, simulations play a crucial role in enhancing students' learning experiences and outcomes in science.

This indicates that pupils demonstrate a strong capacity to recover from setbacks and overcome obstacles when using technological simulations. In this context, resilience is the ability to adjust in a constructive way when faced with difficulties or setbacks. Resilience is greatly enhanced by a supportive learning environment. Students are more likely to overcome obstacles and ask for assistance when necessary when they perceive that their peers and teachers are rooting for them. Students can develop resilience with the help of opportunities for collaboration, constructive criticism, and encouragement.

The data in Table 5 shown below, that the students had *very high acceptability* in terms of persistence *(M=4.46, SD=0.55)* meaning that students exhibit a significant degree of persistence when technological simulations are integrated into their classroom learning experiences.

The findings mean that students who were exposed to technology-enhanced learning environments demonstrated higher levels of persistence compared to those in traditional classrooms

In terms of persistence, the students strongly agreed that they stay engaged in my science studies through technological simulations, consistently working towards their learning goals; it obtained the highest mean *(M=4.53, SD=0.75)*. This indicates that the majority of respondents strongly agreed with this statement, implying that they maintain high levels of engagement and commitment to their science studies when utilizing technological simulations..

This may indicate a slightly lower level of agreement or perceived effort among respondents when faced with challenges in studying science through technological simulations.

This inferred that, students demonstrate a strong level of persistence and engagement in their science studies when utilizing technological simulations, actively pursuing their learning objectives.

Table 5 *Level of Technological Simulation in terms of Persistence*

STATEMENTS	*MEAN*	*SD*	*REMARKS*
I am committed to persistently studying science through technological simulations for the long term	4.48	0.72	Strongly Agree
I persistently engage in problem-solving activities using technological simulations to enhance my scientific skills	4.51	0.73	Strongly Agree
I am persistent in staying focused on my science studies when utilizing technological simulations as a learning tool	4.44	0.76	Strongly Agree
I stay engaged in my science studies through technological simulations, consistently working towards my learning goals.	4.53	0.75	Strongly Agree
. I consistently put in effort when studying science through technological simulations, even when faced with challenges	4.32	0.82	Strongly Agree
Weighted Mean		*4.46*	
SD		*0.55*	
Verbal Interpretation		*Very High*	

Although there may be slight variations in effort when confronted with challenges, the general consensus remains positive, highlighting a resolute dedication to learning and overcoming obstacles within the framework of technological simulation-based education.

Table 6 unveils, that the remarkable rating of "Very High" (M=4.49, SD=0.67) in terms of time efficiency is achieved by the observations. A mean of 4.49 indicates that the vast majority of respondents or observers believe that the technological simulations are extremely efficient in terms of time management.

Table 6 *Level of Technological Simulation in terms of Time Efficiency*

STATEMENTS	*MEAN*	*SD*	*REMARKS*
I believe I have effective time management skills when using technological simulations for studying science.	4.47	0.75	Strongly Agree
I find that using technological simulations makes my study sessions in science more time-efficient.	4.45	0.74	Strongly Agree
I am able to optimally use my study time by incorporating technological simulations into my science learning.	4.54	0.75	Strongly Agree
I can quickly grasp science concepts through the use of technological simulations, saving study time.	4.48	0.72	Strongly Agree
Technological simulations help streamline my	4.48	0.75	Strongly Agree

study sessions, allowing me to cover more material in less time.	
Weighted Mean	*4.49*
SD	*0.67*
Verbal Interpretation	*Very Great Extent*

The students *strongly agreed* that they believe they have effective time management skills when using technological simulations for studying science obtaining the lowest weighted mean of 4.45. This indicates that students feel confident in their ability to manage their time efficiently while engaging with technological simulations, indicating a sense of control and organization in their learning process. Additionally, they *strongly agreed* that they are able to optimally use their study time by incorporating technological simulations into their science learning *(M=4.54, SD=0.75).* The elevated mean score in comparison to the previous statement implies a heightened consensus among students regarding the efficacy of utilizing technological simulations to optimize their study time. The overarching trend portrays that most students view technological simulations as beneficial aids for maximizing their study time and enhancing their learning outcomes in science.

Level of Students' in-classroom Learning Experiences

In this study, the level of Students' in-classroom Learning Experiences was determined by the students' engagement and interactivity and statistically measured by standard deviation. These elements are important predictors of how well students are learning and how they view the learning environment in the classroom. Putting mental effort into learning tasks entails applying critical thinking skills, thoroughly analyzing data, and being willing to take on challenging issues. Cognitively engaged and interactive students are more likely to comprehend and remember the content.

In table 7, the data in terms of engagement was presented. Students' learning experiences involve a variety of interactions, activities, and settings that allow them to interact with educational content, concepts, and skills. These experiences are diverse and can take place in both formal educational environments such as classrooms, labs, and libraries, as well as informal settings like extracurricular activities, field trips, or online learning platforms.

Table 7. *Level of Students' In-Classroom Learning Experiences in terms of Engagement*

STATEMENTS	*MEAN*	*SD*	*REMARKS*
There is an impact of hands-on activities or experiments on your level of engagement in science learning	4.40	0.78	Strongly Agree
You find science lessons interesting and relevant to your interests	4.40	0.77	Strongly Agree
You feel challenged by the content of science lessons	4.52	0.75	Strongly Agree
You find yourself connecting real-world situations to the scientific concepts learned in class	4.43	0.79	Strongly Agree
You feel a sense of accomplishment when successfully solving scientific problems or completing assignments	4.43	0.76	Strongly Agree
Weighted Mean	*4.43*		
SD	*0.71*		
Verbal Interpretation	*Very High*		

Data revealed that the students *strongly agreed* that they feel challenged by the content of science lessons *(M=4.52, SD= 0.75)*; they find themselves connecting real-world situations to the scientific concepts learned in class *(M=4.43, SD= 0.79)*; they feel a sense of accomplishment when successfully solving scientific problems or completing assignments *(M=4.43, SD= 0.76)*; they find science lessons interesting and relevant to your interests *(M=4.40, SD= 0.77)*; and there is an impact of hands-on activities or experiments on their level of engagement in science learning *(M=4.40, SD= 0.78)*. This indicates that students exhibit high levels of engagement during their in-classroom science learning experiences. They perceive the content as challenging, connect it to real-life situations, feel a sense of achievement when tackling problems, find the lessons interesting and personally relevant, and benefit from hands-on activities and experiments. Students are pushed to extend their cognitive capacities with challenging information, which fosters analytical, problem-solving, and critical thinking abilities. This kind of mental stimulation is essential for long-term memory retention and in-depth learning

In terms of engagement, the students had *very high* level of in-classroom Learning Experiences *(M=4.43, SD= 0.71)*. This implies that students were highly engaged and actively involved in their classroom learning activities. High mean scores indicate that, on average, students felt deeply invested in their learning, participating eagerly in class discussions, activities, and assignments.

Table 8 uncovers the results that the statement "*There is a student-to-student interaction during group projects or collaborative activities in* science lessons" obtained the highest mean of 4.45 with a remark of strongly agree. Hence, it means that students perceived a high level of peer interaction and collaboration during group work or collaborative activities in science lessons. The findings of this study contribute to our understanding of effective teaching practices that promote student engagement in science classrooms.

Table 8. *Level of Students' In-Classroom Learning Experiences in Terms of Interactivity*

STATEMENTS	***MEAN***	***SD***	***REMARKS***
To what extent do you feel that interactive technologies, such as simulations or virtual labs, are integrated into your science lessons	4.41	0.76	Strongly Agree
On a scale of 1 to 5, how interactive do you find group discussions and collaborative projects in your science class	4.43	0.70	Strongly Agree
The interactivity contribute to your understanding of complex scientific concepts	4.44	0.76	Strongly Agree
There is a student-to-student interaction during group projects or collaborative activities in science lessons	4.45	0.71	Strongly Agree
Do you find virtual reality or augmented reality applications in making science lessons interactive?	4.42	0.70	Strongly Agree
Weighted Mean		*4.43*	
SD		*0.65*	
Verbal Interpretation		*Very High*	

It provides insights into the role of teachers in creating stimulating learning environments, fostering positive attitudes towards science, and enhancing student interest and motivation in scientific inquiry. Such interactions are essential for promoting teamwork, communication skills, and collective learning experiences among students. Furthermore, the statement "*To what extent do you feel that interactive technologies, such as simulations or virtual labs, are integrated into your science lessons"* obtained the lowest mean of 4.41 and a standard deviation of 0.76. This indicates interactive technologies are available in science lessons, they might not be as extensively incorporated or utilized as student-to-student interactions. Nonetheless, the overall mean score still indicates a high level of agreement among students regarding the integration of interactive technologies in their science lessons.

In terms of interactivity, it revealed that the students had *very high* level of in-classroom Learning Experiences *(M=4.43, SD= 0.65)* indicating that students actively participated in various interactive learning tasks, such as group projects, collaborative activities, and the utilization of interactive technologies. These findings emphasize the effectiveness of integrating interactive learning experiences into the classroom environment, as they can significantly enhance student engagement, motivation, and overall learning outcomes across diverse educational contexts.

Level of Students' Performance

The level of Students' Science Performance was determined by their scores in diagnostic achievement tests. Frequency, percentage, weighted mean and standard deviation were used to assess the students' performance.

Table 9 presents the level of students' science performance with regards to Diagnostic Test. It reveals that out of total number of ninety-three respondents *"9 to 16*" received the highest frequency of forty-six (46) or 49.46% of the total population with descriptive equivalent of *Fairly Satisfactory*. While the scores *"25 to 32*" received the lowest frequency of seven (7) or 7.53% of the total population with descriptive equivalent of *Very Satisfactory*.

Table 9. *Level of Students' Performance to Diagnostic Test*

Score	f	%	Descriptive Equivalent
33 - 40	0	*0.00*	Outstanding
25 - 32	7	*7.53*	Very Satisfactory
17 - 24	40	*43.01*	Satisfactory
9 - 16	46	*49.46*	Fairly Satisfactory
0 - 8	0	*0.00*	Did not meet Expectation
Total	**93**	**100**	
Weighted Mean	17.10		
SD	3.99		
Verbal Interpretation	*Satisfactory*		

With a *(Weighted Mean = 17.10, SD = 3.99)* it shows that the level of students' science performance through Technological Simulations for Elementary Education with regards to diagnostic test has a descriptive equivalent of *Satisfactory.* This means that, on average, students' performance falls within an acceptable range, meeting the expected standards or criteria for proficiency in the subject matter. While there may be some variability in individual performance, the overall performance is deemed satisfactory.

Table 10 presents level of students' science performance with regards to Achievement Test. It revealed that in a total number of ninety-three respondents "25 to 32" received the highest frequency of fifty-four (54) or 58.06% of the total population with descriptive equivalent of Very Satisfactory.

Table 10. *Level of Students' Performance to Achievement Test*

Score	f	%	Descriptive Equivalent
33 - 40	39	*41.94*	Outstanding
25 - 32	54	*58.06*	Very Satisfactory
17 - 24	0	*0.00*	Satisfactory
9 - 16	0	*0.00*	Fairly Satisfactory

0 - 8	0	*0.00*	Did not meet Expectation
Total	**93**	**100**	
Weighted Mean	32.10		
SD	3.63		
Verbal Interpretation	*Very Satisfactory*		

While the scores *"33 to 40*" received the lowest frequency of thirty-nine (39) or 41.94% of the total population with descriptive equivalent of *Outstanding*.

With a *(Weighted Mean = 32.10, SD = 3.63)* it shows that the level of students' science performance through Technological Simulations in Science Investigatory Activities for Elementary Education with regards to achievement test has a descriptive equivalent of *Very Satisfactory.* This infers that, on average, students' performance on the test is highly satisfactory and meets the expected standards for proficiency in science. The descriptive equivalent provides a concise summary of the overall performance level observed among the students.

Significant Difference in the Student's Performance

To determine if there is a significant difference in the students' performance in terms of diagnostic and achievement test, paired sample t-test was used.

Table 11. *Significant Difference in the Students' Performance in terms of Diagnostic and Achievement Tests*

Performance	Mean	Standard Deviation	t	df	p	Analysis
Diagnostic	17.14	3.99	-36.72	92	< .001	Significant
Achievement	32.05	3.63				

Table 11 shows the results after a paired sample t-test was used to compare their scores. Therefore, revealed that the scores obtained in diagnostic test (*M* = 17.14, *SD*= 3.99*)* were significantly lower compared to the scores obtained in achievement test (*M* = 32.05, *SD*= 3.63). This finding signifies an improvement in students' performance in Science, as reflected in their achievement test scores. In addition, the score of standard deviation of achievement is less than standard deviation of diagnostic. This indicates that the scores in the achievement test are more consistent or homogeneous compared to those in the diagnostic test.

Based on the results, the t-value is *-36.72* and the p-value is <0.001 at 92 degrees of freedom. Since the p-value is less than the 5% level of significance therefore there is a significant difference between the students' performance in diagnostic and achievement tests. This means that the improvement observed in students' achievement is not due to chance but is a meaningful result of their learning and understanding of Science concepts. This correlation reinforces the idea that diagnostic testing can contribute significantly to enhancing students' understanding and performance in academic subjects, including Science. To ensure that core concepts are strong before moving on to more complicated topics, teachers can design their classes more efficiently by establishing a baseline understanding of student knowledge. Teachers can address knowledge gaps and enhance student performance by implementing tailored interventions based on the information gathered from diagnostic assessments

Significant Effect of Utilization of Technological Simulation in the Classroom Learning Experiences of Third Graders

Multiple Regression Analysis was used to determine the significant effect of utilization of technological simulation in cultivating the students' classroom learning experiences of third graders with regards to engagement and interactivity. In the table, the unstandardized, estimated regression weights, standard errors, beta weights, and p-values for all predictors are given.

The table presents the results of a multiple regression analysis examining the effect of utilization of Technological Simulation in cultivating the classroom learning experiences of third graders. It denotes that it has significant effect to the students' in-classroom learning experiences in terms of Engagement from the perspective of communication skills, resilience and time efficiency.

Table 12. *Regression Analysis on the Effect of Utilization of Technological Simulation in Cultivating the Classroom Learning Experiences of Third Graders*

Consistency	**Unstandardized**	**SE**	**β**	**t**	**p**
Intercept	3.426	0.048		71.941	< .001
Collaboration	0.202	0.089	0.184	2.273	0.026
Communication Skills	-0.038	0.109	-0.03	-0.351	0.727
Motivation	0.085	0.102	0.081	0.837	0.405
Resilience	0.355	0.124	0.358	2.86	0.005
Persistence	0.043	0.125	0.042	0.343	0.733
Time Efficiency	0.405	0.121	0.341	3.33	0.001
Efficiency	**Unstandardized**	**SE**	**β**	**t**	**p**
Intercept	4.43	0.067		65.926	< .001
Collaboration	0.125	0.124	0.125	1.009	0.316
Communication Skills	0.067	0.152	0.056	0.438	0.663
Motivation	-0.111	0.141	-0.117	-0.785	0.435
Resilience	-0.053	0.172	-0.058	-0.305	0.761
Persistence	0.502	0.173	0.541	2.894	0.005
Time Efficiency	0.278	0.169	0.258	1.647	0.103

$^*p < 0.05$

On the other hand, Persistence is significant under the learning experience of Interactivity. The F-test of the overall model is significant (F(2, 90) with, $p < 0.05$), indicating that the regression model is a good fit for the data. It indicates that the integration of Technological Simulation in classroom settings positively impacts the learning experiences of third-grade students. Such simulations likely enhance engagement, promote active learning, and provide students with hands-on experiences that facilitate deeper understanding of concepts. The significant effect observed underscores the potential of technology to augment traditional teaching methods and improve educational outcomes.

By enabling students to investigate scientific ideas and carry out experiments in a virtual setting, these tools improve accessibility and engagement of learning. Students can, explore space or mimic chemical reactions—activities that would be challenging or impossible in a traditional classroom.

4. Conclusion and Recommendations

The following conclusions are drawn based on the study's various findings in order to address the problem's stated requirements;

Result shown that the null hypothesis was rejected signifying that there is a significant difference between the students' performance in diagnostic and achievement tests. This implies that the science performance of the students has improved. This development indicates that students have learned and understood the scientific concepts better, leading to higher scores in the achievement test compared to their initial diagnostic test scores.

The hypothesis was accepted which infers that there is no significant effect in the utilization of Technological Simulation in cultivating the classroom learning experiences of third graders. The significant effect observed underscores that it does not directly affect the potential of technology to augment traditional teaching methods as it fosters a direct instruction where students tend to get more focused in relation to students' learning experiences.

Given the myriad benefits and applications into the utilization of Technological Simulation to explore scientific concepts in a science classroom, and with the findings and conclusions drawn, the following were recommended:

1. Teachers may offer detailed instructions on how to use these kinds of simulations to improve students' communication skills and motivation, as they include more investigative exercises relevant to simulation to their curricula in order to encourage student cooperation, critical thinking, and interactive learning.
2. Students may take advantage in these engaging science exploratory activities, as they can incorporate them into their foundational knowledge.
3. Educators may adapt the academic performance task in science from the level of their understanding in a specific science concept.

Reference:

Galan, D., Heradio, R., de la Torre, L., Dormido, S., & Esquembre, F. (2017). The experiment editor: supporting inquiry-based learning with virtual labs. European Journal of Physics, 38(3), 035702.