ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 10| Issue: 9| September 2024|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2024: 8.402 || ISI Value: 1.188

E-GEOMETRY: DIGITAL SUPPLEMENTARY MATERIALS ON THE MATHEMATICAL COMPETENCY AND PERFORMANCE

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ABSTRACT

This study investigates the efficacy of e-Geometry as a supplementary learning tool for Grade 10 students, focusing on its effect on mathematical competency and performance. The study wants to know the following: extent of the supplementary material in terms its content and features; the extent of the mathematical competency and performance. Also, it determines the significant relationship between the supplementary materials on mathematical competency and performance.

This research uses a descriptive-qualitative method and selective sampling technique. The data from 122 students at Jacobo Z. Gonzales Memorial National High School, Biñan City, are collected through questionnaires via checklists and Five-Likert scales. Statistical analyses, including frequency counts, mean average, standard deviation, and Pearson correlation, are utilized to assess the relationship between the implementation of e-Geometry and students' mathematical competency and performance. Results indicate that both the content and features of e-Geometry are rated as High, suggesting its positive potential as a supplementary learning material.

The findings reveal that the content and features of the of the e-Geometry was considered as a highly-prepared material. Also, it determines the students' mathematical competency and performance, including comprehension, communication, and problem-solving skills, are approaching proficiency levels. The study also reveals a weak positive correlation between the effectiveness of e-Geometry and students' mathematical competency and performance, the study emphasizes the material's favorable effect on learners' proficiency.

The supplementary material had a significant effect on both the students' mathematical competency and performance, thus the null hypotheses were rejected. The use of e-Geometry has a meaningful effect on mathematical skills. Despite the slight relationship, the supplementary material positively influenced learners' mathematical proficiency.

Recommendations for improving supplementary material creation emphasize the need of a collaborative approach that includes instructors and students. Educators may acquire significant insights into their students' needs and preferences by actively engaging them in the design of learning materials, ensuring that the contents are adapted to their individual requirements. This participative method instills in learners a sense of ownership and participation, making the learning experience more meaningful and successful. Furthermore, educators should prioritize developing localized materials that are relevant to their students' cultural and educational contexts. Creating culturally relevant and contextually appropriate materials not only engages learners more successfully, but also meets the varying needs of students from various backgrounds, encouraging inclusion and equality in the classroom.

KEYWORDS: *e-Geometry; supplementary learning tool; mathematical competency*

1. INTRODUCTION

In the evolving education landscape, digital technology has introduced novel tools to supplement traditional teaching. Digital platforms and resources offer educators new opportunities to enhance learning and cater to diverse student needs. One such innovation, e-Geometry, has the potential to revolutionize mathematics education. Through interactive simulations, visuals, and adaptive exercises, e-Geometry engages students in active learning and problem-solving. Its integration into the curriculum marks a shift towards more personalized and interactive educational approaches, aligning with 21st-century learning needs. Gates, P. (2019) explores the revolutionary potential of digital pedagogy in higher education, focusing on how educational technology may improve teaching techniques and student learning results. It investigates the usefulness of different digital tools and platforms, such as interactive simulations and visualizations comparable to those used in e-Geometry, in engaging students and encouraging active learning. This reference supports the premise that digital technologies provide creative tools to supplement traditional teaching techniques and meet the different demands of students in today's changing educational landscape.

As technology becomes more prevalent in education, studying the influence of personalized digital tools such as e-Geometry on student learning outcomes becomes critical for improving pedagogical techniques. Educators must navigate the complex challenge of incorporating digital resources into their teaching methods, and findings from research like this gives vital direction for evidence-based decision-making. Armed with these facts, teachers may successfully use technology to expand students' conceptual comprehension and improve their mathematical skill. By adopting innovative tools such as e-Geometry, educators may expand educational experiences while also providing students with the skills they need to flourish in a dynamic digital world. This new technique not only improves learning outcomes by encouraging deeper conceptual comprehension and critical thinking abilities, but it also provides students with the adaptable attitude required to negotiate the difficulties of a constantly evolving digital world. Students gain the resilience and flexibility required to survive

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in a fast-changing technology context by interacting with innovative tools such as e-Geometry.

This study aimed to investigate how e-Geometry affects the mathematics skills and performance of Grade 10 students in Biñan City, Philippines. The purpose of this study is to determine the usefulness of e-Geometry as a supplemental aid in mathematics instruction through a comprehensive analysis that includes both quantitative and qualitative assessments. Biñan City's unique socio-cultural milieu makes it ideal for studying the relationship between digital innovation and educational outcomes. Understanding how e-Geometry effects students' learning trajectories and problem-solving abilities is critical for developing instructional techniques and curricula that are adapted to the region's particular demands.

1.1 Statement of the Problem

Specifically, it sought answers to the following questions:

1. What is the extent of the e-Geometry supplementary materials in terms of Content such as:
   1.1 Objectives,
   1.2 Discussion,
   1.3 Activity, and
   1.4 Assessment?
2. What is the extent of the e-Geometry supplementary materials in terms of Features such as:
   2.1 Usability,
   2.2 Functionality,
   2.3 Appropriateness, and
   2.4 Design?
3. What is the extent of the mathematical competency of the supplementary materials in terms of:
   3.1 Comprehension,
   3.2 Communication, and
   3.3 Problem solving?
4. What is the extent of the mathematical performance of the learners, in terms of:
   4.1 Formative Assessments, and
   4.2 Summative Assessment?
5. Is there a significant relationship between the extent of mathematical competency and the supplementary materials?
6. Is there a significant relationship between the extent of mathematical performance and the supplementary materials?

2. METHODOLOGY

The research design used in this study was descriptive method of research was employed in this study. According to McCombes (2019), descriptive research seeks to accurately and comprehensively define a population, circumstance, or phenomenon. It can answer the following questions: what, where, when, and how, but not why. A descriptive research plan may use a variety of research methods to investigate one or more variables. In contrast to experimental research, the researcher does not manipulate or modify any of the variables; instead, they watch and quantify them. The descriptive technique is the best strategy for this study since it focuses on finding the important association between e-Geometry and the learners' mathematical performance and abilities.

3. RESULTS AND DISCUSSION

This chapter deals with the presentation, analysis and interpretation of data that was gathered in this study. The following tabular presentations and discussions will further characterize the extent of the supplementary materials to the mathematical competence and performance of learners.

Thorough analysis of the presented data will be provided as well as its interpretation for each variable. Data analysis is a crucial step in any research or decision-making process as it allows for a deeper understanding of the underlying patterns and relationships within the data. By employing various statistical techniques, such as descriptive statistics, correlation analysis, or regression analysis, it becomes possible to extract meaningful insights and draw valid conclusions from the data. Each variable will be carefully examined to assess its significance, potential impact, and interplay with other variables. Interpretation of the data involves making sense of the findings in light of the research objectives or the problem at hand.

Extent of the Supplementary Materials in terms of Content

In this study, the extent of supplementary materials which includes its content along its indicators such as objectives, discussion, activity and assessment was being analyzed.

The results were analyzed using statistical methods, specifically by calculating the mean and standard deviation. The mean provided an average value, offering a central tendency of the data set, while the standard deviation measured the amount of variation or dispersion from the mean. Together, these metrics gave a comprehensive understanding of the data distribution, allowing for informed conclusions and insights.

Table 1 presents the Extent of the Supplementary Material in terms of Content such as Objectives.

Table 1
Extent of the supplementary materials in terms of Content such as Objectives

The objective is…	*MEAN*	*SD*	*REMARKS*
clearly stated.	3.54	0.50	Relevant
attainable.	3.53	0.50	Relevant
aligned with MELC	3.41	0.49	Relevant
well-defined.	3.43	0.50	Relevant
measurable.	3.48	0.50	Relevant

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Weighted Mean	*3.48*
SD	*0.50*
Verbal Interpretation	*High*

Table 1 illustrates the extent of the supplementary material in terms of content such as objectives.

The objectives are relevant as the learners Agree that the objective is clearly stated (M=3.54 S.D.=0.50), attainable (M=3.53, S.D.=0.50), measurable (M=3.48, S.D.=0.50), well-defined (M=3.43, S.D.=0.50), and is aligned with the MELC (M=3.41, S.D.=0.49).

The weighted mean of 3.48 indicates that the extent of the supplementary material in terms of content such as objectives was verbally interpreted as High. This means that the learning material served its purpose based from its objectives.

Table 2 presents the Extent of the Supplementary Material in terms of Content such as Discussion.

Table 2
Extent of the supplementary materials in terms of Content such as Discussion

The discussion is…	***MEAN***	***SD***	***REMARKS***
aligned with the objectives.	3.55	0.50	Comprehensive
not congested.	3.52	0.50	Comprehensive
clear.	3.51	0.50	Comprehensive
easy to follow.	3.43	0.50	Comprehensive
uses common words.	3.52	0.50	Comprehensive
Weighted Mean		*3.51*	
SD		*0.50*	
Verbal Interpretation		*High*	

Table 2 shows that the discussion is comprehensive as learners Agree that the discussion within the supplementary material is aligned with the objectives (M=3.55, S.D.=0.50), not congested (M=3.52, S.D.=0.50), uses common words (M=3.52, S.D.=0.50), clear (M=3.51, S.D.=0.50), and easy to follow (M=3.43, S.D.=0.50).

The weighted mean of 3.51 indicates that the extent of supplementary material in terms of content such as discussion is verbally interpreted as High. This means that the discussion on the learning material is understood by the respondents. Additionally, this suggests that the provided supplementary content significantly enriches the understanding of the learning material for the learners as they progress.

Table 3 presents the Extent of the Supplementary Material in terms of Content such as Activity.

Table 3
Extent of the supplementary materials in terms of Content such as Activity

The activity is…	***MEAN***	***SD***	***REMARKS***
aligned with the discussion.	3.43	0.50	Relevant
sufficient to fulfill its purpose.	3.49	0.50	Relevant
achievable within the given limitations.	3.41	0.50	Relevant
within the level of the learner.	3.48	0.50	Relevant
provided with a clear instruction.	3.55	0.50	Relevant
Weighted Mean		*3.47*	
SD		*0.50*	
Verbal Interpretation		*High*	

Table 3 shows that the activities are relevant as the learners Agree that the supplementary material provided with a clear instruction (M=3.55, S.D.=0.50), sufficient to fulfill its purpose (M=3.49, S.D.=0.50), within the level of the learner (M=3.48, S.D.=0.50), aligned with the discussion (M=3.43, S.D.=0.50), and achievable within the given limitations (M=3.41, S.D.=0.50).

The weighted mean of 3.47 indicates that the extent of supplementary material in terms of content such as the activity is verbally interpreted as High. It means that the activities embedded on the supplementary material was useful to the students. It also shows that the learners sees the connection of the activity prior to the given discussion and they can apply what they have learned from the it as they progress in the activity.

Table 4 presents the extent of the supplementary material in terms of content such as assessment.

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Table 4
Extent of the supplementary materials in terms of Content such as Assessment

The assessment is…	*MEAN*	*SD*	*REMARKS*
aligned with the objectives.	3.53	0.50	Valid
relative to the discussion.	3.46	0.50	Valid
connected with the activity.	3.43	0.50	Valid
attainable.	3.47	0.50	Valid
clear.	3.43	0.50	Valid
Weighted Mean		*3.46*	
SD		*0.50*	
Verbal Interpretation		*High*	

Table 4 shows the validity of the assessment as the learners Agrees that the assessment is aligned with the objectives (M=3.53, S.D.=0.50), attainable (M=3.47, S.D.=0.50), relative to discussion (M=3.46, S.D.=0.50), connected to the activity (M=3.43, S.D.=0.50), and clear (M=3.43, S.D.=0.50).

The weighted mean of 3.46 indicates that the extent of the supplementary material in terms of content such as assessment is High. It means that the learners find the assessment suitable for the supplementary material. It also shows that they are able to use the skills they acquire from the previous activity they have done.

Extent of the Supplementary Materials in terms of Features
In this study, the extent of supplementary materials which includes its features along with its indicators such as usability, functionality, appropriateness and design was being examined.

The data was evaluated statistically, specifically by determining the mean and standard deviation.
Table 5 illustrates Extent of the supplementary materials in terms of Features such as Usability

Table 5
Extent of the supplementary materials in terms of Features such as Usability

The application…	*MEAN*	*SD*	*REMARKS*
is easy to install.	3.42	0.50	Usable
is user friendly.	3.51	0.50	Usable
is easy to navigate.	3.48	0.50	Usable
do not consume too much space.	3.53	0.50	Usable
do not use too much memory.	3.50	0.50	Usable
Weighted Mean		*3.49*	
SD		*0.50*	
Verbal Interpretation		*High*	

Table 5 shows that the learning material is usable as the learners Agrees that the application do not consume too much space (M=3.53, S.D.=0.50), user friendly (M=3.51, S.D.=0.50), do not consume too much space (M=3.50, S.D.=0.50), easy to navigate (M=3.48, S.D.=0.50), and easy to install (M=3.42, S.D.=0.50).

The weighted mean of 3.49 indicates that the extent of the supplementary material in terms of features such as usability is verbally interpreted as High. Indicating that the learners can use the application with ease.

Table 6 presents the extent of the supplementary material in terms of features such as functionality.

Table 6
Extent of the supplementary materials in terms of Features such as Functionality

The application…	*MEAN*	*SD*	*REMARKS*
has functional buttons	3.32	0.47	Moderately Functional
has a return button.	3.49	0.50	Functional
has a separate back icon.	3.48	0.50	Functional
do not have lag issues.	3.53	0.50	Functional
do not had bugs.	3.57	0.50	Functional
Weighted Mean		*3.48*	
SD		*0.49*	
Verbal Interpretation		*High*	

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Table 6 illustrates that the material is functional as the learners Agree that the application had no bugs (M=3.57, S.D.=0.50), no lag issues (M=3.53, S.D.=0.50), has a return button (M=3.49, S.D.=0.50), has a separate back icon (M=3.48, S.D.=0.50) and Moderately Agree that it has functional buttons (M=3.32, S.D.=0.47).

The weighted mean of 3.48 indicates the extent of the supplementary materials in terms of features such as functionality is High. It indicates that the learners found the supplementary handy.

Table 7 presents the extent of the supplementary materials in terms of features such as appropriateness.

Table 7
Extent of the supplementary materials in terms of Features such as Appropriateness

The application…	*MEAN*	*SD*	*REMARKS*
is installable to any device.	3.48	0.47	Appropriate
is suitable to the age group.	3.50	0.50	Appropriate
has a sequence easy to understand for the age group of the students.	3.44	0.50	Appropriate
has features the students can easily comprehend.	3.57	0.50	Appropriate
is appropriate to needs of the students.	3.56	0.50	Appropriate
Weighted Mean		*3.51*	
SD		*0.50*	
Verbal Interpretation		*High*	

Table 7 illustrates that the learning material is appropriate as the learners Agrees that the supplementary materials had features they can easily understand (M=3.57, S.D.=0.50), appropriate to their needs (M=3.56, S.D.=0.50), suitable to their age (M=3.50, S.D.=0.50), installable to any device (M=3.48, S.D.=0.50), and easy to understand in terms of its sequence (M=3.44, S.D.=0.50).

The weighted mean of 3.51 indicates that the extent of the supplementary materials in terms of features such as appropriateness is verbally interpreted as High. Indicating that it is appropriate for their age group.

Table 8 represents the extent of the supplementary materials in terms of features such as design.

Table 8
Extent of the supplementary materials in terms of Features such as Design

The application…	*MEAN*	*SD*	*REMARKS*
has an attractive design.	3.52	0.50	Pleasing
has a font which is not dull.	3.57	0.50	Pleasing
is readable.	3.41	0.49	Pleasing
has a design that do not overlap necessary figures/illustrations/tables.	3.50	0.50	Pleasing
has a color combination not striking to the eyes.	3.48	0.50	Pleasing
Weighted Mean		*3.50*	
SD		*0.50*	
Verbal Interpretation		*High*	

Table 8 shows that the learning material is pleasing as the learners Agrees that the font is not dull (M=3.57, S.D.=0.50), has an attractive design (M=3.52, S.D.=0.50), the designs do not overlap any important figures (M=3.50, S.D.=0.50), the colors is not striking to the eyes (M=3.48, S.D.=0.50), and it is readable (M=3.41, S.D.=0.50).

The weighted mean of 3.50 indicates that the extent of the supplementary materials in terms of features such as design is verbally interpreted as High. It means that the design of the learning material is acceptable to their age group.

Extent of Mathematical Competency

The extent of mathematical competency in terms of comprehension, communication, and problem solving was being evaluated.

The findings were evaluated statistically, especially by determining the mean and standard deviation. The mean supplied an average number representing the data set's central tendency, and the standard deviation indicated the degree of variance or dispersion from the mean. These measurements provided a full picture of data distribution, allowing for educated judgments and insights.

Table 9 represents the extent of mathematical competency in terms of comprehension.

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Table 9
Extent of mathematical competency in terms of Comprehension

The learning material…	*MEAN*	*SD*	*REMARKS*
has understandable instructions	3.47	0.50	Comprehensive
has example easy to comprehend.	3.53	0.50	Comprehensive
used words that are common among the students.	3.50	0.50	Comprehensive
provided simple structure on each word problem.	3.55	0.50	Comprehensive
gives questions aligned to the provided example and given scenario on the word problem.	3.52	0.50	Comprehensive
Weighted Mean		*3.51*	
SD		*0.50*	
Verbal Interpretation		*High*	

Table 9 illustrates that the learning material is comprehensive as the learners Agrees that the learning material provided simple structure on each word problem (M=3.55, S.D.=0.50), with example easy to comprehend (M=3.53, S.D.=0.50), gives questions aligned to the provided example and given scenario on the word problem (M=3.52, S.D.=0.50), used words that are common among the them (M=3.50, S.D.=0.50), and the instructions were understandable (M=3.47, S.D.=0.50).

The weighted mean of 3.51 of the extent of mathematical competency in terms of comprehension is verbally interpreted as High. Showing that the learners comprehend the competency of each modules.

Table 10 represents the extent of mathematical competency in terms of communications.

Table 10
Extent of mathematical competency in terms of Communication

The learning material…	*MEAN*	*SD*	*REMARKS*
is easy to use during class discussion.	3.49	0.50	Communicable
can provide easy access on cases of online or modular approach.	3.48	0.50	Communicable
is aligned with learning competencies.	3.47	0.50	Communicable
has activities easy to understand.	3.54	0.50	Communicable
can provided ease in terms of conveying the intended lesson.	3.55	0.50	Communicable
Weighted Mean		*3.51*	
SD		*0.50*	
Verbal Interpretation		*High*	

Table 10 shows that the learning materials is communicable as the learners Agrees that the learning material's competency can provided ease in terms of conveying the intended lesson (M=3.54, S.D.=0.50), has activities easy to understand (M=3.54, S.D.=0.50), easy to use during class discussion (M=3.49, S.D.=0.50), can provide easy access on cases of online or modular approach (M=3.48, S.D.=0.50), and aligned with the learning competencies (M=3.47, S.D.=0.50).

The weighted mean of 3.51 of the extent of mathematical competency in terms of communication is verbally interpreted as High. Which means that the learning material reached out the learners as it was intended to be.

Table 11 represents the extent of mathematical competency in terms of problem-solving.

Table 11
Extent of mathematical competency in terms of Problem-Solving

The provided word problem/s…	*MEAN*	*SD*	*REMARKS*
are not too complex for the students.	3.51	0.50	High
is aligned with the objectives and examples.	3.54	0.50	High
is reasonable for the age of the learners.	3.52	0.50	High
uses real-life scenario.	3.45	0.50	High
is applicable to the daily routine of each learner.	3.46	0.50	High
Weighted Mean		*3.50*	
SD		*0.50*	
Verbal Interpretation		*High*	

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Table 11 illustrates the extent of mathematical competency in terms of problem-solving is high as the respondents Agrees that the provided word problems are aligned with the objectives and examples (M=3.54 ,S.D.=0.50), reasonable for the age of the learners (M=3.52 ,S.D.= 0.50), not too complex for the students (M=3.51 ,S.D.= 0.50), is applicable to the daily routine of each learner (M=3.46 ,S.D.= 0.50), and uses real-life scenario. (M=3.45 ,S.D.= 0.50).

The weighted mean of 3.50 of the extent of mathematical competency in terms of problem-solving is verbally interpreted as High. Illustrating that the problems used was suited for the respondents.

Extent of Mathematical Performance

The extent of mathematical performance in terms of comprehension, communication, and problem solving was being assessed.

In the data analysis, frequency and percentage calculations were used to determine distribution and proportions. Descriptive values summarized central tendencies and variability, while the mean provided an average value for interpretation. These methods collectively enabled a thorough examination and meaningful insights from the findings.

Table 12 represents extent of the mathematical performance of the learners in terms of formative assessment.

Table 12
Extent of the mathematical performance of the learners in terms of Formative Assessment

Score	Frequency	Percentage	Descriptive Value
33-40	0	0%	Outstanding
25-32	17	14%	Very Satisfactory
17-24	60	49%	Satisfactory
9-16	41	34%	Fairly Satisfactory
1-8	4	3%	Did Not Meet Expectation
Mean	**18.35**	**Interpretation**	**Approaching Proficiency**

Table 12 illustrates extent of the formative assessment as the mathematical performance of the learners.

The scores of the respondents shows that seventeen got the score from twenty-five to thirty-two which is verbally interpret as Very Satisfactory, sixty got the score from seventeen to twenty-four which is verbally interpreted as Satisfactory, forty-one got the score between nine and sixteen which is verbally interpreted as Fairly Satisfactory, and four got the score from one to eight which is verbally interpreted as Did Not Meet Expectation.

The mean score of 18.35 from the result of the student formative assessment is verbally interpreted as Approaching Proficiency. This means that most of the respondents did not meet the passing score. Consequently, this indicates a need for targeted interventions to help students improve their understanding and achieve proficiency.

Table 13 represents extent of the mathematical performance of the learners in terms of summative assessment.

Table 13
Extent of the mathematical performance of the learners in terms of Summative Assessment

Score	Frequency	Percentage	Descriptive Value
49-60	0	0%	Outstanding
37-48	40	33%	Very Satisfactory
25-36	76	62%	Satisfactory
13-24	6	5%	Fairly Satisfactory
1-12	0	0%	Did Not Meet Expectation
Mean	**33.67**	**Interpretation**	**Approaching Proficiency**

Table 13 illustrates extent of the summative assessment as the mathematical performance of the learners.

The scores of the respondents shows that forty got the score from thirty-seven to forty-eight which is verbally interpret as Very Satisfactory, seventy-six got the score from twenty-five to thirty-six which is verbally interpreted as Satisfactory, and six got the score between thirteen and twenty-four which is verbally interpreted as Fairly Satisfactory.

The mean score of 33.67 from the result of the student summative assessment is verbally interpreted as Approaching Proficiency. This means that most of the respondents did not meet the passing score though none of them got the lowest possible score. Having most of the learners reached the satisfactory level indicates that the room for improvement the material has and less of the population having scores under satisfactory rating shows that effectivity and efficacy of the learning material.

Significant Relationship between the Extent of Supplementary Materials and Mathematical Competency

The impact of supplementary materials on mathematical competency was assessed in this part of the study, and a rigorous statistical analysis was conducted to test the significant relationship between the extent of supplementary materials used and the level of mathematical competency achieved by students. This involved collecting detailed data on the types and quantities of supplementary materials employed in the educational process and measuring students' mathematical competencies through standardized assessments. By analyzing

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this data, the study aimed to determine whether a correlation exists and to what extent supplementary materials influence mathematical learning outcomes. Additionally, the findings contribute valuable insights into how educators can optimize the use of supplementary materials to enhance mathematical learning experiences. The findings also underscore the importance of integrating varied and targeted supplementary materials to support diverse learning needs and enhance overall mathematical proficiency.

The data were statistically analyzed using Minitab 14, specifically employing the Pearson Correlation Coefficient. This method was chosen to assess the strength and direction of the linear relationship between the variables under study. By applying this statistical technique, the research aimed to quantify the degree of association between the selected variables, providing a clear understanding of their interdependencies and potential correlations

Table 14 represents the significant relationship between the extent of supplementary materials and mathematical competency.

Table 14.
Significant Relationship between the Extent of Supplementary Materials and Mathematical Competency

Supplementary Materials (IV)	Mathematical Competency (DV)			Overall
	Comprehension	Communication	Problem Solving	
Content				
Objectives:				
Pearson Correlation	0.105	0.202	0.044	0.117
p-value	0.252	0.026*	0.633	0.443
N	122	122	122	122
Discussion:				
Pearson Correlation	0.129	0.099	0.099	0.109
p-value	0.157	0.28	0.28	0.239
N	122	122	122	122
Activity:				
Pearson Correlation	0.051	0.076	0.047	0.058
p-value	0.576	0.407	0.608	0.530
N	122	122	122	122
Assessment:				
Pearson Correlation	0.078	0.18	0.082	0.113
p-value	0.395	0.047*	0.371	0.383
N	122	122	122	122
Features				
Usability:				
Pearson Correlation	0.056	0.171	0.085	0.104
p-value	0.539	0.06	0.354	0.318
N	122	122	122	122
Functionality:				
Pearson Correlation	0.017	0.028	0.069	0.038
p-value	0.849	0.756	0.452	0.686
N	122	122	122	122
Appropriateness:				
Pearson Correlation	0.128	0.024	0.100	0.084
p-value	0.161	0.793	0.274	0.409
N	122	122	122	122
Design:				
Pearson Correlation	0.037	0.028	0.010	0.025
p-value	0.689	0.757	0.912	0.786
N	122	122	122	122

*Note: * $p < .05$*

It illustrates the significant relationship between the extent of supplementary materials and mathematical competency. It shows that objective had the highest correlation coefficient of 0.117 while the lowest is design with a correlation coefficient of 0.25. Learning objectives matters most on every learning material as long as it is aligned with the most essential competencies the teaching-learning process will be able to achieve its goal. Although the design of learning materials may

ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 10| Issue: 9| September 2024|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2024: 8.402 || ISI Value: 1.188

also matter in the eyes of visual learners.

The correlation coefficients measure the strength and direction of the relationship between the extent of the supplementary materials and mathematical competency suggest that the objective and assessment aspects of supplementary materials have the most significant influence on mathematical competency, particularly in terms of problem-solving skills. However, other factors such as usability, appropriateness, and design have the weakest significant impact on mathematical competency based on this analysis. Thus, it shows a weak positive correlation between the variable.

Test of Significant Relationship between the Extent of Supplementary Materials and Mathematical Performance

The significant relationship between the extent of supplementary materials and mathematical competency was analyzed in this study.

Data were treated statistically using Minitab 14 using the Pearson Correlation Coefficient.

Table 15 represents the significant relationship between the extent of supplementary materials and mathematical performance.

Table 15

Significant Relationship between the extent of supplementary materials and mathematical performance

Supplementary Materials (IV)	Mathematical Performance (DV)		Overall
	Formative	Summative	
Content:			
Objectives:			
Pearson Correlation	0.113	0.003	0.058
p-value	0.216	0.97	0.593
N	122	122	122
Discussion:			
Pearson Correlation	0.006	0.124	0.065
p-value	0.951	0.175	0.563
N	122	122	122
Activity:			
Pearson Correlation	0.143	0.026	0.085
p-value	0.115	0.779	0.447
N	122	122	122
Assessment:			
Pearson Correlation	0.124	0.053	0.089
p-value	0.175	0.56	0.368
N	122	122	122
Features:			
Usability:			
Pearson Correlation	0.025	0.027	0.026
p-value	0.783	0.765	0.774
N	122	122	122
Functionality:			
Pearson Correlation	0.024	0.031	0.028
p-value	0.789	0.731	0.76
N	122	122	122
Appropriateness:			
Pearson Correlation	0.106	0.004	0.055
p-value	0.243	0.962	0.603
N	122	122	122
Design:			
Pearson Correlation	0.007	0.143	0.075
p-value	0.936	0.116	0.526
N	122	122	122

*Note: * $p < .05$*

Table 15 illustrates the significant relationship between the extent of supplementary materials and mathematical performance. It shows that assessment has the highest correlation coefficient of 0.089 while its usability has the lowest correlation coefficient of 0.026.

The correlation coefficients measure the strength and direction of the relationship between the extent of the supplementary

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materials and mathematical performance suggest that the assessment and activity aspects of supplementary materials have the most significant influence on mathematical performance, particularly in terms of formative assessment. However, other factors such as usability, appropriateness, and functionality appear to have lesser significant impact on mathematical performance based on this analysis. However, it shows a very weak positive correlation between the variables.

4. CONCLUSION AND RECOMMENDATIONS

Based on the findings, it can be concluded that:

1. The supplementary material, e-Geometry, has relevant objectives and activities, comprehensive discussion, valid assessment, usable, functional, and appropriate features, and pleasing design. Its competencies were also comprehensive and communicable. Its problem-solving competency was also high. Both formative and summative assessments were approaching proficiency. Thus, the null hypothesis is rejected. Although it has a weak correlation, it had a positive impact on the learners' mathematical competency. Improving the supplementary material might result to a more desirable outcome which will benefit both teachers and students.
2. e-Geometry, the supplementary material in terms of its content and feature had a weak positive correlation on the mathematical performance of the learners in terms of formative assessment and summative assessment. Thus, the null hypothesis is rejected. Despite the slight relationship, the supplemental material had a favorable impact on the learners' mathematical proficiency.

The recommendations that are made below are inferred from the conclusions that have been presented.

1. Teachers may use the result of this study focusing on crafting a more effective and efficient learning material. Having an additional learning material may help both the teacher and students achieve the desirable learning outcome.
2. Learners may benefit from the researcher recommends that they should feed suggestions in crafting the supplementary materials. It should be suited to their age group and to their technological capacity so that it will not be misused, disregard or ignored. They can give recommendations and feedbacks for the better of the supplementary materials that they used. Adjusting it to their preference will make it more effective and efficient.
3. Educators, not only teachers, encourage teachers to craft additional/supplementary materials. Having a localized-materials will also become a stepping stone in providing quality education which one of Education mission.

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