

Connecting People in Calculus (CPC): A Mobile-Assisted Learning Tool

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Abstract—The study developed Connecting People in Calculus (CPC), a Mobile-Assisted Learning Tool designed to enhance learning engagement and the students' performance in Calculus. Specifically, it sought to examine the levels of assessment on the components and features, and the level of student learning outcomes in terms of student engagement and student performance. The study intended to identify the significant relationship between the components and features of the CPC tool and student engagement in learning Calculus. Furthermore, it aimed to determine the significant effect between the use of CPC tools on the student's performance. A quantitative predictive correlational research design was employed to investigate the causal relationships between CPC tools and designated outcomes. The respondents were 140 Grade 11 STEM students from STI College Sta. Cruz, selected through purposive sampling. Data were gathered using validated survey questionnaires to capture perceptions on learning experiences and a researcher-made quizzes to determine impact on learning outcomes. Descriptive data were analyzed using weighted mean and standard deviation, while inferential questions were treated using Pearson Product-Moment Correlation and Multiple Linear Regression. Results observed that on the components of the CPC tool, respondents have an acceptable level of assessment in all its indicators. Moreover, the features of CPC tools were rated acceptable for design quality, accessibility, and efficiency, while highly acceptable for user-friendliness and functionality. Further, the students' learning outcomes demonstrated engaged level in terms of behavioral and emotional and highly engaged in cognitive. In terms of quizzes the results showed were proficient. In regard to relationships, study revealed a significant relationship between CPC tool's components and features and student engagement, indicating that well-designed instructional elements strengthen engagement. Nonetheless, findings revealed no significant effect on the students' performance. The study concludes that CPC learning tool's components and features were significantly related with the student's engagement, thereby rejecting the null hypotheses. However, there's no significant effect on using the CPC tool on the students' performance leading to the acceptance of null hypothesis. Based on the findings, teachers are advised to use the CPC tool to support engagement and content delivery but should not rely solely on it to develop students' cognitive abilities in Calculus. To improve students' skills, teachers should supplement the tool with explicit strategic instruction to enhance students' performance.

Keywords— Mobile-assisted Learning Tool, Connecting People in Calculus (CPC), Student Engagement, Student Performance, Calculus.

I. INTRODUCTION

Effective Calculus learning relies on the dynamic interplay between teachers' pedagogical knowledge and how students interact with each other. Face-to-face instruction fosters

critical thinking, problem-solving, and logical analysis, which are vital skills for learning Calculus. However, traditional classrooms often face limitations, including not enough class time, students with different levels of ability and pressures from the curriculum. These problems can restrict how to fully develop these skills and limit possibilities for in-depth learning exploration.

Additionally, the traditional process of learning Calculus can be cumbersome for both students and teachers. A one-size-fits-all strategy may overlook varied and diverse learning requirements, thus resulting in some students being left behind. To tackle these issues, implementing mobile technologies with traditional teaching methods could improve the way Calculus is taught. Mobile learning (M-learning) advances have made things more efficient and opened new opportunities and possibilities. By looking into the details of how teachers and students interact in Calculus classrooms and integrating mobile technology, teachers can improve their teaching methods and strategies in classroom interactions to help students develop higher-order analytical thinking skills. This will improve the quality of Calculus education and help students demonstrate and achieve learning outcomes.

Mobile learning (M-learning) can effectively address the inefficiencies of traditional Calculus learning methods. According to Kalyani (2024), integration of digital technologies can improve learning by encouraging active learning, knowledge construction, inquiry, and exploration on the part of the students. Digital learning tools such as mobile learning applications and educational software have made learning more flexible and accessible. Likewise, as stated by Kumbo et al., (2023), integrating technology into the classroom allows new ways of teaching, which have been proved to make students more interested and improve their learning. Using mobile technology and improving their teaching methods, teachers can create a more comprehensive and accessible learning experience to enhance students' understanding. These studies accentuate the alignment of the project platform, Connecting People in Calculus (CPC) a Mobile-Assisted Learning Tool, addressing the pressing needs of students for accessing Calculus resources, thereby bridging the gap between students and teachers. CPC learning tool is structured to offer a comprehensive suite of features aimed at transforming Calculus learning more conveniently for students. Harnessing digital advancements, the tool's key functionalities and program include allowing step-by-step learning of limits, derivatives, and integration of functions to help students achieve all intended learning outcomes.

Moreover, CPC learning tool includes multiple graphical learning modules, which could help expose students to demonstrate new strategy in visualization of Mathematics concepts, allowing significant improvement in student performance relating to proficiency and mastery of analytical and problem-solving abilities, and gaining deeper understanding of complex situational topics.

This study “Connecting People in Calculus: A Mobile-Assisted Learning Tool” aims to determine the effectiveness of using the mobile-assisted learning tool in the success of learning Calculus.

1.1 Statement of the Problem

Problem/s which were addressed by the research

The general objective of this study was to develop a mobile-assisted learning tool–CPC (Connecting People in Calculus), as a mobile learning tool to enhance Calculus learning outcomes.

Specifically, it sought to address the following research questions:

1. What is the level of assessment on the Components of Connecting People in Calculus a Mobile-Assisted Learning Tool in terms of:
 - 1.1 Objectives;
 - 1.2 Content;
 - 1.3 Activity; and
 - 1.4 Assessment?
2. What is the level of assessment on the Features of Connecting People in Calculus a Mobile-Assisted Learning Tool in terms of:
 - 2.1 Design Quality;
 - 2.2 Accessibility;
 - 2.3 User-friendliness;
 - 2.4 Functionality; and
 - 2.5 Efficiency?
3. What is the level of Students’ Learning Outcomes in terms of Student Engagement, with regards to:
 - 3.1 Behavioral Engagement;
 - 3.2 Emotional Engagement; and
 - 3.3 Cognitive Engagement?
4. What is the level of Students’ Learning Outcomes in terms of Student Performance, with regards to Quizzes?
5. Is there a significant relationship between the components of Connecting People in Calculus a mobile-assisted learning tool and the student engagement in learning Calculus?
6. Is there a significant relationship between the features of Connecting People in Calculus a mobile-assisted learning tool and the student engagement in learning Calculus?
7. Is there a significant effect between the use of Connecting People in Calculus a mobile-assisted learning tool on the Students’ Performance in learning Calculus?

II. METHODOLOGY

A quantitative predictive correlational research design was employed to investigate the causal relationships between CPC tools and designated outcomes. The respondents were 140 Grade 11 STEM students from STI College Sta. Cruz, selected

through purposive sampling. Data were gathered using validated survey questionnaires to capture perceptions on learning experiences and a researcher-made quizzes to determine impact on learning outcomes. Descriptive data were analyzed using weighted mean and standard deviation, while inferential questions were treated using Pearson Product-Moment Correlation and Multiple Linear Regression.

III. RESULTS AND DISCUSSION

This part presents the statistical analysis, as well as provides a detailed discussion and interpretation of the results derived from the findings of the gathered data in relation to the statement of the problem and hypotheses.

Level of Assessment on the Components of Connecting People in Calculus a Mobile-Assisted Learning Tool

In this study, this refers to mobile-assisted learning tool’s characteristics examined and designed to benefit students in Calculus education. The level of assessment on the components of Connecting People in Calculus a Mobile-Assisted Learning Tool in terms of objectives, content, activity and assessment was treated statistically using descriptive statistics of mean and standard deviation.

Table 1 shows the level of assessment on the components of Connecting People in Calculus (CPC) a Mobile-Assisted Learning Tool in terms of objectives, including the indicators with their corresponding mean, standard deviation, and remarks.

The results revealed that students have a positive appraisal of the CPC learning tool. The objective indicated in Connecting People in Calculus (CPC) Mobile-Assisted Learning tool facilitates students’ ability to evaluate solutions relevant to Calculus concepts ($M=4.10$, $SD=0.90$) gained the highest mean score and was marked Agree. This implies that the CPC learning tool has been deemed an effective learning aid by assisting students in determining mathematical definitions, enhancing understanding of calculus concepts, and applying their math skills to actual life problems.

Table 1. Level of Assessment on the Components of Connecting People in Calculus a Mobile-Assisted Learning Tool in terms of Objectives

Statements	Mean	SD	Remarks
The objective indicated in Connecting People in Calculus (CPC) Mobile-Assisted Learning tool...			
...helps students identify key math definitions across topic.	3.70	1.06	Agree
...enables students to explain Calculus concepts in a clear manner.	3.41	1.13	Agree
...allows students to apply various mathematical skills to solve problems.	4.08	0.81	Agree
...facilitates students’ ability to evaluate solutions relevant to Calculus concepts.	4.10	0.90	Agree
...ensures deep understanding and proficiency in math topics.	4.01	0.96	Agree
Weighted Mean	3.86		
SD	0.97		
Verbal Interpretation			Acceptable

Meanwhile, although it was also interpreted as Agree, the objective indicated in Connecting People in Calculus (CPC) Mobile-Assisted Learning tool enables students to explain Calculus concepts in a clear manner ($M=3.41$, $SD=1.13$)

received the lowest mean score. This denotes that, while CPC learning tool explain Calculus concepts in a clear manner, it doesn't indicate to students how complex they are.

Overall, with a weighted mean of 3.86 and a standard deviation of 0.97, students perceived that the objective of the CPC learning tool is Acceptable. More specifically, the students on average agree that the CPC learning tool helps them to develop their understanding of concepts studied and is a good resource for improving those as well.

In summary, this shows that the learning tool effectively helps students overcome challenges with Calculus concepts. With further refinements, it could boost students' ability to explain concepts clearly and enhance their overall mathematical ability.

Table 2. Level of Assessment on the Components of Connecting People in Calculus a Mobile-Assisted Learning Tool in terms of Content

Statements	Mean	SD	Remarks
Connecting People in Calculus (CPC) Mobile-Assisted Learning tool's content discussion ...			
...provides organized notes that help students remember and understand Calculus concepts.	3.91	0.88	Agree
...illustrate necessary Calculus topics with practical examples.	4.35	0.82	Strongly Agree
...enhance students' learning experience by ensuring thorough, accurate, clear, and effective content delivery.	3.36	1.06	Agree
...helps students understand complex Calculus concepts.	3.47	1.15	Agree
...create new ways to tackle Calculus problems, boosting creativity and problem-solving skills.	3.61	1.07	Agree
Weighted Mean	3.74		
SD	1.00		
Verbal Interpretation	Acceptable		

Table 2 presents the level of assessment on the components of Connecting People in Calculus (CPC) a Mobile-Assisted Learning Tool in terms of content aspect. Connecting People in Calculus (CPC) Mobile-Assisted Learning tool's content discussion illustrates necessary Calculus topics with practical examples acquired the highest mean score ($M=4.35$, $SD=0.82$) and interpreted as Strongly Agree. This result indicates that by showing necessary examples, makes abstract concepts more relatable and understandable, increasing student engagement and motivation. The CPC learning tool format provides flexibility and accessibility, catering to different learning styles. This combo helps students grasp complex topics better. In contrast, Connecting People in Calculus (CPC) Mobile-Assisted Learning tool's content discussion enhance students' learning experience by ensuring thorough, accurate, clear, and effective content delivery got the lowest mean score ($M=3.36$, $SD=1.06$) and interpreted as Agree. This reveals that while students are aware of the potential benefits of using CPC learning tool, they seek to understand its practical relevance and specific advantages it offers to enhance their learning experience.

The overall weighted mean of 3.74 and a standard deviation of 1.00 indicates a verbal interpretation of Acceptable. Essentially, students appreciate tangible

applications over broad assurances of quality from using the CPC learning tool.

In conclusion, the results underscore the efficacy of the CPC Mobile-Assisted Learning Tool in enhancing Calculus learning by presenting topics through practical examples, which resonates strongly with students. This indicates that students value the tool's ability to render abstract concepts more relatable, thereby augmenting engagement.

Table 3. Level of Assessment on the Components of Connecting People in Calculus a Mobile-Assisted Learning Tool in terms of Activity

Statements	Mean	SD	Remarks
The activities in Connecting People in Calculus (CPC) Mobile-Assisted Learning tool			
...help students move beyond just memorizing facts to understand Calculus concepts.	4.04	0.73	Agree
...allow students to apply Calculus concepts to real-world scenarios, making learning more relevant and practical.	3.71	0.92	Agree
...encourage students to dig deeper into analyzing concepts that can be self-paced and flexible to learning.	4.00	0.97	Agree
...develop critical judgment of students as they learn to assess their practice problem-solving skills in Calculus.	4.24	0.78	Strongly Agree
...foster self-paced learning is interactive and can be collaborative.	4.39	0.57	Strongly Agree
Weighted Mean	4.07		
SD	0.79		
Verbal Interpretation	Acceptable		

Table 3 illustrates the level of assessment on the components of Connecting People in Calculus (CPC) a Mobile-Assisted Learning Tool in terms of activity aspect. The activities in Connecting People in Calculus (CPC) Mobile-Assisted Learning tool foster self-paced learning is interactive and can be collaborative yielded the highest mean score ($M=4.39$, $SD=0.57$) and interpreted as Strongly Agree. This result attributed to the CPC learning tool's ability, which aligns with students' preferences for flexible and autonomous learning experiences, thereby enhancing engagement and accessibility in Calculus education.

On the other hand, the activities in Connecting People in Calculus (CPC) Mobile-Assisted Learning tool allow students to apply Calculus concepts to real-world scenarios, making learning more relevant and practical obtained the lowest mean score ($M=3.71$, $SD=0.92$) and interpreted as Agree. This aspect suggests that students may have limited exposure to or recognition of the practical applications of Calculus concepts, or alternatively, the CPC learning tool's constraints may not have sufficiently emphasized these real-world connections, indicating an opportunity for refinement to enhance learning relevance.

The overall weighted mean of 4.07 and a standard deviation of 0.79 indicates a verbal interpretation of Acceptable. Fundamentally, CPC learning tool's activities promote a deeper understanding of Calculus to students by fostering conceptual understanding, real-world application, self-paced exploration, critical thinking, and collaborative learning, ultimately helping them develop a more meaningful and practical grasp of Calculus concepts.

In conclusion, the ideas of CPC Mobile-Assisted Learning tool's activities facilitate a comprehensive learning experience, cultivating conceptual understanding, practical application, self-directed exploration, critical thinking, and collaborative engagement, thereby enabling students to develop a more profound and applicable understanding of Calculus.

Table 4. Level of Assessment on the Components of Connecting People in Calculus a Mobile-Assisted Learning Tool in terms of Assessment

Statements	Mean	SD	Remarks
Connecting People in Calculus (CPC) Mobile-Assisted Learning tool's assessment ...			
...ensure students' grasp of Calculus basics like recalling formulas, defining terms, and explaining concepts.	4.40	0.69	Strongly Agree
...check students ability to apply Calculus formulas and methods in solving problems.	4.24	0.71	Strongly Agree
...encourage students to reflect on their own learning and understanding of Calculus.	4.31	0.73	Strongly Agree
...helps students explain and justify their answers clearly and logically.	3.65	1.03	Agree
...develop student's critical thinking through problem solving and reasoning tasks.	4.04	0.88	Agree
Weighted Mean	4.13		
SD	0.81		
Verbal Interpretation	Acceptable		

Table 4 demonstrates the level of assessment on the components of Connecting People in Calculus (CPC) a Mobile-Assisted Learning Tool in terms of assessment aspect.

Connecting People in Calculus (CPC) Mobile-Assisted Learning tool's assessment ensure students' grasp of Calculus basics like recalling formulas, defining terms, and explaining concepts shows the highest mean score ($M=4.40$, $SD=0.69$) and interpreted as Strongly Agree. This imposed that focus on foundational analytical knowledge, which is often more straightforward to grasp and measure, allows students to demonstrate their understanding of Calculus.

Meanwhile, Connecting People in Calculus (CPC) Mobile-Assisted Learning tool's assessment helps students explain and justify their answers clearly and logically got the lowest mean score ($M=3.65$, $SD=1.03$) and interpreted as Agree. This explains that answers require higher-order thinking, critical thinking, and effective communication skills which can be more challenging for students to master, especially in a mobile-assisted learning environment that is the constraint of CPC learning tool.

Overall, the weighted mean of 4.13 and a standard deviation of 0.81 indicates a verbal interpretation of Acceptable. This likely shows due to CPC learning tool's assessment focus on foundational Calculus knowledge. By helping students demonstrate more concrete aspects of learning, such as recalling formulas, defining mathematical terms, explaining different concepts, and evaluating real-life problems, enhance their understanding of the topic.

In summary, the assessments in the CPC learning tool are relevant as they comprehensively evaluate students' Calculus knowledge, encompassing foundational understanding, application of concepts, self-reflection, and critical thinking, thereby supporting a holistic development of Calculus skills.

Level of Assessment on the Features of Connecting People in Calculus a Mobile-Assisted Learning Tool

In this study, it refers to the capability of the CPC learning tool that caters the needs of students which supports flexible, interactive, and effective learning. These aspects work together to support student learning and engagement in Calculus.

The level of assessment on the features of Connecting People in Calculus a Mobile-Assisted Learning Tool in terms of design quality, accessibility, user-friendliness, functionality and efficiency was treated statistically using mean and standard deviation.

Table 5. Level of Assessment on the Features of Connecting People in Calculus a Mobile-Assisted Learning Tool in terms of Design Quality

Statements	Mean	SD	Remarks
Connecting People in Calculus (CPC) Mobile-Assisted Learning Tool's design quality feature ...			
...facilitates conceptual understanding through visuals that help students understand abstract concepts in Calculus.	4.10	0.82	Agree
...presents clear and high-quality information that makes learning easier.	3.93	1.10	Agree
...adapts to each student's pace, adjusting difficulty levels to keep them challenged yet supported.	4.02	0.96	Agree
...encourages students to dive into interactive simulations, exploring Calculus concepts hands-on.	4.31	0.78	Strongly Agree
...allows students to evaluate their own progress through review sections.	3.93	1.10	Agree
Weighted Mean	4.06		
SD	0.95		
Verbal Interpretation	Acceptable		

Table 5 presents the level of assessment on the features of Connecting People in Calculus (CPC) a Mobile-Assisted Learning Tool in terms of design quality. Connecting People in Calculus (CPC) Mobile-Assisted Learning Tool's design quality feature encourages students to dive into interactive simulations, exploring Calculus concepts hands-on yielded the highest mean score ($M=4.31$, $SD=0.78$) and interpreted as Strongly Agree. This result was linked to the CPC learning tool's design feature which encouraged students to engage with interactive simulations, making concepts more tangible and enjoyable. This hands-on approach led to critical thinking and better concept retention.

Simultaneously, Connecting People in Calculus (CPC) Mobile-Assisted Learning Tool's design quality feature presents clear and high-quality information that makes learning easier; and allows students to evaluate their own progress through review sections both obtained the lowest

mean score ($M=3.93$, $SD=1.10$) and interpreted as Agree. This explains that students may have overlooked these features, as they are often taken for granted. Clear information and self-assessment tools are essential components of effective learning, but students may not always recognize their value or leverage them optimally. Alternatively, the implementation or presentation of these features may require refinement to meet students' needs.

The overall weighted mean of 4.06 and a standard deviation of 0.95 indicates a verbal interpretation of Acceptable. This implies that catering to diverse learning needs, like clarifying abstract concepts, presenting clear and high-quality information, adapting to individual learning paces, and incorporates interactive simulations for hands-on exploration allows students to evaluate their progress and conceptual understanding, personalized learning, and progress monitoring for effective learning outcomes.

Generally, the findings reveals that CPC Mobile-Assisted Learning tool's design quality features are noteworthy for their ability to enhance student engagement and understanding. Incorporating visuals to facilitate conceptual understanding, presenting clear and high-quality information, may collectively promote personalized learning, foster autonomy, and support effective mastery of Calculus concepts, exemplifying the potential of technology to improve learning outcomes.

Table 6. Level of Assessment on the Features of Connecting People in Calculus a Mobile-Assisted Learning Tool in terms of Accessibility

Statements	Mean	SD	Remarks
The built-in features of Connecting People in Calculus (CPC) Mobile-Assisted Learning Tool ...			
...provide graphing tools that are accessible to students making Calculus more inclusive to their learning.	4.33	0.67	Strongly Agree
...break down complex equations making Calculus easier to understand.	4.04	0.97	Agree
...gives helpful feedback for incorrect answers on problem-solving.	4.23	0.80	Strongly Agree
...use simple simulations designed to minimize distractions, helping students stay focused on problem-solving.	4.04	0.97	Agree
...offer accessible input methods to empower students' math skills and easy to use for everyone.	4.29	0.71	Strongly Agree
Weighted Mean	4.19		
SD	0.82		
Verbal Interpretation	Acceptable		

Table 6 shows the level of assessment on the features of Connecting People in Calculus (CPC) a Mobile-Assisted Learning Tool in terms of accessibility. The built-in features of Connecting People in Calculus (CPC) Mobile-Assisted Learning Tool provide graphing tools that are accessible to students making Calculus more inclusive to their learning yielded the highest mean score ($M=4.33$, $SD=0.67$) and interpreted as Strongly Agree. This reveals that providing built-in graphing tools, CPC learning tool likely bridged gaps in understanding, empowering students to explore and engage with complex concepts more effectively.

Concurrently, the built-in features of Connecting People in Calculus (CPC) Mobile-Assisted Learning Tool break down complex equations making Calculus easier to understand; and use simple simulations designed to minimize distractions, helping students stay focused on problem-solving acquired the lowest mean score ($M=4.04$, $SD=0.97$) and interpreted as Agree. This result reveals that students may have undervalued their significance, as simplifications and focused simulations are often perceived as inherent components of a learning tool. Consequently, the benefits of these features may have been taken for granted, resulting in a lower perceived impact.

The overall weighted mean of 4.19 and a standard deviation of 0.82 indicates a verbal interpretation of Acceptable. This signifies that CPC learning tool's accessibility features are a standout aspect of its design. The inclusion of graphing tools, breaking down complex equations, providing helpful feedback, using focused simulations, and offering intuitive input methods, it caters to diverse learning needs and abilities. To sum up, these features collectively make Calculus more inclusive, empowering students to engage with and master complex mathematical concepts.

Table 7. Level of Assessment on the Features of Connecting People in Calculus a Mobile-Assisted Learning Tool in terms of User-friendliness

Statements	Mean	SD	Remarks
The user-friendly system of Connecting People in Calculus (CPC) Mobile-Assisted Learning Tool based on user interface and user experience ...			
...helps students to focus mental energy on remembering formulas, definitions, and procedure.	4.35	0.69	Strongly Agree
...makes abstract mathematical concepts easier to visualize, facilitating better conceptual understanding.	4.28	0.77	Strongly Agree
...provides clear explanations, helping students pinpoint mistakes and adjust their thinking.	4.26	0.75	Strongly Agree
...enables students to track their own learning progress at their own learning pace using example problems.	4.28	0.77	Strongly Agree
...increases student's motivation by making learning easy and accessible.	4.31	0.81	Strongly Agree
Weighted Mean	4.30		
SD	0.76		
Verbal Interpretation	Highly Acceptable		

Table 7 illustrates the level of assessment on the features of Connecting People in Calculus (CPC) a Mobile-Assisted Learning Tool in terms of user-friendliness. The user-friendly system of Connecting People in Calculus (CPC) a Mobile-Assisted Learning Tool based on user interface and user experience helps students to focus mental energy on remembering formulas, definitions, and procedure gained the highest mean score ($M=4.35$, $SD=0.69$) and interpreted as Strongly Agree. This shows that CPC learning tool enables students to make focus on higher-order thinking, rather than getting bogged down by navigation or technical issues, leading to a more effective learning experience.

Whereas, while still interpreted as Strongly Agree, the user-friendly system of Connecting People in Calculus (CPC) Mobile-Assisted Learning Tool based on user interface and

user experience provides clear explanations, helping students pinpoint mistakes and adjust their thinking attained the lowest mean score ($M=4.26$, $SD=0.75$). This outcome states that students might've taken clear explanations for granted and explanations may have been perceived as straightforward, thus not eliciting a strong impression.

Overall, the weighted mean of 4.30 and a standard deviation of 0.76 indicates a verbal interpretation of Highly Acceptable. This result conveys that CPC learning tool's user-friendliness in educational technology, as it can significantly enhance learning outcomes, motivation, and overall student experience by making complex concepts more accessible and manageable.

In conclusion, the user-friendliness of the CPC Mobile-Assisted Learning Tool is crucial in facilitating effective student learning, as it enables students to focus on conceptual understanding while reducing cognitive load, track progress in understanding and applying contexts, and stay motivated, ultimately making Calculus more accessible and manageable for all.

Table 8. Level of Assessment on the Features of Connecting People in Calculus a Mobile-Assisted Learning Tool in terms of Functionality

Statements	Mean	SD	Remarks
Connecting People in Calculus (CPC) Mobile-Assisted Learning Tool's purpose is to...			
...helps students recall important mathematical concepts more easily after learning them through the learning tool.	4.40	0.69	Strongly Agree
...incorporates interactive elements that work smoothly in visualizing abstract concepts such as graphical models.	4.24	0.71	Strongly Agree
...apply step-by-step guidance on procedures, enabling students to use formulas in calculations.	3.93	1.10	Agree
...analyzes relationships between components in functions or equations.	4.50	0.58	Strongly Agree
...demonstrates spatial reasoning in high-level Calculus concepts.	4.38	0.70	Strongly Agree
Weighted Mean	4.29		
SD	0.76		
Verbal Interpretation	Highly Acceptable		

Table 8 describes the level of assessment on the features of Connecting People in Calculus (CPC) a Mobile-Assisted Learning Tool in terms of functionality.

Connecting People in Calculus (CPC) Mobile-Assisted Learning Tool's purpose is to analyzes relationships between components in functions or equations achieved the highest mean score ($M=4.50$, $SD=0.58$) and interpreted as Strongly Agree. This entails that analyzing relationships between components is fundamental aspect of Calculus, and CPC tool that effectively supports this can greatly enhance students' understanding concepts.

On the contrary, Connecting People in Calculus (CPC) Mobile-Assisted Learning Tool's purpose is to apply step-by-step guidance on procedures, enabling students to use formulas in calculations received the lowest mean score ($M=3.93$, $SD=1.10$) and interpreted as Agree. This means that perhaps the guidance wasn't adaptive enough to students

individual learning styles or didn't sufficiently address common points in applying formulas in diverse student learners.

Overall, the weighted mean of 4.29 and a standard deviation of 0.76 indicates a verbal interpretation of Highly Acceptable. This result reveals the significance of CPC Mobile-Assisted Learning Tool's various functionalities in catering to different learning needs of students, from recalling concepts to visualizing abstractions and applying formulas to achieve student learning outcomes.

In summary, this multifaceted approach highlights the importance of functionality in educational tools, as it can significantly boost student understanding, engagement, and ability to apply complex concepts. The CPC learning tool's functionalities, such as interactive visualizations and step-by-step guidance, are deemed significant in enhancing student understanding and application of Calculus concepts.

Table 9. Level of Assessment on the Features of Connecting People in Calculus a Mobile-Assisted Learning Tool in terms of Efficiency

Statements	Mean	SD	Remarks
Connecting People in Calculus (CPC) Mobile-Assisted Learning Tool's efficiency feature ...			
...reduces cognitive overload by presenting information clearly allowing students to recall mathematical formulas without becoming overwhelmed.	4.35	0.82	Strongly Agree
...loads quickly and helps complete problem-solving tasks efficiently providing students to correct misconceptions immediately and improve comprehension.	3.36	1.06	Agree
...incorporates scaffolding and evaluate own performance after completing problem-solving tasks.	4.10	0.90	Agree
...builds mathematical confidence and perseverance to help students complete problem-solving tasks efficiently.	4.18	0.85	Agree
...promotes self-correction, lets students spot mistakes, reflect on their work, and refine their thinking to boost self-assessment skills.	4.19	0.86	Agree
Weighted Mean	4.04		
SD	0.90		
Verbal Interpretation	Acceptable		

Table 9 presents the level of assessment on the features of Connecting People in Calculus (CPC) a Mobile-Assisted Learning Tool in terms of efficiency. Connecting People in Calculus (CPC) Mobile-Assisted Learning Tool's efficiency feature reduces cognitive overload by presenting information clearly allowing students to recall mathematical formulas without becoming overwhelmed obtained the highest mean score ($M=4.35$, $SD=0.82$) and interpreted as Strongly Agree. This describes that presenting information precisely, CPC learning tool's efficiency feature directly addresses students' struggles with complex math concepts.

Contrastingly, Connecting People in Calculus (CPC) Mobile-Assisted Learning Tool's efficiency feature loads quickly and helps complete problem-solving tasks efficiently providing students to correct misconceptions immediately and improve comprehension got the lowest mean score ($M=3.36$, $SD=1.06$) and interpreted as Agree. This means that as perceived by the students perhaps the tool's efficiency, though

helpful, wasn't as impactful in addressing deeper learning hurdles in Calculus.

Overall, the weighted mean of 4.04 and a standard deviation of 0.90 indicates a verbal interpretation of Acceptable. This reveals that CPC learning tool's efficiency features boost student engagement by reducing cognitive overload, promoting self-correction, and fostering active learning, leading to improved comprehension and problem-solving skills.

In conclusion, the CPC learning tool's efficiency features enhance student learning outcomes, using CPC tool enable them to tackle complex Calculus concepts with relative ease, improving learning proficiency and achieving student engagement and motivation.

Level of Student Learning Outcomes in Terms of Student Engagement

In this study, this refers to the degree to which students are actively involved, motivated, and invested in their mobile learning experience. The level of student learning outcomes in terms of student engagement, with regards to behavioral engagement, emotional engagement and cognitive engagement was treated statistically using mean and standard deviation.

Table 10. Level of Student Learning Outcomes in terms of Student Engagement, with regards to Behavioral Engagement

Statements	Mean	SD	Remarks
The use of Connecting People in Calculus (CPC) Mobile-Assisted Learning tool help students ...			
...remember key concepts in Calculus ideas through active engagement.	3.99	0.82	Often
...practice problem-solving skills and actively involve in class activities.	4.07	0.74	Often
...show focus by staying on task, applying effort to understand and solve math problems during lessons.	3.67	0.98	Often
...engage in discussions and share thoughts on topics.	4.25	0.79	Always
...make informed judgments based on their understanding of the subject matter.	3.56	1.13	Often
Weighted Mean	3.91		
SD	0.89		
Verbal Interpretation	Engaged		

Table 10 displays the level of student learning outcomes in terms of student engagement, with regards to behavioral engagement.

The use of Connecting People in Calculus (CPC) Mobile-Assisted Learning tool help students engage in discussions and share thoughts on topics yielded the highest mean score ($M=4.25$, $SD=0.79$) and interpreted as Always. This suggests that students highly value CPC learning tool's collaborative features, indicating that integrated interactive discussions, peer to peer tutoring, group facilitated learning and idea-sharing are key aspects to their engagement, motivation and satisfaction in student learning experience.

Conversely, the use of Connecting People in Calculus (CPC) Mobile-Assisted Learning tool help students make informed judgments based on their understanding of the subject matter gained the lowest mean score ($M=3.56$, $SD=1.13$) and interpreted as Often. This indicates students struggled to grasp CPC learning tool for self-assessment or

applying understanding to make informed judgments, possibly needing more guidance on using the tool for critical thinking. Altogether, the weighted mean of 3.91 with a standard deviation of 0.89 indicates a verbal interpretation of "Engaged." The mean score falls within the upper range of the scale, suggesting that students consistently experienced behavioral engagement while using the CPC learning tool. A standard deviation of 0.89 reflects moderate variability, meaning that while most students reported similar levels of engagement, there were some individual differences in how strongly they responded.

This result expresses that the CPC learning tool generally promotes strong behavioral engagement among students, particularly in fostering active participation, sustained focus, and collaborative interaction. The high mean suggests that the tool's design and activities successfully elicit observable behaviors associated with engagement, such as contributing to discussions, staying on task, and working constructively with peers. In conclusion, the CPC learning tool effectively boosts behavioral engagement in Calculus learning. Students demonstrated increased participation in discussions and greater consistency in staying on task, which suggests that the tool successfully promotes observable, active involvement in the learning process. These behaviors align with key indicators of behavioral engagement, such as effort, persistence, and adherence to academic tasks.

Table 11. Level of Student Learning Outcomes in terms of Student Engagement, with regards to Emotional Engagement

Statements	Mean	SD	Remarks
The use of Connecting People in Calculus (CPC) Mobile-Assisted Learning tool help students ...			
...share thoughts and ideas openly, fostering discussion and deeper understanding in Calculus.	4.27	0.72	Always
...exhibit a sense of achievement, boosting motivation and confidence in tackling Calculus problems.	3.74	0.97	Often
...contribute to group work and discussions in class.	4.10	0.81	Often
...display enthusiasm and eagerness to dive into mathematics lessons.	4.15	0.82	Often
...appreciate learning Calculus more when lessons include interactive activities.	4.16	0.69	Often
Weighted Mean	4.08		
SD	0.80		
Verbal Interpretation	Engaged		

Table 11 depicts the level of student learning outcomes in terms of student engagement, with regards to emotional engagement. The use of Connecting People in Calculus (CPC) Mobile-Assisted Learning tool help students share thoughts and ideas openly, fostering discussion and deeper understanding in Calculus achieved the highest mean score ($M=4.27$, $SD=0.72$) and interpreted as Always. This indicates that students highly value CPC learning tool's features, that boosts students' emotional connection to the material and their peers.

While the use of Connecting People in Calculus (CPC) Mobile-Assisted Learning tool help students exhibit a sense of achievement, boosting motivation and confidence in tackling Calculus problems gained the lowest mean score ($M=3.74$,

SD=0.97) and interpreted as Often. This shows students may need more structured feedback or successful experiences with using CPC learning tool to solidify their sense of achievement and confidence in tackling Calculus problems.

Collectedly, the weighted mean of 4.08 and a standard deviation of 0.80 indicates a verbal interpretation of Engaged. This finding expresses that CPC learning tool generally enhances emotional engagement through collaboration, but scores lower on motivation and enthusiasm, indicating a need for improvement in these areas.

In conclusion, the CPC learning tool boosts emotional engagement, particularly in fostering group discussion and peer collaboration. However, students reported lower scores on feeling less achievement and enthusiasm, suggesting a need to enhance motivational aspects of the mobile-assisted learning tool.

Table 12. Level of Student Learning Outcomes in terms of Student Engagement, with regards to Cognitive Engagement

Statements	Mean	SD	Remarks
The use of Connecting People in Calculus (CPC) Mobile-Assisted Learning tool help students ...			
...reflect thinking and learning in Calculus.	4.23	0.69	Always
...understand the underlying concepts of Calculus.	4.20	0.73	Often
...explore different approaches to solving Calculus problems.	4.36	0.68	Always
...apply abstract concepts to concrete, interactive experiences making math more accessible and less intimidating.	4.29	0.73	Always
...develop strategies to approach unfamiliar and challenging mathematical problems.	4.39	0.80	Always
Weighted Mean	4.29		
SD	0.73		
Verbal Interpretation			Highly Engaged

Table 12 depicts the level of student learning outcomes in terms of student engagement, with regards to cognitive engagement.

The use of Connecting People in Calculus (CPC) Mobile-Assisted Learning tool help students develop strategies to approach unfamiliar and challenging mathematical problems attained the highest mean score (M=4.39, SD=0.80) and interpreted as Always. This represents that focus on collaborative problem-solving and group discussions, with the use of CPC learning tool helps students develop a growth mindset in problem-solving skills and enhance confidence in tackling challenging mathematics problems, enhancing their cognitive engagement and ability to approach unfamiliar tasks, achieving the learning outcome.

Meanwhile, the use of Connecting People in Calculus (CPC) Mobile-Assisted Learning tool help students understand the underlying concepts of Calculus got the lowest mean score (M=4.20, SD=0.73) and interpreted as Often. This signifies that students might need more explicit connections or scaffolding within CPC to grasp abstract Calculus concepts, making it harder for them to fully understand underlying principles.

Overall, the weighted mean of 4.29 and a standard deviation of 0.73 indicates a verbal interpretation of Highly Engaged. This finding denotes that CPC learning demonstrates

high cognitive engagement, notably in developing problem-solving strategies and applying abstract concepts to interactive experiences. It facilitates reflection and exploration of different approaches, although enhancing understanding of underlying Calculus concepts remains an area for improvement.

In summary, the CPC learning tool enhances cognitive engagement in Calculus learning, particularly in problem-solving and applying concepts, but could be improved to deepen understanding of underlying principles.

Level of Student Learning Outcomes in Terms of Student Performance

In this study, this refers to the assessment in which students are measured on how well they acquire knowledge and skills.

The level of student learning outcomes in terms of student performance, with regards to quizzes was treated statistically using the frequency and percentage.

Table 13. Level of Student Learning Outcomes in terms of Student Performance, with regards to Quizzes

Grade	Quizzes		Descriptive Equivalent
	F	%	
41-50	36	25.71%	Highly Proficient
31-40	97	69.29%	Proficient
21-30	7	5.00%	Nearly Proficient
11-20	0	0.00%	Low Proficient
0-10	0	0.00%	Not Proficient
Total	140	100%	
Weighted Mean	37.61		
SD	5.42		
Verbal Interpretation	Proficient		

Table 13 presents the level of student learning outcomes in terms of student performance in quizzes, including the distribution of grades with their corresponding frequency, percentage, and descriptive remarks.

The result shows that most learners are doing well on quizzes, with 69.29% having met the proficiency requirement. In addition, 25.71% of them performed at a highly proficient, which demonstrates that quiz questions were well done across a large number of students. At the same time, very few (5.00%) were moderately proficient, and none were under proficiency.

Students scored an average of 37.61 on quizzes, with a standard deviation of 5.42. This indicates that students performed generally well. Yet, the standard deviation being relatively moderate indicates that while the majority of students are scoring within a similar range, there is some varying degree of score among them.

In summary, this implies that most students are performing well on quizzes based on a large number of students being categorized as proficient or highly proficient, while no student performed as the lowest category. However, since a higher percentage of students fell under the proficient rather than highly proficient categories, additional support will be needed to help a greater number of students reach higher levels of performance in Calculus through further enhancement of both instructional strategies and additional support/enrichment activities.

Test of Significant Relationship between Components of Connecting People in Calculus a Mobile-Assisted Learning Tool and Student Engagement in Learning Calculus

To test the significant relationship between Components of Connecting People in Calculus a Mobile-Assisted Learning Tool and Students' Engagement in Learning Calculus, with regards to behavioral engagement, emotional engagement and cognitive engagement, was treated statistically using Jamovi 2.3.28 using the Pearson correlation coefficient.

Table 14. Significant Relationship between the Components of Connecting People in Calculus a Mobile-Assisted Learning Tool and the Students' Engagement in Learning Calculus

Components of Connecting People in Calculus a Mobile-Assisted Learning Tool		Behavioral	Emotional	Cognitive
Objectives: Pearson Correlation	0.56***	0.40***	0.38***	
Significance(2-Tailed)	<.001	<.001	<.001	
N	140	140	140	
Content: Pearson Correlation	0.56***	0.40***	0.39***	
Significance(2-Tailed)	<.001	<.001	<.001	
N	140	140	140	
Activity: Pearson Correlation	0.49***	0.52***	0.52***	
Significance(2-Tailed)	<.001	<.001	<.001	
N	140	140	140	
Assessment: Pearson Correlation	0.64***	0.63***	0.45***	
Significance(2-Tailed)	<.001	<.001	<.001	
N	140	140	140	

Note: *p<.05, ** p<.01, ***p<.001

Table 14 presents the relationship between the components of Connecting People in Calculus (CPC) a Mobile-Assisted Learning Tool and Student Engagement in learning Calculus, particularly in terms of behavioral, emotional, and cognitive engagement, using the Pearson correlation coefficient.

The results revealed that the various components of the CPC mobile-assisted learning tool have a weak to moderate positive correlation with all aspects of student engagement.

When looking at objectives specifically, there were moderate correlations between behavioral ($r = 0.56$, $p < .001$), emotional ($r = 0.40$, $p < .001$) and cognitive engagement ($r = 0.38$, $p < .001$). However, this shows that having clearly defined learning objectives can lead to an increase in student behavior, emotion and cognitive involvement in learning Calculus.

Similarly, the components of the content also had moderate correlations with behavioral ($r = 0.56$, $p < .001$), emotional ($r = 0.40$, $p < .001$) and cognitive engagement ($r = 0.39$, $p < .001$). As such, this demonstrates that providing students with academic content that meets their individual needs will positively impact their ability to engage, be interested in and understand calculations.

There is also a weak positive correlation between activities and behavioral engagement ($r = 0.49$, $p < .001$), as well as moderate positive correlations between both emotional ($r = 0.52$, $p < .001$) and cognitive engagement ($r = 0.52$, $p < .001$). Engaging and interactive activities help students develop an emotional bond and a meaningful level of involvement with their learning task while having a positive impact on how they are engaged in their own learning.

Assessments also reveal moderate positive correlations with both behavioral ($r = 0.64$, $p < .001$) and emotional engagement ($r = 0.63$, $p < .001$) and a weak positive correlation with cognitive engagement ($r = 0.45$, $p < .001$). These results indicate that the strategies used to assess student performance have a significant influence on their level of participation and emotional commitment and contribute to their cognitive learning development in studying Calculus.

In summary, the results imply that all components of the CPC mobile-assisted learning tool—objectives, content, activities, and assessment—have significant positive relationships with student engagement in learning Calculus. The correlations, which predominantly fall within the weak to moderate range, suggest that each component contributes meaningfully to engagement, but none operates in isolation as a dominant driver. This pattern indicates that engagement is cumulative: improvements across multiple components are likely to produce a more substantial effect than enhancing any single element alone.

Consequently, targeted refinements in the four areas have the potential to strengthen students' behavioral, emotional, and cognitive engagement in tandem. For example, clarifying and contextualizing learning objectives can increase perceived relevance, thereby enhancing emotional investment. Refining content to emphasize conceptual connections and real-world applications can promote deeper cognitive processing, while well-structured activities and assessments that balance challenge with support can sustain active participation and persistence.

Test of Significant Relationship between Features of Connecting People in Calculus a Mobile-Assisted Learning Tool and Student Engagement in Learning Calculus

To test the significant relationship between Features of Connecting People in Calculus a Mobile-Assisted Learning Tool and Students' Engagement in Learning Calculus, with regards to behavioral engagement, emotional engagement and cognitive engagement, was treated statistically using Jamovi 2.3.28 using the Pearson correlation coefficient.

Table 15. Significant Relationship between the Features of Connecting People in Calculus a Mobile-Assisted Learning Tool and the Students' Engagement in Learning Calculus

Features of Connecting People in Calculus a Mobile-Assisted Learning Tool		Behavioral	Emotional	Cognitive
Design quality: Pearson Correlation	0.57***	0.31***	0.22**	
Significance(2-Tailed)	<.001	<.001	0.009	
N	140	140	140	
Accessibility: Pearson Correlation	0.34***	0.56***	0.25**	
Significance(2-Tailed)	<.001	<.001	0.003	
N	140	140	140	
User-friendliness: Pearson Correlation	0.30***	0.41***	0.66***	
Significance(2-Tailed)	<.001	<.001	<.001	
N	140	140	140	
Functionality: Pearson Correlation	0.39***	0.34***	0.35***	
Significance(2-Tailed)	<.001	<.001	<.001	
N	140	140	140	
Efficiency: Pearson Correlation	0.32***	0.24**	0.14	
Significance(2-Tailed)	<.001	0.004	0.098	
N	140	140	140	

Note: *p<.05, ** p<.01, ***p<.001

Table 15 presents the relationship between the features of Connecting People in Calculus (CPC) a Mobile-Assisted Learning Tool and Student Engagement in learning Calculus, particularly in terms of behavioral, emotional, and cognitive engagement, using the Pearson correlation coefficient.

The results revealed that the various features of the CPC mobile-assisted learning tool have a weak to moderate positive correlation with all aspects of student engagement.

When looking at design quality specifically, there were moderate positive correlations between behavioral ($r = 0.57$, $p < .001$), and emotional ($r = 0.31$, $p < .001$), as well as weak positive correlation on cognitive engagement ($r = 0.22$, $p < .001$). However, this shows that having visually design mobile tool can lead to an increase in student behavior, emotion and cognitive involvement in learning Calculus.

Similarly, the features of accessibility also had moderate positive correlations with behavioral ($r = 0.34$, $p < .001$), and emotional ($r = 0.56$, $p < .001$), as well as weak positive correlation on cognitive engagement ($r = 0.25$, $p < .003$). As such, this demonstrates that ease of use in accessing the tool meets their individual needs will positively impact their ability to engage, be interested in and understand calculations.

There is also a moderate positive correlation between user-friendliness and behavioral engagement ($r = 0.30$, $p < .001$), emotional ($r = 0.41$, $p < .001$) and cognitive engagement ($r = 0.66$, $p < .001$). This entails that perceived usefulness of the tool help students develop an emotional bond and a meaningful level of involvement with their learning task while having a positive impact on how they are engaged in their own learning.

Functionality also reveal moderate positive correlations with behavioral engagement ($r = 0.39$, $p < .001$), emotional engagement ($r = 0.34$, $p < .001$) and cognitive engagement ($r = 0.35$, $p < .001$). These results indicate that the tools performance and support in learning have a significant influence on their level of participation and emotional commitment and contribute to their cognitive development in Calculus.

In contrast, efficiency reveal weak positive correlations with behavioral engagement ($r = 0.32$, $p < .001$), emotional engagement ($r = 0.24$, $p < .004$), and cognitive engagement ($r = 0.14$, $p < .098$). These results indicate that the assistance of the tool in learning have a significant weak influence on their level of participation and emotional commitment and contribute to their cognitive development in Calculus.

In summary, the results imply that all features of the CPC mobile-assisted learning tool have significant positive relationships with student engagement in learning Calculus. The results displayed most correlations at the weak to moderate level. Thus, improvements in the five areas of design quality, accessibility, user-friendliness, functionality and efficiency have the capacity to strengthen student behavioral, emotional, and cognitive engagement.

In conclusion, providing an adaptive and immersive learning experience by integrating digital literacy, such as CPC mobile-assisted learning tool, can increase student

motivation, active student participation, and overall engagement, leading to improved academic outcomes.

Test of Significant Effect of Connecting People in Calculus a Mobile-Assisted Learning Tool and Student Performance in Learning Calculus

The Significant Effect of Connecting People in Calculus a Mobile-Assisted Learning Tool and Student Performance in Learning Calculus in terms of quiz, was treated statistically using Real Statistics Data Analysis Tools using multiple regression analysis.

Table 16. Significant Effect between the use of Connecting People in Calculus a Mobile-Assisted Learning Tool on the Students' Performance

ANOVA^a

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	6.65	9	0.74	3.17	0.002
Residual	30.34	130	0.23		
Total	36.99	139			

a. Dependent Variable: Quiz

b. Predictors: Objectives, Content, Activity, Assessment, Design Quality, Accessibility, User-Friendliness, Functionality and Efficiency

Coefficients^a

Model	Unstandardized Coefficients			
	B	Std. Error	T	Sig.
(Constant)	4.79	0.53	8.97	<.000
Objectives	-0.13	0.09	-1.47	0.144
Content	0.01	0.09	0.14	0.885
Activity	-0.26	0.11	-2.43	0.016*
Assessment	-0.05	0.11	-0.44	0.664
Design Quality	0.15	0.08	1.74	0.084
Accessibility	0.13	0.09	1.37	0.172
User-Friendliness	-0.05	0.10	-0.46	0.649
Functionality	0.08	0.14	0.54	0.588
Efficiency	-0.03	0.11	-0.28	0.778

Note: * $p < .05$, ** $p < .01$, *** $p < .001$

A multiple regression analysis was conducted to determine whether the components of Connecting People in Calculus (CPC) a mobile-assisted learning tool namely objectives, content, activity, assessment, design quality, accessibility, user-friendliness, functionality, and efficiency could significantly predict students' performance in learning Calculus in terms of quizzes.

The analysis of variance, the regression model has significance ($F(9, 130) = 3.17$, $p = 0.002$). Therefore, the entire CPC mobile assisted learning tool is significantly predictive of student quiz performance in calculus. As such, the regression model indicates that these variables work together to predict student success.

The individual predictors all show a lack of significant effect on predicting Quiz Performance due to their p-values being greater than .050 levels of significance for the following predictors: Objectives: ($B = -0.13$, $p = 0.144$), Content: ($B = 0.01$, $p = 0.885$), Assessment: ($B = -0.05$, $p = 0.664$), Design Quality: ($B = 0.15$, $p = 0.084$), Accessibility: ($B = 0.13$, $p = 0.172$), User-friendliness: ($B = -0.05$, $p = 0.649$), Functionality: ($B = 0.08$, $p = 0.588$) and Efficiency: ($B = -0.03$, $p = 0.778$). Only, Activity, was found to significantly

predict Quiz Performance (i.e. $B = -0.26$, $t = -2.43$, $p = 0.016$). The negative coefficients suggest that there is a slightly negative correlation between the rating of activity and quiz performance indicating that as the rating of activity increases, there is an inverse relationship to performance.

In summary, this implies that CPC mobile-assisted learning tool does not predict quiz performance for students. While the CPC learning tool has demonstrated overall positive outcomes relative to student performance, increasing the effectiveness of the tool components, particularly with regard to the activity component, it will not improve the overall academic outcomes for the students studying Calculus. Thus, there is no significant effect between the Connecting People in Calculus a Mobile-Assisted Learning Tool on the Student Performance in Learning Calculus.

IV. CONCLUSION AND RECOMMENDATIONS

There is a significant relationship between the components of Connecting People in Calculus, a mobile-assisted learning tool and student engagement in learning Calculus, resulting from the rejection of the null hypothesis. This indicates that a well-designed tool can enhance these engagement aspects, leading to improved learning outcomes. The positive relationship suggests that investing in the four areas of the components of CPC tool learning can pay off in terms of student engagement.

The features of Connecting People in Calculus, a mobile-assisted learning tool and student engagement in learning Calculus, depicts a significant relationship based on the rejection of the null hypothesis. This specified that providing an adaptive and immersive experience for students, CPC learning tool can strengthen student engagement, motivation and driving academic success.

There is no significant effect between the use of Connecting People in Calculus, a mobile-assisted learning tool on the student performance in learning Calculus. While the CPC tool has demonstrated overall positive outcomes relative to student performance, increasing the effectiveness of the tool components, particularly with regard to the activity component, it does not predict quiz performance for students

and improve the overall academic outcomes for the students studying Calculus. Thus, the null hypothesis is accepted.

Recommendations

Based on the results from the summary, findings, and conclusions, the following recommendations were drawn:

School Administrators may support the utilization of the mobile learning tool in lessons and encourage collaborative learning, and peer-to-peer interaction. Provide resources and support for teachers to effectively incorporate mobile-assisted learning tools, fostering a culture of innovation and student-centered learning.

Teachers are recommended to re-examine the design and implementation of mobile-assisted learning tools to identify areas for improvement and potential impact on student performance.

Students are encouraged to engage actively in math classes through discussions, group work, and problem-solving using tools like the Connecting People in Calculus (CPC) mobile-assisted learning tool. Developing regular study habits and participating in activities that boost memory, reasoning, and problem-solving skills can also help them succeed in mathematics.

Future researchers may conduct further studies to investigate the non-significant predictors of student performance in the CPC Mobile-assisted Learning Tool, exploring factors such as student demographics, learning styles, and tool usage patterns. This can inform targeted improvements to the CPC tool or other mobile-assisted learning tools, enhancing its effectiveness in supporting Calculus learning outcomes.

REFERENCE

- [1]. Kalyani, Dr. (2024). The Role of Technology in Education: Enhancing Learning Outcomes and 21st Century Skills. *International Journal of Scientific Research in Modern Science and Technology*. 3. 05-10. 10.59828/ijsmst.v3i4.199.
- [2]. Kumbo, L., Mero, R. F., & Hayuma, B. J. (2023). Navigating The Digital Frontier: Innovative Pedagogies for Effective Technology Integration in Education. *The Journal of Informatics*, 3(1). <https://doi.org/10.59645/tji.v3i1.142>