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Quick-Response Embedded Slide Decks (QRESD): Strategic Intervention Material to Enhance Learners' Interest and Mathematical Skills

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Abstract*—The main purpose of the study was to determine the effect of Quick-Response Embedded Slide Decks (QRESD) as strategic intervention material on the learners' interest and mathematical skills. It specifically aimed to assess the QRESD components in terms of priming, activity, abstraction, and assessment; characteristics with regards to accessibility, interactive, usability, and appropriateness; determine the level of learners' interest in terms of peer evaluation, task completion, and participation; measure learners' mathematical skills using a written test; identify any relationship between QRESD components, characteristics and students' interest; and examine the effect of QRESD on learners' mathematical skills. The study employed a quantitative descriptive research design, which involved 32 Grade 11 learners, purposively selected from Masaya Integrated National High School during the Second Semester of the A.Y. 2024-2025. To evaluate the QRESD, data were gathered using varied instruments, with statistical analyses including mean, standard deviation, Pearson correlation, and regression analysis. The findings indicated that QRESD components received a high acceptability rating. Also, the QRESD characteristics were highly acceptable. Learners demonstrated highly interested levels and achieved a very satisfactory mathematical skills based on written assessments. The results revealed no significant relationship and effect between QRESD's components and characteristics on learners' interest and mathematical skills. This means that QRESD provides structured components and interactive characteristics, but these indicators alone do not directly influence learners' interest. Additionally, QRESD enhances accessibility and interest in activities, its integration into lessons may not be sufficient to substantially enhance learners' mathematical skills. Further research and development are recommended to identify specific aspects of QRESD that require refinement for greater effectiveness. Enhancing its design could help educators strengthen learners' interest and mathematical skills. School administrators may explore alternative or supplementary interventions to support students' mathematical development. These findings can also inform teacher training programs, equipping educators with strategies to foster engagement and skill-building in mathematics. Moreover, this study provides a foundation for future research on QRESD and similar educational tools, contributing to the continuous improvement of teaching and learning practices.*

***Keywords*—** *Quick-Response Embedded Slide Decks (QRESD), learners' interest, mathematical skills*.

I. INTRODUCTION

Mathematics studies numbers, quantities, shapes, patterns, and the relationships between them. It is a fundamental discipline that reinforces various fields such as education, engineering, physics, economics, and even art. Mathematics is not just about numbers and equations; it enables individuals to understand and describe the world, from the simplest tasks like budgeting expenses to complex phenomena like predicting weather patterns.

Mathematics plays an essential role in daily life, influencing almost every activity, whether consciously recognized or not. From cooking and baking—where precise measurements are important—to managing finances—where budgeting and calculating interest rates are necessary—mathematical skills are indispensable. They also help make informed decisions, such as comparing prices while shopping or planning travel itineraries. The ability to think mathematically enhances our problem-solving skills and logical reasoning, which are valuable in both personal and professional contexts.

Integrating Quick-Response Embedded Slide Decks (QRESD) in mathematics education aims to address the gaps and mitigate post-pandemic learning losses. These materials enhance learners' interest and mathematical proficiency by providing targeted interventions for the least mastered competencies.

In response to these challenges, the Department of Education (DepEd) in the Philippines has issued several memoranda to improve mathematics education. One such initiative is the integration of technology into teaching and learning processes. DepEd Memorandum No. 173, s. 2019, for instance, emphasizes the use of Information and Communication Technology (ICT) to enhance education delivery and improve student outcomes. This initiative aligns with the global trends advocating technology-driven, innovative, and engaging instructional materials.

As a Strategic Intervention Material (SIM) in mathematics, QRESD is designed to provide quick and easy access to supplementary learning materials, making it more convenient for students to review and reinforce their understanding of mathematical concepts. By scanning the QRESD, students can access slide decks and interactive exercises.

1.1 Statement of the Problem

Problem/s which were addressed by the research

The purpose of this research is to assess how the learners' mathematical aptitude and interest are impacted by the use of Quick-Response Embedded Slide Decks (QRESD) as a strategic intervention tool.

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Specifically, it sought answers to the following questions:

1. What is the level of assessment on the components of the Quick Response Embedded Slide Decks (QRESD) in terms of:
   1.1 priming;
   1.2 activity;
   1.3 abstraction; and,
   1,4 assessment?
2. What is the level of assessment on the characteristics of the Quick Response Embedded Slide Decks (QRESD) in terms of:
   2.1 accessibility;
   2.2 interactivity;
   2.3 usability; and,
   2.4 appropriateness?
3. What is the level of learners' interest in terms of:
   3.1 peer evaluation;
   3.2 task completion; and,
   3.3 participation?
4. What is the level of the learner's mathematical skills after using Quick- Response Embedded Slide Decks (QRESD) in terms of a written test?
5. Is there a significant relationship between the components and characteristics of the Quick-Response Embedded Slide Decks (QRESD) and the learners' interest?
6. Is there a significant effect of the Quick-Response Embedded Slide Decks (QRESD) components and characteristics on the learner's mathematical skills in a written test?

II. Methodology

The study employed a quantitative descriptive research design, which involved 32 Grade 11 learners, purposively selected from Masaya Integrated National High School during the Second Semester of the A.Y. 2024-2025. To evaluate the QRESD, data were gathered using varied instruments, with statistical analyses including mean, standard deviation, Pearson correlation, and regression analysis. The findings indicated that QRESD components received a high acceptability rating. Also, the QRESD characteristics were highly acceptable. Learners demonstrated highly interested levels and achieved a very satisfactory mathematical skills based on written assessments.

III. Results and Discussion

This chapter deals with the presentation, analysis, and interpretation of the data gathered that showed a significant relationship between the content and characteristics of Quick-Response Embedded Slide Decks (QRESD) and the learners' interest, and the significant effect of component and characteristics of Quick-Response Embedded Slide Decks (QRESD) on the mathematical skills of grade 11 students using a written test.

Level of Assessment of the Component of Quick-Response Embedded Slide Decks (QRESD)

The level of assessment on the components of Quick-Response Embedded Slide Decks (QRESD), which consist of priming, activity, abstraction, and assessment.

The following table shows the statement, mean, standard deviation, remarks and verbal interpretation.

Table 1 presents the level of assessment on the components of Quick-Response Embedded Slide Decks (QRESD) in terms of priming. It includes statements, mean scores, standard deviations, and corresponding remarks.

The computed weighted mean of 4.19 with a standard deviation of 0.71 indicates a moderately acceptable level of assessment among respondents regarding the effectiveness of the QRESD in introducing lesson topics, capturing attention, encouraging reflection, presenting objectives, and ensuring smooth transitions.

Overall, the results indicate that the components of the QRESD are well-structured and effectively support student engagement and learning. The agreement among components shows the importance of clear introductions, engaging elements, reflective prompts, well-defined objectives, and logical transitions in enhancing students' understanding and interest in the lesson.

TABLE 1. Level of Assessment on the Components of Quick-Response Embedded Slide Decks in Terms of Priming

STATEMENTS	MEAN	SD	REMARKS
The slide deck effectively introduces the lesson topic.	4.19	0.64	Agree
Engaging elements (e.g., questions, images, quotes) are used to capture my attention.	4.16	0.77	Agree
I am encouraged to reflect on prior knowledge.	4.06	0.72	Agree
Objectives and expectations are presented.	4.38	0.55	Strongly Agree
Transitions between topics are logical and smooth.	4.16	0.85	Agree
Weighted Mean	4.19		
SD	0.71		
Verbal Interpretation	Moderately Acceptable		

In relation to the result of the study, previous research has emphasized the significance of designing instructional materials that are both engaging and accessible. For instance, Mayer (2015) highlighted the importance of multimedia learning principles in creating effective educational tools. This aligns with the findings of the current study, which emphasize the value of integrating engaging elements and clear objectives to enhance student learning experiences. Additionally, Clark and Mayer (2016) emphasized the need for well-structured instructional design to support cognitive processes and improve learning outcomes. These insights reinforce the importance of systematic planning and evaluation in developing instructional materials like QRESD.

Table 2 presents the level of assessment on the components of Quick-Response Embedded Slide Decks (QRESD) in terms of activity. It includes statements, mean scores, standard deviations, and corresponding remarks.

The computed weighted mean of 4.17 with a standard deviation of 0.65 indicates a moderately acceptable level of assessment among respondents regarding the interactivity, collaboration, value addition, alignment with learning objectives, and clarity of instructions in the QRESD activities. Overall, the results indicate that the activities within the

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QRESD are well-structured and effectively support student engagement and learning. The agreement across all components shows the importance of interactive tasks, collaborative opportunities, clear instructions, and alignment with learning objectives in enhancing students' learning experiences.

TABLE 2. Level of Assessment on the Components of Quick-Response Embedded Slide Decks in Terms of Activity

STATEMENTS	MEAN	SD	REMARKS
Tasks are interactive and require my active participation.	4.03	0.65	Agree
Activities encourage collaboration or independent learning.	4.28	0.63	Strongly Agree
The QR code-enhanced activities add value to my learning.	4.16	0.72	Agree
Tasks align with the learning objectives.	4.28	0.58	Strongly Agree
The instructions are clear and easy to follow.	4.09	0.64	Agree
Weighted Mean	4.17		
SD	0.65		
Verbal Interpretation	Moderately Acceptable		

In relation to the result of the study, previous research has emphasized the significance of designing instructional materials that promote active learning and engagement. For instance, Freeman et al. (2020) highlighted the benefits of active learning strategies in improving student outcomes. This aligns with the findings of the current study, which underscore the value of interactive and collaborative activities in enhancing student learning experiences. Additionally, Johnson, Johnson, and Smith (2020) emphasized the importance of cooperative learning in fostering student engagement and achievement. These insights reinforce the importance of systematic planning and evaluation in developing instructional materials like QRESD.

Table 3 presents the level of assessment on the components of Quick-Response Embedded Slide Decks (QRESD) in terms of abstraction. It includes statements, mean scores, standard deviations, and corresponding remarks.

TABLE 3. Level of Assessment on the Components of Quick-Response Embedded Slide Decks in Terms of Abstraction

STATEMENTS	MEAN	SD	REMARKS
Concepts are clearly explained with examples.	4.13	0.71	Agree
Important points are emphasized effectively.	4.09	0.59	Agree
Explanations cater to different learning styles.	4.09	0.64	Agree
QR codes provide access to additional explanations.	4.22	0.61	Strongly Agree
Key takeaways are summarized effectively.	4.03	0.59	Agree
Weighted Mean	4.11		
SD	0.63		
Verbal Interpretation	Moderately Acceptable		

The computed weighted mean of 4.11 with a standard deviation of 0.63 indicates a moderately acceptable level of assessment among respondents regarding the clarity of explanations, emphasis on important points, accommodation of different learning styles, provision of additional explanations via QR codes, and effective summarization of key takeaways in the QRESD.

Overall, the results indicate that the abstraction components of the QRESD are well-structured and effectively support student understanding and learning. The high level of agreement across all components shows the importance of clear explanations, effective emphasis, accommodation of diverse learning styles, and the use of QR codes to provide additional resources in enhancing students' comprehension and retention of the material.

In connection to this study, previous research has emphasized the significance of clear and accessible instructional materials. For instance, Fiorella and Mayer (2015) highlighted the importance of cognitive theory in multimedia learning, which supports the use of clear explanations and additional resources to enhance learning. This aligns with the findings of the current study, which underscore the value of clear explanations and additional resources in supporting student learning. Additionally, Clark and Mayer (2016) emphasized the role of multimedia learning in catering to different learning styles and enhancing understanding. These insights reinforce the importance of systematic planning and evaluation in developing instructional materials like QRESD.

Table 4 presents the level of assessment on the components of Quick-Response Embedded Slide Decks (QRESD) in terms of assessment. It includes statements, mean scores, standard deviations, and corresponding remarks.

The computed weighted mean of 4.34 with a standard deviation of 0.64 indicates a highly acceptable level of assessment among respondents regarding the variety of assessment tools, immediate feedback from formative assessments, alignment with learning objectives, additional assessment activities via QR codes, and the provision of scores in the QRESD.

TABLE 4. Level of Assessment on the Components of Quick-Response Embedded Slide Decks in Terms of Assessment

STATEMENTS	MEAN	SD	REMARKS
The slide deck includes varied assessment tools.	4.41	0.61	Strongly Agree
Formative assessments provided immediate feedback.	4.38	0.66	Strongly Agree
Assessment items align with learning objectives.	4.41	0.61	Strongly Agree
QR codes lead to useful additional assessment activities.	4.34	0.70	Strongly Agree
Scores are provided.	4.19	0.59	Agree
Weighted Mean	4.34		
SD	0.64		
Verbal Interpretation	Highly Acceptable		

In summary, the results indicate that the assessment components within the QRESD are well-structured and effectively support student evaluation and learning. The high level of agreement across all components shows the importance of varied assessment tools, immediate feedback, alignment with learning objectives, additional activities, and clear scoring in enhancing students' learning experiences.

Demosthenous et al. (2021) stated that the assessment features of a lesson help teachers refine instructional materials

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to target specific student competencies. This is also supported by the study of Mahlambi et al. (2023), which states that the assessment component serves as an avenue for teachers to understand students' progress. Consequently, students accept it as it allows them to track their own learning progress.

The level of assessment on the characteristics of Quick-Response Embedded Slide Decks (QRESD) regarding accessibility, interactivity, usability, and appropriateness

Level of Assessment of the Component of Quick-Response Embedded Slide Decks (QRESD)

The following table was treated statistically using mean and standard deviation, providing a comprehensive analysis of user satisfaction and performance across these dimensions.

Table 5 provides an evaluation of the characteristics of Quick-Response Embedded Slide Decks (QRESD) with a focus on accessibility. It details various statements, along with their corresponding mean scores, standard deviations, and remarks.

The calculated weighted mean of 4.23, with a standard deviation of 0.74, reflects a highly acceptable level of assessment among respondents regarding the accessibility of the slide decks on various devices, the proper functioning of QR codes, the quick loading of slides, ease of navigation, and the visibility of text and images on screens.

In essence, the findings suggest that the accessibility components of the QRESD are well-designed and effectively facilitate student use and engagement.

TABLE 5. Level of Assessment on the Characteristics of Quick-Response Embedded Slide Decks in Terms of Accessibility

STATEMENTS	MEAN	SD	REMARKS
The slide deck is accessible on the device I use.	4.38	0.66	Strongly Agree
QR codes function properly on all tested devices.	4.41	0.71	Strongly Agree
The slides load quickly and do not lag.	4.19	0.69	Agree
I can easily navigate between slides.	4.09	0.78	Agree
The text and images are visible on my screen.	4.09	0.86	Agree
Weighted Mean	4.23		
SD	0.74		
Verbal Interpretation	Highly Acceptable		

The strong agreement across all components highlights the significance of device compatibility, functional QR codes, quick loading times, easy navigation, and clear visibility in enhancing the educational experience for students.

Al-Fraihat et al. (2020) emphasizes the importance of usability and accessibility in e-learning systems, highlighting that these factors significantly impact user satisfaction and learning outcomes. Additionally, Martin et al. (2020) underscore the necessity of ensuring that digital learning tools are accessible and user-friendly to enhance student engagement and success. These insights reinforce the importance of designing instructional materials like QRESD with a strong focus on accessibility.

Table 6 provides an evaluation of the characteristics of Quick-Response Embedded Slide Decks (QRESD) with a focus on interactivity. It details various statements, along with their corresponding mean scores, standard deviations, and remarks.

The calculated weighted mean of 4.12, with a standard deviation of 0.74, reflects a moderately acceptable level of assessment among respondents regarding the encouragement of engagement, the addition of interactive elements through QR codes, the design fostering exploration and participation, the responsiveness of the slide deck to user input, and the integration of gamification elements.

TABLE 6. Level of Assessment on the Characteristics of Quick-Response Embedded Slide Decks in Terms of Interactivity

STATEMENTS	MEAN	SD	REMARKS
The slides encourage me to engage.	4.13	0.75	Agree
QR-embedded activities add interactive elements.	4.19	0.74	Agree
The design fosters my exploration and participation.	4.13	0.75	Agree
The slide deck responds well to my input.	4.00	0.76	Agree
Gamification elements (if applicable) are well integrated.	4.16	0.68	Agree
Weighted Mean	4.12		
SD	0.74		
Verbal Interpretation	Moderately Acceptable		

This may suggest that the interactivity components of the QRESD are well-designed and effectively facilitate student engagement and participation. The agreement across all components highlights the significance of engaging slides, interactive QR-embedded activities, a design that promotes exploration, responsive slide decks, and well-integrated gamification elements in enhancing the educational experience for students.

Interactivity, as stated by Knapp et al. (2022), is how students are engaged in lessons with a hands-on approach rather than just being recipients of knowledge and information from instructional materials and the teacher in the classroom, which is evident in the QRESD as students have rated the material moderately acceptable.

Table 7 shows the level of assessment of the characteristics of Quick-Response Embedded Slide Decks in terms of usability. It details various statements, along with their corresponding mean scores, standard deviations, and remarks.

TABLE 7. Level of Assessment on the Characteristics of Quick-Response Embedded Slide Decks in Terms of Usability

STATEMENTS	MEAN	SD	REMARKS
The slide deck is easy to navigate, even with limited technical knowledge.	4.19	0.64	Agree
I can easily follow instructions for navigation.	4.13	0.79	Agree
The interface is intuitive and user-friendly.	4.00	0.80	Agree
The design minimizes cognitive load, making content easy to understand.	4.28	0.63	Strongly Agree
The slide deck's interactive features are easy to access and use.	4.09	0.69	Agree
Weighted Mean	4.14		
SD	0.71		
Verbal Interpretation	Moderately Acceptable		

The results indicate that the highest-rated statement, with a mean score of 4.28, highlights that the design minimizes cognitive load, making the content easy to understand. This

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suggests that students appreciate the clear and structured presentation of information, which enhances their learning experience.

Other aspects, such as ease of navigation, clear navigation instructions, and accessibility of interactive features, were also rated positively, indicating that the slide deck provides a smooth and manageable user experience. However, the lowest-rated aspect pertains to the interface's intuitiveness, suggesting that some students may find certain design elements less user-friendly.

With an overall weighted mean of 4.14 and a standard deviation of 0.71, the QRESD's usability is classified as moderately acceptable. The results indicate that students generally find the slide deck easy to use.

Fernández-Enríquez and Delgado-Martín (2020) stated that technology for teaching math should be user-friendly and accessible to both teachers and students, which aligns with the results of this study. Since QRESD has been accessible to students, it indicates ease of access. Ease of access refers to students being able to quickly engage with content simply by scanning the code (Widyasari et al., 2019).

Table 8 shows the level of assessment on the characteristics of Quick-Response Embedded Slide Decks (QRESD) in terms of appropriateness. It includes statements, mean scores, standard deviations, and corresponding remarks.

The computed weighted mean of 4.29 with a standard deviation of 0.67 indicates a highly acceptable level of assessment among respondents regarding the suitability of content, support for learning goals, age-appropriateness of visual text elements, alignment with technological cognitive proficiency, and the enhancement of the learning experience through visual design.

Overall, the results indicate that the appropriateness characteristics of the QRESD are well-aligned with student needs and expectations. The high level of agreement across all components shows the importance of suitable content, supportive design, age-appropriate elements, alignment with cognitive proficiency, and effective visual design in enhancing students' learning experiences.

TABLE 8. Level of Assessment on the Characteristics of Quick-Response Embedded Slide Decks in Terms of Appropriateness

STATEMENTS	MEAN	SD	REMARKS
The content is suitable for my needs and expectations.	4.13	0.61	Agree
The slide deck design supports my overall learning goals and objectives.	4.09	0.69	Agree
The visual and text elements are age-appropriate for a student my age.	4.22	0.71	Strongly Agree
The slide deck's complexity level is aligned with my technological and cognitive proficiency.	4.56	0.56	Strongly Agree
Visual design enhances, rather than detracts from, the learning experience.	4.47	0.76	Strongly Agree
Weighted Mean	4.29		
SD	0.67		
Verbal Interpretation	Highly Acceptable		

AlNajdi (2022) indicated that the appropriateness of using QR codes and interactive slides in education significantly improves the learning process by making it easier to access and engage with content. Technology integration fosters a more interactive and efficient learning environment, allowing students to grasp math concepts. This study's results reveal that student participants strongly agree with enhancing their learning experience through Quick-Response Embedded Slide Decks (QRESD).

Level of the Learners' Interest

The level of learners' interest in using Quick-Response Embedded Slide Decks (QRESD) in terms of peer evaluation, task completion, and participation was treated statistically using mean and standard deviation. This approach provided a quantitative measure of students' engagement while interacting with the slide decks.

Table 9 presents the level of interest in using Quick-Response Embedded Slide Decks (QRESD) in terms of peer evaluation. It illustrates the statements used, along with the corresponding mean scores, standard deviations, and remarks.

TABLE 9. Level of Learners' Interest in Using Quick-Response Embedded Slide Decks (QRESD) in Terms of Peer Evaluation

STATEMENTS	MEAN	SD	REMARKS
The use of QRESD encouraged	4.34	0.65	Strongly Agree
QRESD helped in providing constructive feedback to classmates.	4.50	0.57	Strongly Agree
My peers and I were able to assess each other's progress effectively.	4.44	0.62	Strongly Agree
QRESD facilitated a deeper understanding of my peers' perspectives.	4.47	0.67	Strongly Agree
The peer evaluation process using QRESD improved the quality of our group discussions.	4.59	0.61	Strongly Agree
Weighted Mean	4.47		
SD	0.63		
Verbal Interpretation	Highly Interested		

The computed weighted mean of 4.29 with a standard deviation of 0.67 indicates highly level of interest among respondents regarding the suitability of content, support for learning goals, age-appropriateness of visual text elements, alignment with technological cognitive proficiency, and the enhancement of the learning experience through visual design. Overall, the results indicate that the appropriate characteristics of the QRESD are well-aligned with student needs and expectations. The high level of agreement across all characteristics shows the importance of suitable content, supportive design, age-appropriate elements, alignment with cognitive proficiency, and effective visual design in enhancing students' learning experiences.

In addition, it emphasizes the significant impact of QRESD on peer evaluation, as reflected in students' high levels of interest and satisfaction. The platform enhances the quality of group discussions and feedback and fosters empathy, understanding, and collaboration among learners. These findings highlight the transformative potential of QRESD in promoting a more engaging and supportive educational environment.

Table 10 presents the level of interest in using Quick-Response Embedded Slide Decks (QRESD) in terms of task

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completion. It includes statements, mean scores, standard deviations, and corresponding remarks.

The computed weighted mean of 4.55 with a standard deviation of 0.62 indicates that learners shown that they are highly interested in using QRESD for task completion. The high mean scores across all statements suggest that learners strongly agree that QRESD helps them complete tasks efficiently, provides clear and easy-to-follow instructions, enables timely completion of activities, streamlines the task completion process, and helps them stay on track and meet deadlines.

TABLE 10. Level of Learners' Interest in Using Quick-Response Embedded Slide Decks (QRESD) in Terms of Task Completion

STATEMENTS	MEAN	SD	REMARKS
QRESD helped me complete tasks efficiently.	4.56	0.56	Strongly Agree
The instructions embedded in QRESD were clear and easy to follow.	4.50	0.67	Strongly Agree
I was able to complete the assigned activities on time using QRESD.	4.66	0.60	Strongly Agree
QRESD streamlined the process of task completion, making it more organized.	4.53	0.62	Strongly Agree
The tools provided in QRESD helped me to stay on track and meet deadlines.	4.50	0.62	Strongly Agree
Weighted Mean	4.55		
SD	0.62		
Verbal Interpretation	Highly Interested		

The computed weighted mean of 4.55 with a standard deviation of 0.62 indicates that learners shown that they are highly interested in using QRESD for task completion. The high mean scores across all statements suggest that learners strongly agree that QRESD helps them complete tasks efficiently, provides clear and easy-to-follow instructions, enables timely completion of activities, streamlines the task completion process, and helps them stay on track and meet deadlines.

KC et al. (2017) found that their work on workload management and job selection demonstrates how people successfully plan, arrange, and carry out their responsibilities. They discuss the concept of Task Completion Bias (TCB) and its impact on short-term productivity, which aligns with the findings on QRESD helping students' complete tasks efficiently and on time. This research emphasizes the importance of clear instructions and organized processes in task completion, reinforcing the idea that QRESDs have an outstanding impact on students' ability to manage and organize their learning tasks effectively.

This significantly enhances learners' task completion, contributing to a more efficient and productive educational experience. It helps students' complete tasks efficiently and on time. This also further supports the idea that QRESDs have an outstanding impact on students' task completion, reinforcing their overall effectiveness in managing and organizing learning tasks.

Table 11 presents the learners' level of interest in using Quick-Response Embedded Slide Decks (QRESD) in terms of participation.

TABLE 11. Level of Learners' Interest in Using Quick-Response Embedded Slide Decks (QRESD) in Terms of Participation

STATEMENTS	MEAN	SD	REMARKS
QRESD increased my engagement in class activities	4.47	0.62	Strongly Agree
I was more motivated to participate in discussions when using QRESD.	4.81	0.40	Strongly Agree
QRESD made learning more enjoyable and interactive.	4.38	0.66	Strongly Agree
The features in QRESD encouraged me to take an active role in class.	4.47	0.67	Strongly Agree
Using QRESD made me feel more confident in sharing my ideas with others.	4.22	0.55	Strongly Agree
Weighted Mean	4.47		
SD	0.58		
Verbal Interpretation	Highly Interested		

Student participation, according to González et al. (2020), has been linked to good outcomes such as civic growth, an engaged public life, and prosocial actions. Their study emphasizes the importance of student engagement in improving academic performance and subjective well-being, which aligns with the findings on QRESD increasing student participation and engagement in class activities. This study emphasizes the significance of promoting student engagement and real participation in the school, reinforcing the idea that QRESDs have a substantial impact on students' active involvement and overall educational experiences.

Level of Students' Mathematical Skills in terms of Written Test

The level of learners' mathematical skills in terms of written tests was treated statistically using the frequency and percentage. This method allowed for an analysis of how many students fell into each category. Additionally, it provided insights into the overall distribution of student performance, identifying trends and areas needing improvement. The results serve as a basis for assessing the effectiveness of instructional strategies and potential interventions.

Table 12 presents the level of learners' mathematical skills based on their written test performance. It includes the score ranges, frequency, percentage, and corresponding remarks.

TABLE 12. Level of Learner Mathematical Skills in Terms of Written Test

Scores	Frequency	Percentage	Remarks
25-30	9	28.13%	Outstanding
19-24	18	56.25%	Very Satisfactory
13-18	5	15.63%	Satisfactory
7-12	0	0.00%	Fairly Satisfactory
0-6	0	0.00%	Did Not Meet the Expectations
Total	32	100%	

Weighted Mean = 22.50
SD = 4.08

This indicates that out of the 32 respondents, the majority (18 students or 56.25%) scored between 19-24, which falls under the very satisfactory category. This was followed by nine students (28.13%) who scored in the 25-30 range, classified as outstanding. Meanwhile, five students (15.63%) scored between 13-18, placing them in the satisfactory category. Notably, no student scored in the lower ranges of 0-12, meaning no one was classified as fairly satisfactory or did not meet expectations. The overall weighted mean score was 22.50, with a standard deviation of 4.08. This implies that most students demonstrated a very satisfactory level of mathematical proficiency in the written test, with a considerable number performing at an outstanding level.

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The results presented in Table 12 align with Fabian, Topping, and Barron's (2018) findings, demonstrating the positive impact of mobile-supported learning on students' mathematical performance. Most students achieved either an outstanding or very satisfactory rating, with a weighted mean score of 22.50, indicating strong performance on the written test.

Significant Relationship between the Components and Characteristics of QRESD to Learners' Interest

To test the significant relationship between Quick-Response Embedded Slide Decks (QRESD) components and characteristics and learners' interest in terms of peer evaluation, task completion, and participation was treated statistically using Jamovi 2.3.28, Pearson correlation.

Table 13 presents the relationship between Quick-Response Embedded Slide Decks (QRESD) components and characteristics and learners' interest.

The Pearson correlation analysis results indicate that the characteristics of Quick-Response Embedded Slide Decks (QRESD) generally exhibit weak and non-significant relationships with learners' interest, as measured by peer evaluation, task completion, and participation. Notably, accessibility showed a significant negative correlation with participation ($r = -0.36$, $p = 0.044$), suggesting that accessing materials can hinder students' willingness to engage in class activities or discussion.

This finding aligns with the research by Muir et al. (2022), who stated that clear and accessible instructional materials are crucial for maintaining student engagement in online learning environments. Similarly, Getenet and Tualaulelei (2023) emphasized that while interactive technologies can enhance engagement, their effectiveness relies on seamless integration and ease of access for students.

Additionally, while interactivity demonstrated a significant positive correlation with peer evaluation ($r = 0.34$, $p = 0.054$), it did not significantly influence task completion or participation. This observation is consistent with the findings by Teng and Wang (2021), who noted that interactive educational tools can enhance student engagement. Still, their effectiveness and usage depend on proper integration into the learning experience.

Other QRESD components, such as priming, activity, abstraction, assessment, usability, and appropriateness, did not show meaningful correlations with student engagement. For instance, priming ($r = 0.04$ to -0.24, $p > 0.05$) and activity ($r = -0.05$ to 0.16, $p > 0.05$) had minimal influence on how students completed tasks, collaborated with peers, or participated in class. Similarly, usability ($r = -0.19$ to 0.24, $p > 0.05$) and appropriateness ($r = -0.002$ to 0.17, $p > 0.05$) did not significantly correlate with learners' interest, despite their importance in instructional design.

TABLE 13. Significant Relationship between the Components and Characteristics of the Quick-Response Embedded Slide Decks (QRESD) to Learners' Interest

Quick-Response Embedded Slide Decks (IV)	Learners' Interest (DV)		
	Peer Evaluation	Task Completion	Participation
Priming: Pearson Correlation Significance(2-Tailed) N	0.04 0.817 32	-0.24 0.183 32	-0.14 0.463 32
Activity: Pearson Correlation Significance(2-Tailed) N	0.16 0.395 32	-0.05 0.779 32	0.05 0.795 32
Abstraction: Pearson Correlation Significance(2-Tailed) N	0.11 0.242 32	0.05 0.779 32	-0.05 0.778 32
Assessment: Pearson Correlation Significance(2-Tailed) N	-0.213 0.242 32	-0.27 0.795 32	-0.16 0.375 32
Accessibility: Pearson Correlation Significance(2-Tailed) N	0.19 0.290 32	0.05 0.795 32	-0.36 0.044 32
Interactive: Pearson Correlation Significance(2-Tailed) N	0.34 0.054 32	0.01 0.965 32	-0.03 0.870 32
Usability: Pearson Correlation Significance(2-Tailed) N	0.24 0.188 32	0.06 0.744 32	-0.19 0.303 32
Appropriateness: Pearson Correlation Significance(2-tailed) N	0.17 0.354 32	0.06 0.736 32	-0.002 0.990 32

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

In summary, while QRESD may serve as a useful digital tool for instruction, its features alone do not strongly predict student motivation or engagement. The weak correlations imply that additional pedagogical strategies, such as improving accessibility, increasing interactive elements, and aligning content with students' learning preferences, may be necessary to maximize the effectiveness of QRESD in fostering learner interest.

Significant Effect between the Components and Characteristics of QRESD on the Learners' Mathematical Skills

To test the significant effect of components and characteristics of the Quick-Response Embedded Slide Decks (QRESD) on the learners' mathematical skills in terms of written test was treated statistically using Jamovi 2.3.28 using the regression analysis.

Rhomina Ortiz Artiaga, "Quick-Response Embedded Slide Decks (QRESD): Strategic Intervention Material to Enhance Learners' Interest and Mathematical Skills," *International Journal of Multidisciplinary Research and Publications (IJMRAP)*, Volume 7, Issue 12, pp. 761-769, 2025.

Table 14 presents the effect of Quick-Response Embedded Slide Decks (QRESD) components and characteristics and learners' interest.

The regression analysis examined whether various aspects of QRESD content and characteristics predict mathematical skill in a written test. The overall model was not statistically significant ($F(8,23) = 0.90$, $p = 0.534$), indicating that these predictor variables do not strongly explain variations in mathematical performance.

TABLE 14. Significant Effect between the Components and Characteristics of the Quick-Response Embedded Slide Decks (QRESD) on the Learners' Mathematical Skill

Predictor Variables	B	SE B	t	p
(Constant)	27.37	15.37	1.78	0.088
Priming	1.61	2.25	0.72	0.481
Activity	-6.25	2.88	-2.17	0.041*
Abstraction	3.34	2.47	1.35	0.189
Assessment	-71	3.41	-0.21	0.837
Accessibility	-.80	2.37	-0.34	0.740
Interactive	-1.18	2.21	-0.53	0.599
Usability	0.39	2.59	0.15	0.88
Appropriateness	2.41	2.82	0.85	0.402

Note. $R^2 = .238$, $F(8, 23) = 0.90$, $p = .534$. *p < .05, **p < .01, **p < .001.

Among the predictors, only activity had a significant negative effect on test scores ($B = -6.25$, $p = 0.041$), suggesting that higher engagement in activity-based learning was associated with lower performance on the written test. In contrast, other factors such as Priming, Abstraction, Assessment, Accessibility, Interactivity, Usability, and Appropriateness did not show significant effects ($p > 0.05$), meaning they were not strong predictors of mathematical skill in this context.

These findings align with the research of Kim, Belland, and Axelrod (2018), who examined the relationship between interactive learning activities and mathematics assessments. Their study found that while activity-based learning enhances engagement, it does not always lead to improved test scores, particularly in written assessments. They suggested that excessive reliance on interactive activities without reinforcing conceptual understanding may hinder students' ability to perform well in traditional evaluations.

Thus, this implies that while activity-based learning may negatively affect mathematical skills in written assessments, other variables do not show significant effects.

IV. Conclusion and Recommendations

Based on the findings of the study, the following conclusions were drawn:

There is no significant relationship between the components and characteristics of Quick-Response Embedded Slide Decks (QRESD) and the learners' interest among Grade 11 students is accepted. Thus, QRESD may provide structured components and interactive elements; these indicators alone do not directly influence learners' interest.

Similarly, the components and characteristics of QRESD have no significant effect on the mathematical skills of Grade 11 students using a written test, which is also accepted. Therefore, while QRESD enhances accessibility and interest in activities, its integration into lessons may not be sufficient to significantly improve students' mathematical skills.

Based on the conclusions made, the following recommendations are given.

To help students strengthen their mathematical skills, they are encouraged to fully utilize Quick-Response Embedded Slide Decks (QRESD) as a supplementary resource. Engaging in problem-solving activities, puzzles, and real-world math applications can make learning more meaningful and enjoyable.

Teachers play a crucial role in making lessons more engaging. Incorporating hands-on activities, real-world problem-solving, and group projects can create a more dynamic learning environment. They can also enhance QRESD by integrating multimedia resources, case studies, and interactive lessons. Teachers can further support comprehension and skill development by tailoring lessons to match students' learning styles and needs.

School administrators can contribute by providing additional support systems, such as math tutorials, workshops, or mentorship programs for students who need extra guidance. Encouraging collaboration among educators by sharing the best practices and innovative teaching techniques can also improve learning experiences. Additionally, administrators may offer training programs focused on effective math instruction and student engagement strategies to ensure that teaching methods continue to evolve and improve.

For researchers currently exploring the use of technology in education, this study offers valuable insights into how Quick Response (QR) codes can effectively enhance mathematical skills. Future studies could focus on refining QRESD by adding more interactive elements and assessing its impact on different subjects.

Finally, future researchers can build on these findings to explore new and innovative ways of integrating QR-based tools into education. Continuously improving digital learning methods can help create more engaging and effective teaching strategies across various academic disciplines.

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