JPPIPA 10(12) (2024)

Jurnal Penelitian Pendidikan IPA

Journal of Research in Science Education

http://jppipa.unram.ac.id/index.php/jppipa/index

The Impact of the Quizizz Application on Students' Self-Efficacy

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Received: October 17, 2024
Revised: December 13, 2024
Accepted: December 25, 2024
Published: December 31, 2024

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DOI: 10.29303/jppipa.v10i12.9456

Abstract: The integration of technology into education can facilitate more effective learning, promote collaborative learning among students, and substantially increase self-efficacy. This study aims to analyze the Quizizz application's impact on students' test preparation self-efficacy. Quizizz, a gamified assessment tool, offers game elements such as points, leaderboards, and direct feedback, which are expected to improve student motivation and self-confidence. Data collection involved 215 students from Purwoharjo High School uses a mixed-method approach, including interviews, documentation, and questionnaires. The results show that most students positively perceive Quizizz as a tool that enhances their academic self-efficacy. Gamification elements such as leaderboards and immediate feedback significantly boost motivation, allowing students to focus on areas of improvement and manage their learning time more effectively. However, some variations in the impact on self-efficacy were observed, especially among students with lower self-confidence. This research concludes that Quizizz can effectively enhance students' self-efficacy when adequately integrated into the learning process.

Keywords: Gamification; Learning Self-efficacy; Quizizz; Student Motivation

Introduction

Technology in education has touched all aspects of learning so that learning can be more effective, efficient, optimal, and engaging, and stimulates creative thinking for every student (Nurdyansyah & Widodo, 2015). (Sholiha & Rizal, 2023). Technology in education has touched all aspects of learning so that learning can be more effective, efficient, optimal, and engaging, and stimulates creative thinking for every student (Helmy Nadeem & Abdulaziz Al Falig, 2020; Krath et al., 2021), it is essential to encourage students to work together in group competitions (Sanchez et al., 2020), and significantly increase self-efficacy (Babakhani & Tabatabaee-Yazdi, 2023). Gamification of learning can influence learning through a mediation process, where game elements influence student behavior or attitudes, which then impact learning outcomes and moderation (game elements strengthen the relationship between the quality of instructional design and learning outcomes) (Landers, 2014).

Although gamification generally positively influences student learning development, other research on self-efficacy students has not shown consistent results. Research on the effect of gamification on self-efficacy shows that some students do not like gamification because they feel there are no additional benefits. It causes anxiety and envy among friends. They feel that elements such as leaderboards or rewards create unhealthy competition (Bai et al., 2020; Dichev et al., 2020). Furthermore, gamification did not significantly increase the number of quizzes completed, for high-achieving students, quizzes lead to greater academic performance (Sanchez et al 2020), Similar research Jethu (2024) showed that students with high self-efficacy obtained higher scores. In contrast, research by Watford-spence, (2021) found that students with low self-efficacy achieved better learning outcomes from gamification activities. This phenomenon

How to Cite:
Yani, Y., Vidya , R. M., Tiirtheshvara, D., Dantes , G. R., & Indrawan, G. (2024). The Impact of the Quizizz Application on Students' Self-Efficacy. *Jurnal Penelitian Pendidikan IPA*, *10*(12), 11249–11256. https://doi.org/10.29303/jppipa.v10i12.9456

suggests a variation in how gamification influences self-efficacy.

One innovative gamification of learning is the Quizziz application, which can make assessments fun and interactive and increase user concentration and accuracy (Masruchan, 2020). Quizziz offers game elements such as points, leaderboards, and direct feedback, which are expected to increase students' self-efficacy. The use of Quizizz also shows that this application can help students in the learning process become more independent And active (Retnaningrum & Pamungkas, 2024). In terms of moderation, *quizzes are* easy to create and apply by sharing the quiz link and code for login access with students, and students can access it anywhere and anytime. Quizizz helps improve *self-regulated* (independent learning), where students can manage time, monitor progress, and master material. (Dabbous et al., 2022). On the other hand, as stated by Yu et al (2021) The effect of educational games on motivation sometimes shows inconsistent results, and there is debate about whether gamification can increase motivation significantly in all cases. This research shows variations in gamification's influence on self-efficacy, so further analysis is needed regarding the impact of gamification, in this case, the Quizziz application, on self-efficacy.

The observations made at Purwoharjo High School show that the level of use of Quizziz in learning assessments reached 71.25%, whereas 57 teachers admitted to having carried out assessments using Quizziz. This shows that teachers believe that using Quizziz can help with student assessment. However, research has yet to be conducted to show whether Quizziz positively impacts assessment, including those related to self-efficacy. This article aims to analyze the impact of using Quizizz on students' self-efficacy in facing tests. This research will test whether the gamification elements in Quizizz can increase students' self-confidence in completing tests and improve the quality of their learning. Therefore, how does the Quizizz application influence high school students' self-efficacy in facing tests? Can Quizizz be an effective tool in increasing students' self-confidence, or do other factors moderate the effect? This research will answer the hypothesis that quizzes significantly impact students' *self-efficacy*.

Method

This research employs a qualitative descriptive method with a combined quantitative approach to analyze the impact of the Quizizz application on high school students' self-efficacy in facing tests. Data was collected through interviews, documentation, and questionnaires, which were measured using a 5-point Linkert scale.

The study was conducted at Purwoharjo High School, involving 215 randomly selected students who actively used Quizizz in their learning activities. Data collection is carried out through three techniques such as interview, the Semi-structured interviews were conducted with teachers and several students to explore their perceptions of using Quizizz more profoundly and its impact on academic self-efficacy. Documentation to records student activities using Quizizz during the learning process, and Questionnaires were distributed to all participating students to measure their academic self-efficacy after using the Quizizz application. This questionnaire uses a Likert scale with five answer choices (1 = strongly disagree, 5 = strongly agree) and measures three main aspects, first general academic self-efficacy for measuring students' confidence in their general academic abilities. Second the influence of gamification from Quizizz on self-efficacy for measuring the impact of gamification elements such as scores, badges, and Leaderboards on increasing student confidence. The last is perception of the use of Quizizz for measuring students' views on the use of Quizizz in learning.

Research was carried out in three stages as in Figure 1.

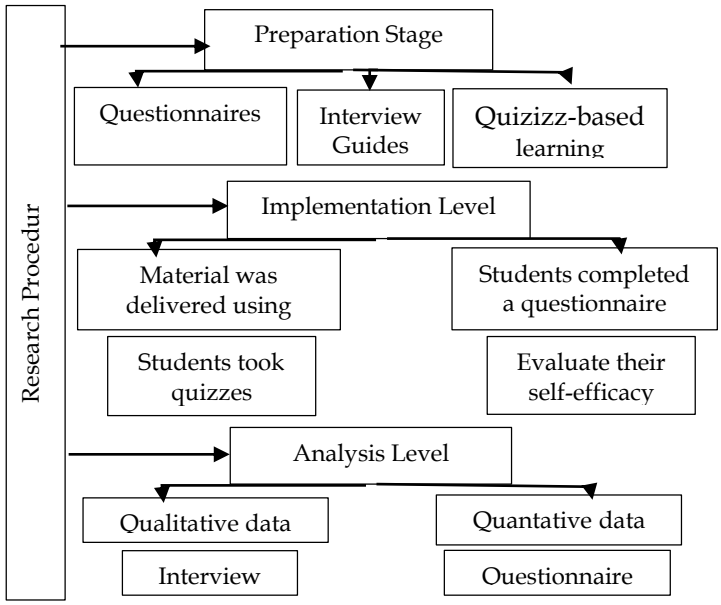

Figure 1. Research Procedur Chart Flow

Data Analysis

In the analysis stage, qualitative data from interviews were processed using thematic analysis to identify patterns and themes, while quantitative data from the questionnaires were analyzed descriptively to calculate averages and frequency distributions of self-efficacy scores.

The analysis involved a sequential mixed-method approach. Qualitative data underwent reduction, presentation, and conclusion-drawing to explore the effects of Quizizz gamification on academic self-efficacy. Simultaneously, quantitative analysis utilized descriptive statistics to measure numerical outcomes, revealing the extent to which gamification elements like scores, badges, and leaderboards enhanced students' confidence. The combination of these methods provided a comprehensive understanding of the educational benefits and student perceptions of Quizizz in fostering academic self-efficacy.

Result and Discussion

Table 2. Frequency Analysis Results Student Self-Efficacy Towards General Academics (SEAU)

		Item 1 SEAU	Item 2 SEAU	Item 3 SEAU	Item 4 SEAU	Item 5 SEAU	Item 6 SEAU	Item 7 SEAU	Item 8 SEAU	Item 9 SEAU	Item 10 SEAU
N	Valid	215	215	215	215	215	214	215	215	215	215
	Missing	0	0	0	0	0	1	0	0	0	0
Mean		3.82	3.67	3.40	3.47	4.07	3.33	3.69	3.79	3.94	3.73
Median		4.00	4.00	3.00	3.00	4.00	3.00	4.00	4.00	4.00	4.00
Mode		4	4	3	3	5	3	4	4	4	4
Std. Deviation		0.730	0.791	0.641	0.772	0.925	0.723	0.749	0.762	0.724	0.676
Variance		0.532	0.626	0.410	0.596	0,856	0.523	0.561	0.580	0.524	0.457
Range		3	4	3	4	4	4	4	3	4	4
Minimum		2	1	2	1	1	1	1	2	1	1
Maximum		5	5	5	5	5	5	5	5	5	5
Sum		821	788	732	745	874	713	793	814	847	803

The questionnaire related to self-efficacy is an instrument that combines scale elements, the *College Academic Self-Efficacy Scale (CASES),* which has been validated internationally (Ifdil et al., 2019; Owen & Froman, 1988) There are three main parts of the analysis: Student Self-Efficacy towards General Academics (SEAU), the Effect of Gamification through Quizzing on Self-Efficacy (PGQSE), and Perceptions of the Use of Quizzing (PPQ).

Student Self-Efficacy Towards General Academics (SEAU).

The validity and reliability of the instrument were tested on 215 students, showing the following results. Based on the findings obtained, the significance value for each item is 0.00 with a value < 0.05 and r table (0.133) < for each question item (the value can be seen in the total item Pearson correlation). The results of this analysis show that the question items related to students' general academic self-efficacy have been proven to meet the validity requirements.

Table 1. Reliability Test Student Self-Efficacy Towards General Academics (SEAU)

Cronbach's Alpha	Cronbach's Alpha Based on Standardized items	N of Items
.809	.818	10

The reliability test shows that the calculated Cronbach's Alpha is 0.809, a significant value of 0.70 (Ghozali, 2021). This shows that the items to measure general academic self-efficacy have been proven to meet reliability.

For quantitative descriptive analysis from the results of the frequency analysis are shown in the table 2. In Table 2, the mean obtained for each mean is 3.33 to 4.07. The high means on several items, such as "I am confident that I can follow lessons even if the topics are difficult" (4.07) and "I am confident that I can get good grades in most subjects" (3.94), indicate that the majority of students have an excellent ability to cope academic challenges. The mode and median values show consistency with a value of 3 or 4, indicating that the value that appears most frequently and the middle value of the data distribution is in the "fairly agree and agree" category. This shows that most respondents' perceptions of their academic abilities are positive. The standard deviation value for each item ranges from 0.641 to 0.925, which means there is variation in students' self-efficacy perceptions. A minor standard deviation, such as in Item 3 SEAU (0.641), indicates that students' answers to this item are more homogeneous.

Conversely, a more significant standard deviation, such as in Item 5 of SEAU (0.925), indicates a more significant variation in students' beliefs about their ability to follow challenging courses. The variance and range displayed show a variation of between 3 and 5 points, which means there are differences in students' views of their academic abilities. This range indicates that some students feel very confident, but some are less confident in their abilities. This indicates that other factors influence self-efficacy, as Bandura (1978) stated,

namely the support of the learning environment, interaction with peers, and intrinsic motivation. Variations in standard deviation and variance values show that although most students feel confident, some still have lower levels of self-efficacy.

The Influence of Gamification through Quizizz on Self-Efficacy (PGQSE)

The validity and reliability tests on the influence of gamification through Quizizz on Self-Efficacy (PGQSE) show a significance value of 0.00 for each item, with a value of < 0.05 and an r-table value (0.133) being less than the Pearson correlation value of each item (as can be seen in the total item Pearson correlation). Based on this analysis, the test items regarding the influence of gamification through Quizizz on Self-Efficacy (PGQSE) meet the validity requirements.

Table 3. Reliability Test the Influence of Gamification through Quizizz on Self-Efficacy (PGQSE)

Cronbach's Alpha	Cronbach's Alpha Based on Standardized items	N of Items
.947	.948	21

From Table 3, show the reliability test that the calculated Cronbach's Alpha is 0.947, which is indicates a value greater than 0.70 (Ghozali, 2021). This shows that the question items used to measure the effect of gamification through Quizizz on Self-Efficacy (PGQSE) are reliable.

The quantitative descriptive analysis of the question items reveals the influence of gamification through quizzes on students' self-efficacy by focusing on several key aspects. Points and badges, highlighted in items such as 1, 4, 8, 16, and 21, act as positive reinforcers that motivate students to consistently engage with and understand lesson materials. These elements reward their efforts and provide a sense of achievement, encouraging sustained learning.

Leaderboards, addressed in items 2 and 13, foster a sense of healthy competition among students. By visually ranking their performance, leaderboards inspire students to enhance their academic abilities, cultivating intrinsic motivation to perform better while fostering a spirit of collaboration and self-improvement.

Immediate feedback, as emphasized in items 3 and 14, plays a critical role in affirming students' understanding of the material. This feature allows students to instantly know whether their answers are correct or incorrect, enabling them to identify areas where they need further improvement. This real-time validation builds their confidence and contributes significantly to their self-efficacy.

Furthermore, challenges and rewards, reflected in items 6, 10, 15, and 17, serve to stimulate critical thinking and encourage students to put in greater effort in their studies. These elements not only make learning more engaging but also empower students to overcome academic challenges, ultimately boosting their belief in their own abilities.

The results of the frequency analysis on the influence of gamification through Quizizz on Self-Efficacy (PGQSE) in table 4. show that the mean values of the PGQSE items range between 3.66 and 4.21; this shows that students agree that the gamification element in Quizizz helps increase their self-confidence in facing academic material and tests. The highest average score was found in Item 2 PGQSE (4.21), which states that the leaderboard on Quizizz increases students' motivation to improve their ranking in the class. The results of interviews with students show that ranking on Quizziz makes students feel proud and motivated to learn better, especially in positions above. However, there are problems if students are ranked at the bottom; students feel inferior, but everything is resolved when students can retake the test and learn. The feedback that the tests provide, and in addition, the leaderboard element, can add flavor to *self-efficacy* students.

Table 4. Frequency Analysis Results the Influence of Gamification through Quizizz on Self-Efficacy (PGQSE)

Item	Mean	Median	Std. Deviation	Min	Maks	Sum
1	4.06	4.00	0.740	2	5	872
2	4.21	4.00	0.702	2	5	905
3	4.00	4.00	0.666	2	5	861
4	4.10	4.00	0.700	2	5	881
5	3.78	4.00	0.674	2	5	812
6	4.09	4.00	0.667	2	5	879
7	3.68	4.00	0.650	2	5	792
8	3.97	4.00	0.683	2	5	854
9	3.81	4.00	0.694	2	5	819
10	3.83	4.00	0.677	1	5	824
11	3.91	4.00	0.698	2	5	840
12	3.93	4.00	0.720	2	5	844
13	4.13	4.00	0.675	2	5	887
14	3.84	4.00	0.631	2	5	825
15	3.94	4.00	0.702	2	5	848
16	3.76	4.00	0.654	2	5	808
17	3.74	4.00	0.741	1	5	804
18	3.79	4.00	0.684	2	5	814
19	3.74	4.00	0.682	2	5	804
20	3.66	4.00	0.684	2	5	787
21	3.86	4.00	0.662	2	5	830

Item 3 (mean 4.00) regarding the presence of feedback shows that students agree that feedback helps focus on learning, especially on the true-false feature in Quizizz; through this feature, students assess that they can immediately re-study material they have yet to understand. It can be said that direct feedback

encourages *self-efficacy* in students who take tests. Through Quizziz, students feel confident in their ability to understand the material because they can repeat learning material they got wrong to save study time when facing tests; besides, they do not need to feel burdened by mastering much material, just repeating the wrong material. They work on it and remember the material they are working on correctly.

Interview results support these findings, with students stating that Quizizz allows them to focus on difficult passages understood, strengthening their confidence in facing the test. Other elements, such as games and challenges, make learning fun and help them overcome stress. Students feel more relaxed in studying and more enthusiastic about facing tests. This is reflected in the quantitative results on Item 4 PGQSE, which shows that most students feel that Quizizz makes learning more enjoyable, with an average score of 3.99. The findings from interviews show that gamification elements in Quizziz, such as points, leaderboards, and badges, increase students' motivation to study harder, where students are motivated to do better on tests and strengthen their self-confidence in facing other tests.

The standard deviation for each question item is between 0.650 and 0.741, which indicates that the variation in students' answers is manageable. This shows that most students have the same view regarding the influence of gamification on their self-efficacy. The minor standard deviation on items such as Item 8 (0.683) indicates that most students feel confident that collecting points on Quizizz increases their self-confidence in facing tests. The similarity of positive perceptions regarding collecting points on Quizziz shows that this reward encourages students to increase their self-confidence in facing tests.

The median for all items is 4, indicating that the most answers and the middle value of the data distribution are on the "agree" scale. This shows that the majority of students consider that the use of gamification elements through Quizizz has a positive effect on their self-efficacy. Based on the findings of descriptive statistical data presented for the Influence of Gamification Through Quizizz on Self-Efficacy (PGQSE) items, it shows that the use of gamification elements such as points, leaderboards, badges, challenges, and direct feedback has a significant impact in increasing self-efficacy students if designed appropriately for learning (Baah et al., 2023; Bai et al., 2020; Putz et al., 2020; Razali et al., 2020; Zainuddin et al., 2020).

Perception of the Use of Quizizz (PPQ)

Analysis of the validity and reliability results of question items related to Perceptions of the Use of Quizizz (PPQ). Based on the findings obtained, the significance value for each item is 0.00 with a value < 0.05 and r table (0.133) < for each question item (the value can be seen in the total items *Pearson correlation*). The results of this analysis show that the question items related to Perceptions of Using Quizizz (PPQ) meet the validity requirements.

Table 5. Reliability Test Perception of the Use of Quizziz (PPQ)

Cronbach's Alpha	Cronbach's Alpha Based on Standardized items	N of Items
.911	.913	8

The reliability test shows that the calculated Cronbach's Alpha is 0.911, higher than 0.70 (Ghozali, 2021). This shows that the question items to measure perceptions of using Quizziz are reliable.The results of the frequency analysis of Perceptions of Using Quizziz (PPQ) are shown in Table 6.

Table 6. Frequency Analysis Results Perception of the Use of Quizziz (PPQ)

		Item 1 PPQ	Item 2 PPQ	Item 3 PPQ	Item 4 PPQ	Item 5 PPQ	Item 6 PPQ	Item 7 PPQ	Item 8 PPQ
N	Valid	215	215	215	215	215	215	215	215
	Missing	0	0	0	0	0	0	0	0
Mean		3,83	3,90	3,79	3,99	3,81	3,78	3,65	3,80
Median		4,00	4,00	4,00	4,00	4,00	4,00	4,00	4,00
Mode		4	4	4	4	4	4	4	4
Std. Deviation		0,761	0,820	0,696	0,697	0,699	0,679	0,758	0,703
Variance		0,579	0,672	0,484	0,486	0,489	0,461	0,574	0,494
Range		4	3	3	3	3	3	4	3
Min		1	2	2	2	2	2	1	2
Max		5	5	5	5	5	5	5	5
Sum		824	838	815	858	820	813	785	818

The findings obtained regarding students' perceptions of using Quizizz show that each question item has a mean value of 3.65 to 3.99. This data shows that, from the student's point of view, Quizziz influences student self-efficacy. Each question item shows a

median and mode value of 4, which shows that students agree that quizizz can help improve *self-efficacy*.

The findings of this research highlight several important points, starting with the fact that Quizizz can increase students' learning motivation. The average score for Item 1 ("I feel more motivated to study when using Quizizz") is 3.83, indicating that most students agree that Quizizz provides additional motivation for them in their studies. However, for Item 7 ("I feel more motivated to learn when using Quizizz compared to other learning methods"), the mean value is lower, at 3.65. This shows that although students feel more motivated with Quizizz, some feel that other learning methods can also motivate students to learn better.

Most students stated that the Quizizz leaderboard motivated them to compete with classmates, with a mean of 3.90 in Item 2. This positive perception indicates that the leaderboard's gamification element triggers the emergence of positive competition that encourages students to try to get the highest score.

The majority of students agree that direct feedback from Quizizz helps them focus more on studying (mean = 3.79 in Item 3), increase their self-confidence in facing exams (mean = 3.80 in Item 8), and be more confident in understanding the material (in item 6 mean = 3.78). This aligns with research from Maraza-Quispe et al., (2024), which shows that direct feedback from Quizizz can convince students of their academic abilities.

Item 4 ("Quizizz makes the learning process more enjoyable and increases my confidence to study harder") has the highest mean value (3.99). This suggests that students' perceptions of Quizizz positively contributing to a more fun and interactive learning atmosphere, motivating them to study harder.

Item 5, with a mean of 3.81, shows that the challenges and rewards in Quizizz positively impact student motivation to complete assignments and tests on time. These gamification elements serve as effective external motivators.

Based on these descriptive results, the use of Quizizz in learning has a positive impact on *students' self-efficacy*. To examine the relationship between gamification in Quizizz and students' perceptions of self-efficacy, the Spearman correlation test was conducted, and yielding the following results (Table 7).

According to the Spearman correlation findings, a significance value of 0.000 < 0.05 was obtained, indicating a significant relationship between gamification in Quizziz and student's perception of self-efficacy. The two variables show a positive relationship, with a correlation coefficient of 0.654, which falls within the range of 0.60-0.799, indicating a strong relationship between these two variables and students' perceptions of Quizizz. The value of 0.572, represents a moderate correlation for student self-efficacy.

Table 7. Spearman Correlation Analysis

			Total PGQS	Total PPQ	Total SEAU
Spearman's rho	Total PGQS	Correlation Coefficient	1.000	.808**	.654**
		Sig (2-tailed)	.	.000	.000
		N	215	215	215
	Total PPQ	Correlation Coefficient	.808**	1.000	.572**
		Sig (2-tailed)	.000	.	.000
		N	215	215	215
	Total SEAU	Correlation Coefficient	.654**	.572**	1.000
		Sig (2-tailed)	.000	.000	.
		N	215	215	215

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

Tabel 8. Strength of Relationship in Spearman Correlation

Correlation Value	Level of Relationship
0.00-0.199	Very Weak
0.20-0.399	Weak
0.40-0.599	Moderate
0.60-0.799	Strong
0.80-1.00	Very Strong

Based on these findings, gamification in Quizizz and students' perceptions of using Quizizz influence students' self-efficacy. This finding aligns with several studies showing that gamification elements can increase students' motivation and self-confidence when facing academic evaluations. (Cancino & Viguera, 2024; Oliveira et al., 2022; Putz et al., 2020; Razali et al., 2020). This research results align with previous studies, which show that gamification can improve *self-efficacy* and student motivation in learning. (Abdul Latiff et al., 2024; Watford-spence, 2021). One of the factors contributing to the increase in *self-efficacy* is the direct feedback provided by Quizizz, which allows students to know their results in real-time and correct any mistakes they make (Luo, 2022)Additionally, the leaderboard and points system in Quizizz creates an element of healthy competition, which can motivate students to learn better and increase their confidence in mastering the material. (Capuno, 2023; Jaramillo-Mediavilla et al., 2024; Kaya & Ercag, 2023).

The increase in students' self-efficacy suggests that Quizizz can be used as a practical evaluation and learning tool to support students' independent learning. (Hernanz et al., 2024). Using Quizizz can help students with *low self-efficacy* be more confident and actively involved in learning. Further research also needs to consider moderating variables such as intensity of Quizizz use, time spent, and frequency of use in one

week. This will provide a clearer picture of the influence of the duration and intensity of Quizizz use on *self-efficacy* students.

Conclusion

Overall, using Quizizz positively impacts *students' self-efficacy* in learning. Students feel more students' learning self-efficacy and confidence in understanding the material and facing academic evaluations after using Quizizz. This shows that gamification through Quizizz can be an effective learning method to improve learning *self-efficacy* in students.

Acknowledgments
Sincere gratitude is extended to the lecturer of the Community Computer Science course for their guidance, support, and invaluable corrections throughout the research process. Their dedication and expertise have contributed significantly to the successful completion of this work.

Author Contributions
Conceptualization, Y.Y.; methodology, Y.Y.; software, Y.Y.; validation, Y.Y., RMV, and DT; formal analysis, Y.Y.; investigation, RMV; resources, Y.Y.; data curation, Y.Y.; writing—original draft preparation, Y.Y.; writing—review and editing, RMV, DT, GRD, and GI; visualization, Y.Y.; supervision, Y.Y.; project administration, Y.Y.; funding acquisition, Y.Y. All authors have read and agreed to the published version of the manuscript.

Funding
This research received no external funding.

Conflicts of Interest
The researchers declare that there are no financial or personal conflicts of interest or collaborative relationships that influenced the data collection or analysis results of the research in this article.

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