

UMT Education Review (UER)

Volume 7 Issue 1, Spring 2024


ISSN(P): 2616-9738, ISSN(E): 2616-9746

Homepage: <https://journals.umt.edu.pk/index.php/uer>



Article QR



- Title:** Elementary Science Teachers’ Perceptions of Science Quizzes
- Author (s):** Romana Shahzad, and Farkhunda Rasheed Choudhary
- Affiliation (s):** Allama Iqbal Open University, Pakistan
- DOI:** <https://doi.org/10.32350/uer.71.03>
- History:** Received: September 29, 2022, Revised: February 08, 2024, Accepted: June 10, 2024,
Published: June 28, 2024
- Citation:** Shahzad, R., & Choudhary, F. R. (2024). Elementary science teachers’ perceptions of science quizzes. *UMT Education Review*, 7(1), 41–61.
<https://doi.org/10.32350/uer.71.03>
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- Conflict of Interest:** Author(s) declared no conflict of interest



A publication of
Department of Education, School of Social Sciences and Humanities
University of Management and Technology, Lahore, Pakistan

Elementary Science Teachers' Perceptions of Science Quizzes

Romana Shahzad, and Farkhunda Rasheed Choudhary*

Allama Iqbal Open University, Pakistan

Abstract

This study investigated the perception of science teachers about science quizzes at elementary level employing survey method. The population of this study comprised all science teachers working at elementary level in public schools of District Rawalpindi during 2019. The sample consisted of 105 science teachers working in public schools of tehsil Kallar Syedan, District Rawalpindi. A questionnaire was developed by the researcher and validated by experts, which was then administered to the sample. Frequency and percentage of each statement were calculated to analyze the data. The study examined the perception of science teachers about usefulness of quizzes, effect of quizzes on instructor and effect of quizzes on improving academic performance. Findings of the study showed that teachers perceive quizzes as an effective way of improving students' grades of. Quizzes serve multiple beneficial purposes, including promoting regularity among students, improving study habits, motivating them, fostering, and ultimately increasing both students' learning and retention. Additionally, administration of quizzes particularly at the start of day can drift learners directly into the topic and provide a quick review of previously learnt material. Regularly scheduled quizzes enable teachers to know whether certain topics need to be taught again or not. It is recommended that work load of teachers be reduced and facilities be provided, particularly to science teachers to conduct frequent quizzes. This, in turn, is expected to enhance students' performance at end of course exam.

Keywords: elementary level, public schools, quizzes, science teachers

Introduction

Daily quizzes have been shown to have a positive impact on students' learning fostering motivation to study and aiding teachers in improving instruction. A study revealed that in order to make students busy right from the start, it is beneficial to use daily quizzes in the class from the beginning (Mwapea, [2015](#)). Unannounced quizzes promote student learning and

*Corresponding Author: Farkhunda.rasheed@aiou.edu.pk

persuade students to study target content before lectures. An increase in learners' attendance and performance was observed during the study (Kamucho, [2007](#)). Regular quizzes assist students retain material for longer periods and better prepare them for final exams (Gholami, [2013](#)).

Oral quiz competitions are found to be informative, effective, and promote healthy competitions among groups, fostering active learning and student-centered methods, particularly useful for large batches. Students also get help from internet sources during quiz preparation making the process more playful and engaging (Talsania et al., [2015](#)).

Overall, classroom quizzes have a positive impact on student performance, improving engagement and interest of learners' (Brian & Phelan, [2015](#)). Quizzes allow students to process information in a more meaningful way and motivate them to study much more intensely (Roediger, [2014](#)).

In Pakistan, prevailing approach to teaching science by using traditional methods leads to rote learning and there is no true comprehension of concepts, especially at the elementary level. Focus of teaching science is not to cultivate scientist mindset or understanding, but on memorizing factual knowledge (Shah & Rahat, [2014](#)).

Literature Review

Quizzes: An Assessment Tool

It is imperative to assess the progress of learning in the students during the teaching process. Quizzes are one of the many ways to assess students and to gauge the impact of teaching at various stages of the learning process. Numerous studies have been conducted to validate the efficacy of this technique and its different methodologies in educational field.

Perception of Different Researchers about Quizzes

Usefulness of Quizzes

A study has proved the effectiveness of quizzes in enhancing student learning. Researchers introduced regular class quizzes in order to test students' knowledge of required reading and previous sessions. The findings revealed that this practice successfully encouraged students to review their course notes before each class, leading to increased class participation (Haigh, [2002](#)).

Additionally, regular quizzes have been shown to reduce test anxiety and to improve their long-term memory in students. It motivates the students to commit the lessons to memory, reduces pressure from them while taking a test which ultimately helps them take the final tests with comfort (Fries, [2009](#)).

Weekly online quizzes are becoming a norm these days. Many teachers resort to this practice to enhance student's learning and their engagement. These help underachievers to improve their grades (Aravinthan et al., [2011](#)).

Effect of Quizzes on Academic Achievement

The academic achievement of the students is the prime concern for researchers and practitioners and they are focusing in finding out ways to improve the academic achievement of students across all levels of education. The drop in the students' performance is a main issue and for the high quality of education it is vital to know how teachers can maintain quality education.

A study was done in which quizzes were given to students on weekly basis in order to find out their effect on final achievement score. Regular quizzes assist students in retaining material for longer time (Gholami, [2013](#)). Moreover, the study found that frequent quizzes improved performance of students on summative exam, thereby enhancing student learning (Zhang & Henderson, [2015](#)).

Another study was conducted to examine the impact of in-class quizzes and homework assignments on learners' exam performance in an undergraduate business program. Quizzes and homework assignments are usual assessment techniques used by teachers in undergraduate programs. Both assessment techniques involve costs in terms of instructor's time for preparing and marking, and students' time in completion the result of this study showed that assignments had a statistically visible positive influence on exam grades, while quizzes had no statistically visible influence (Latif & Miles, [2020](#)).

In a study, a meta-analysis of several studies was done to investigate the effect of regular administration of tests to check whether tests increase anxiety, motivation, interest, and improve scores on the subsequent tests. Even though, many studies were in favor of regular administration of tests whereas some studies showed that the effect of these regular tests is not significant on improving scores of students on final test. Moreover, regular

tests were found to have no significant effect on improving study hours of students (Ramshi, [2014](#)).

In another study, during the pharmacodynamics and pharmacokinetics course, the effect of quizzes was investigated. Eleven students enrolled in this course were the sample of the study. The semester was divided in two parts consisting of six sessions each. During first six sessions, students were taught by traditional lecture method using question answer technique. In the next six sessions, quizzes were introduced at the start of each session. At the end of semester, total scores obtained by students were compared revealing that such assessment promoted gain of knowledge and improved retention. However, the study revealed that regular quizzes did not lead to good scores in final examination (Atia et al., [2018](#)).

In a different study, Semantic Web technology was used to assess students. This technology allowed students to take tutorials, quizzes, free exercises, previous exams and their model answers, course reviews, and the facility to access the system through the mobile for quick quizzes and exercises. This process of assessing students by using online quizzes significantly improved their performance at end of course exam (Sofany & Seoud, [2011](#)).

Effect of Quizzes on Instructor

Several studies have demonstrated the effectiveness of quizzes for teachers in enhancing student learning and engagement. They are also a source of judging how far objectives have been achieved and also facilitates interaction between teachers and students. In this way a teacher can satisfy a student query thus leading to complete understanding of content material being taught (Ashakiran & Deepthi, [2013](#)).

Good teachers always adapt their teaching methodology to improve student behaviors and outcomes. A study showed that conducting regular quizzes was worthwhile, the students were trained how to self-advocate and self-assess for their own knowledge. Researcher observed that students were more prone to ask for help from a teacher or a peer, fostering active participation in discussions (Hirschman, [2017](#))

Furthermore, researchers of the study concluded that Quizizz should be used in daily online lessons as an assessment tool for both formative and summative assessments. They can reduce issues such as, low motivation, cheating, boredom, and tiresome assessment tools, thereby enhancing

online learning experience and prolongation of the use of Quizizz as a testing tool. It is compelling that Quizzes bring favorable outcomes and work with the rating process in the teaching and learning process. Students are eager to use Quizizz due to its engaging and efficient presentation, which supports them in completing tests with ease. Consequently, teachers are encouraged to use Quizzes to reduce their workload in the preparation of online examinations (Wen & Aziz, [2022](#)).

Overall, classroom quizzes have a positive impact on student performance, improving classroom engagement and interest of learners' (Brian & Phelan, [2015](#)).

Effect of Quizzes on Learner

A study investigated the theory of gamified learning and explored the benefits of gamification on student learning through the testing effect. In a quasi-experimental design, university students ($N = 473$) prepared for three tests using traditional quizzes and gamified online quizzes. The study showed that students finishing gamified quizzes completed more quizzes and, through the benefits of the testing effect, would show better learning. Findings supported the testing effect, revealing that students who completed more quizzes performed better on successive tests. Furthermore, students who accomplished the gamified quizzes had significantly better scores, indicating the effectiveness of gamified learning in enhancing student learning (Sanchez et al., [2020](#)).

Similarly, numerous studies have highlighted the benefits of regular quizzing in the classroom. Regular quizzing can improve more student attendance, involvement, practice and review, and also fosters academic achievement by improving information retention. Quizzes improve interaction between students and teachers as the discussion regarding quiz performance engages them in learning process (El-Hashash, [2022](#)).

Another study showed the effect of online quizzing on learner engagement and academic performance. Results showed that online quizzing improved learners' classroom management. Improvement in student perception was observed as a result of online quizzing (Urtel et al., [2006](#)).

A study examined the effects of surprise quizzes on student performance in quantitative analysis examination. The group with surprise quizzes showed better performance compared to the other group. Unannounced

quizzes promote student learning, persuading students to study target content before lectures, thereby increasing learners' attendance and improved performance (Kamucho, [2007](#)).

In a study conducted in medical college, the effectiveness of quizzes versus traditional lecture method was examined on undergraduate students of Ahmadabad. Active participation of students was ensured in quiz method, which was found to be informative, effective, and strong mode of teaching. Quizzes are helpful in building healthy competitions among groups, providing opportunities for active learning. It is a student-centered method, making it effective for larger batches. Additionally, students also get help from internet during quiz preparation making the process more playful and engaging (Talsania et al., [2015](#)).

Another study demonstrated that online quizzing reduces amount of time in its preparation and checking as compared to manual quizzes. It was also learnt that administering frequent quizzes reduce anxiety in the students and improve their learning (Twigg, [2003](#)).

A study was carried out to find out the effect of daily quizzes on students' learning in a Chemistry classroom. The study showed that daily quizzes increased retention. The learning material was presented many times to students through daily quizzes, thus, they got mastery of material (Kayser, [2015](#)). Another study which was done on undergraduate university students showed that those students who were given test regularly during the course, they learnt and retained information better than those who were not tested regularly (Roediger & Karpicke, [2006](#)).

A study showed the effectiveness of regular online quizzing. The outcome of this work showed that learners who took online quizzes on daily readings, their class participation increased as compared to those who did not take quizzes. Students who had online quiz came in class with additional preparation, asked many questions and participated actively in class discussion (Marcell, [2008](#)). Online quizzes resulted in more in-depth discussions. Students took it positive as it was easy to use (Hillman, [2012](#)).

Another study was done about quizzes and their effects on student performance. Academic performance of experimental group did not improve as a result of quizzes. The control and experimental groups of the study performed approximately the same on achievement test. The study showed that there was no considerable effect on performance of students as

showed by midterm and end of course exams as a result of conducting quizzes (Alzughairi et al., 2016). Quizzes allow students to process information in a more meaningful way and motivate them to study much more intensely (Roediger, 2014).

Rationale of Study

The rationale for conducting this study stems from the understanding that assessments play a crucial role in the teaching and learning process. Assessments provide feedback on material learned and to direct teaching. Quizzes measure performance of an individual in a particular subject. In public schools, classes are overcrowded and teachers focus less on assessment. Resultantly, students are not motivated to learn. Given these challenges, this study was conducted to find out perception of science teachers about science quizzes, providing valuable insights into the effectiveness of assessment practices in promoting student learning and engagement.

Problem Statement

The problem statement highlights several key issues in the current educational system in Pakistan, especially regarding the assessment of General Science at the elementary level in Tehsil Kallar Syedan, District Rawalpindi. In Pakistan, the subject General Science is taught through lecture method and most of the time is spent in delivering science content. In the teacher centered approach, there is little room for continuous improvement of learners as there is limited focus of teachers on students' assessment. So, there is a need for incorporating assessment for learning, such as quizzes, to motivate students and enhance their learning experiences. Quizzes are not being used frequently for science learning in the schools. Therefore, the present study aims to explore the perception of science teachers about science quizzes at elementary level in Tehsil Kallar Syedan, District Rawalpindi.

Objectives

Research was intended to find out perception of science teachers about science quizzes at elementary level.

Research Questions

1. What is the perception of science teachers' regarding usefulness of quizzes?

2. What is the perception of science teachers' regarding effect of quizzes on instructor?
3. What is the perception of science teachers' regarding effect of quizzes on academic achievement?
4. What is the perception of science teachers' regarding effect of quizzes on learner?

Significance of Study

The significance of this research lies in its potential to impact various stakeholders within the educational system, particularly science teachers, students, and educational policymakers. For educational stakeholders and policymakers, the findings of this research can help in making provisions of opportunities so that science teachers can assess students learning timely. Resultantly, learning of science students will be improved. The results of the study will contribute to the development of more engaging and effective learning experiences for students in science classrooms.

Methodology

It was a quantitative research design. Survey method was used to investigate perception of science teachers about science quizzes at Elementary level.

Population and Sample of the Study

All male and female science teachers working during 2019 at elementary level in public school of District Rawalpindi were the population of this study. There are seven tehsils in district Rawalpindi. One tehsil i.e. Kallar Syedan was selected as a convenient sampling. There were 105 male and female science teachers working during 2019 at elementary level in public school of tehsil Kallar Syedan, District Rawalpindi (Government of Punjab [GOP], [2019](#)). Data were collected from all male and female science teachers of this tehsil working at elementary level.

Research Instrument

A questionnaire on perception of science teachers about science quizzes at elementary level was developed by the researcher. Likert scale with responses from *Strongly Agree* = SA, *Agree* = A, *Undecided* = UN, *Disagree* = D, *Strongly Disagree* = SD was used. The research instrument was distributed personally to the teachers by the researcher.

Data Analysis

Usefulness of Quizzes

Table 1

Quizzes are a Source of Motivation.

Response	Frequency	Percent
Strongly Disagree	1	1.0
Disagree	2	1.9
Undecided	11	10.5
Agree	33	31.4
Strongly Agree	57	54.3
Total	104	99.0
Missing System	1	1.0
Total	105	100.0

The above Table 1 indicates that 1.0% teachers strongly disagree that quizzes are a source of extrinsic motivation, 1.9% disagreed with this statement, 10.5% were undecided, 31.4% agreed to it and 54.3% strongly agreed. Overall, results of the table revealed that most of the teachers perceive quizzes as an effective tool for motivating students.

Table 2

Quizzes are Helpful in Improving Content Knowledge

Response	Frequency	Percent
Strongly Disagree	1	1.0
Disagree	4	3.8
Undecided	9	8.6
Agree	31	29.5
Strongly Agree	60	57.1
Total	105	100.0

The results present in the above Table 2 indicate that 1.0% teachers strongly disagreed with the statement that quizzes are helpful in improving content knowledge, 3.8% disagreed, 8.6% were undecided, 29.5% agreed and 57.1% strongly agreed with the statement. Overall, the data suggests that most of the teachers strongly agreed that quizzes are helpful in improving content knowledge.

Table 3*Quizzes Increase Student Learning*

Response	Frequency	Percent
Strongly Disagree	4	3.8
Disagree	4	3.8
Undecided	8	7.6
Agree	31	29.0
Strongly Agree	57	54.8
Total	104	99.0
Missing System	1	1.0
Total	105	100.0

The results in the above Table 3 indicate that 3.8% teachers strongly disagreed with the statement that quizzes increase student learning, 3.8% disagreed with the statement, 7.6% were undecided, 29.5% agreed and 54.8% strongly agreed. Overall, the data of the Table 3 revealed that most of the teachers strongly agreed that quizzes increase student learning.

Table 4*Quizzes are Effective in Creating Interest among Students*

Response	Frequency	Percent
Strongly Disagree	5	4.8
Disagree	5	4.8
Undecided	7	6.7
Agree	32	30.5
Strongly Agree	55	52.4
Total	104	99.0
Missing System	1	1.0
Total	105	100.0

The results in the above Table 4 indicate that 4.8% teachers strongly disagreed with the statement that quizzes are effective in creating interest among students. 4.8% disagreed to it, 6.7% were undecided, 30.5% agreed and 52.4% strongly agreed with it. Overall, results of the Table 4 revealed that most of the teachers strongly agreed that quizzes are effective in creating interest among students.

Effect on Instructor**Table 5***Quizzes Inform Instructor about Student Learning*

Response	Frequency	Percent
Strongly Disagree	1	1.0
Disagree	3	2.9
Undecided	6	5.7
Agree	44	41.9
Strongly Agree	49	46.7
Total	103	98.1
Missing System	2	1.9
Total	105	100.0

It is indicated in the above Table 5 that 1.0% teachers strongly disagreed that quizzes inform instructor about student learning, 2.9% disagreed with the statement, 5.7% were undecided, 41.9% agreed and 46.7% strongly agreed with it. Overall, results of the Table 5 revealed that most of the teachers strongly agreed that quizzes inform instructor about student learning.

Table 6*Quizzes Provide Information about Weaknesses of Lecture*

Response	Frequency	Percent
Strongly Disagree	1	1.0
Disagree	9	8.6
Undecided	11	10.5
Agree	42	40.0
Strongly Agree	41	39.0
Total	104	99.0
Missing System	1	1.0
Total	105	100.0

Results in the above Table 6 suggest that 1.0% teachers strongly disagreed that quizzes provide information about weaknesses of lecture, 8.6% disagreed with the statement, 10.5% were undecided, 40.0% agreed and 39.0% strongly agreed to it. Overall, results of the Table 6 revealed that most of the teachers perceive quizzes inform teachers about the weaknesses of lecture.

Table 7*Quizzes Inform Instructor about Academic Deficiencies of Weak Students*

Response	Frequency	Percent
Strongly Disagree	1	1.0
Disagree	2	1.9
Undecided	9	8.6
Agree	42	40.0
Strongly Agree	50	47.6
Missing System	1	1.0
Total	105	100.0

The above Table 7 suggests that 1.0% teachers strongly disagreed that quizzes inform instructor about academic deficiencies of weak students, 1.9% disagreed, 8.6% were undecided, 40.0% agreed and 47.6% strongly agreed with the statement. Overall, results of the Table 7 revealed that most of the teachers perceive that quizzes inform instructors about academic deficiencies of weak students.

Table 8*Quizzes are Liked as They are Easy to Score*

Response	Frequency	Percent
Strongly Disagree	4	3.8
Disagree	13	12.4
Undecided	14	13.3
Agree	37	35.2
Strongly Agree	35	33.3
Total	103	98.1
Missing System	2	1.9
Total	105	100.0

It is suggested in the above Table 8 that 3.8% teachers strongly disagreed with the statement that quizzes are liked as they are easy to mark, 12.4% disagreed, 13.3% undecided, 35.2% agreed and 33.3% strongly agreed. Overall, results of the Table 8 revealed that most of the teachers like quizzes as they are easy to mark.

Effect on Academic Performance

Table 9

Quizzes Improve Academic Performance of Students

Response	Frequency	Percent
Strongly Disagree	5	4.8
Disagree	0	0.0
Undecided	5	4.8
Agree	44	41.9
Strongly Agree	51	48.6
Total	105	100.0

It is indicated in the above Table 9 that 4.8% teachers strongly disagreed with the statement that quizzes improve academic performance of students, 0.0% disagreed, 4.8% were undecided, 41.9% agreed and 48.6% strongly agreed to it. Results of the Table 9 revealed that most of the teachers perceive that quizzes improve academic performance of students.

Table 10

Regular Quizzes Help Students to Pass their Tests

Response	Frequency	Percent
Strongly Disagree	4	3.8
Disagree	4	3.8
Undecided	8	7.6
Agree	39	37.1
Strongly Agree	47	44.8
Total	102	97.1
Missing System	3	2.9
Total	105	100.0

It is suggested in the above Table 10 that 3.8% teachers strongly disagreed with the statement that regular quizzes help students pass their tests, 3.8% disagreed to it, 7.6% were undecided, 37.1% agreed and 44.8% strongly agreed. Results of the Table 10 revealed that most of the teachers perceive that regular quizzes help students pass their tests.

Table 11*Quizzes Improve Retention of Learned Concepts*

Response	Frequency	Percent
Strongly Disagree	1	1.0
Disagree	6	5.7
Undecided	8	7.6
Agree	44	41.9
Strongly Agree	46	43.8
Total	105	100.0

It is indicated in the above Table 11 that 1.0% teachers perceive that quizzes improve retention of learned concepts, 5.7% disagreed with the statement, 7.6% were undecided, 41.9% agreed and 43.8% strongly agreed to it. Results of the Table 11 revealed that most of the teachers strongly agreed that quizzes improve retention of learned concepts.

Effect of Quizzes on Learner**Table 12***Quizzes are Liked as They are Short in Nature*

Response	Frequency	Percent
Strongly Disagree	2	1.9
Disagree	6	5.7
Undecided	6	5.7
Agree	41	39.0
Strongly Agree	50	47.6
Total	105	100.0

It is suggested in the above Table 12 that 1.9% teachers strongly disagreed with the statement that quizzes are liked as they are short in nature, 5.7% disagreed, 5.7% were undecided, 39.0% agreed and 47.6% strongly agreed to it. Results of the Table 12 revealed that most of the teachers perceive that quizzes being brief in nature are liked by students.

Table 13*Quizzes are Liked as They are Objective in Nature*

Response	Frequency	Percent
Strongly Disagree	1	1.0

Response	Frequency	Percent
Disagree	6	5.7
Undecided	9	8.6
Agree	51	48.6
Strongly Agree	38	36.2
Total	105	100.0

It is stated in the above Table 13 that 1.0% teachers were strongly disagreed that quizzes are liked as they are objective in nature, 5.7% disagreed, 8.6% undecided, 48.6% agreed and 36.2% strongly agreed. Results of the Table 13 revealed that most of the teachers were agreed that quizzes are liked as they are objective in nature.

Table 14

Quizzes are Liked as They Don't Include Long Questions

Response	Frequency	Percent
Strongly Disagree	2	1.9
Disagree	7	6.7
Undecided	6	5.7
Agree	41	39.0
Strongly Agree	48	45.7
Total	104	99.0
Missing System	1	1.0
Total	105	100.0

Results in the above Table 14 indicate that 1.9% teachers strongly disagreed that quizzes are liked as they don't include long questions, 6.7% disagreed to it, 5.7% were undecided, 39.0% agreed and 45.7% strongly agreed with the statement. Results of the Table 14 revealed that most of the teachers perceived that quizzes are liked as they don't include long questions.

Table 15

Quizzes are Liked as Students Get Quick Feedback

Response	Frequency	Percent
Strongly Disagree	2	1.9
Disagree	3	2.9
Undecided	9	8.6
Agree	40	38.1

Response	Frequency	Percent
Strongly Agree	50	47.6
Total	104	99.0
Missing System	1	1.0
Total	105	100.0

Results in the above Table 15 suggest that 1.9% teachers strongly disagreed that quizzes are liked as students get quick feedback, 2.9% disagreed with the statement, 8.6% were undecided, 38.1% agreed and 47.6% strongly agreed. Results of the Table 15 revealed that most of the teachers were strongly agreed that quizzes are liked as students get quick feedback.

Discussion

The study showed that teachers had positive perception regarding quizzes. Quizzes motivate students, make them active, they give more time to studies, and participate in discussions. Resultantly, their academic performance in final exam gets better. The findings of this study align with other studies conducted by Davi (2014), Ghorbani (2017) and Ramshi (2014). Moreover, the regular use of quizzes helps students develop better study habits, improves their content knowledge, and fosters a habit of questioning, leading to enhanced learning outcomes and retention. Through regular quizzing, small amounts of materials are tested regularly, students bring a lot of discussions and interaction in the classroom which assists them in retaining material for a longer time.

The main findings of this study suggest that teachers hold the view that quizzes serve multiple purposes benefitting both instructors and learners. Quizzes serve many purposes i.e. motivate students, make them regular, help in improving content knowledge, develop questioning habit in students and make them active right from the start and so on. They not only motivate students and improve their study habits but also provide valuable feedback to teachers about students' mastery of the content. By incorporating quizzes into their teaching practices, teachers can create an engaging learning environment, ultimately leading to academic achievement among students.

In conclusion, the findings of this research suggest that quizzes are not only a source of motivation for students, but also improve content knowledge and contribute to increased student learning. Science teachers are of the view that quizzes inform instructor about student learning and

academic deficiencies of weak students. Teachers consider that quizzes are usually liked by students as they are easy to score and their regular execution improves academic performance of students. Teachers also believe that quizzes improve retention of learned concepts and are particularly favored by students for their preference for objective type format which provide instantaneous feedback.

Conflict of Interest

The author of the manuscript has no financial or non-financial conflict of interest in the subject matter or materials discussed in this manuscript.

Data Availability Statement

The data associated with this study will be provided by the corresponding author upon request.

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