

Technology Utilization in Improving Learners' Reading Fluency Skills

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Abstract:

Technology is pivotal in enhancing learners' reading fluency skills in the evolving education landscape. With the integration of digital tools, adaptive learning platforms, and interactive reading applications, educators can create personalized and engaging literacy experiences tailored to individual student needs. This study explored the extent of technology utilization in improving the learners' reading fluency skills in a cluster of a medium-sized school's division in central Philippines for the School Year 2024-2025 as the basis for an enhanced reading program. The study employed a descriptive-quantitative research design and used a researcher-made questionnaire for data gathering from 103 public elementary school teachers. The independent variables included were age, highest educational attainment, length of service, and number of relevant trainings attended. The areas of concentration included online reading fluency exercises, participatory learning, and virtual formative assessments. The statistical tools used were frequency count, percentage distribution, mean, and the Mann-Whitney U Test. The respondents' profile slightly leaned toward younger individuals, higher educational attainment, longer service duration, and greater training exposure. Secondly, the technology utilization in enhancing learners' reading fluency skills in online reading fluency exercises, participatory learning, and virtual formative assessments is to a high extent. The technology utilization in enhancing learners' reading fluency skills when grouped according to the aforementioned variables is high. Finally, there is no significant difference in the extent of technology utilization in enhancing learners' reading fluency skills when grouped and compared according to the aforementioned variables. Various recommendations, such as expanding digital scaffolding, increasing motivation for repeated reading, and enhancing adaptive learning approaches, were provided: personalized reading levels based on fluency metrics can support differentiated instruction.

Keywords: Technology utilization, Learners' reading fluency skills, Adaptive learning platforms, Interactive Reading Applications

Introduction:

If reading is hard for some students, technology can help them read more easily by making learning exciting. It lets teachers create reading lessons that are more fun and fit exactly what each student needs (Lysenko, 2020). Technology is important in today's schools to help kids become better readers. Teachers can use online tools and apps that change based on how well a student is doing, making reading lessons enjoyable and just right for them (Alqahtani, 2020).

Teaching students to read and understand what they read is an essential foundational skill for children's academic and lifelong learning. However, many pupils struggle to become proficient readers because of low reading skills (Quimsing, 2024). Studies have indicated that technology-assisted reading teaching can enhance vocabulary, comprehension, fluency, phonics, and phonemic awareness. For instance, digital resources like e-books, audiobooks, and interactive whiteboards may give pupils a more dynamic and enjoyable reading experience. By offering focused teaching and practice in particular reading domains, educational apps and games can also assist kids in developing their reading abilities (Williams, 2023).

The lack of reading materials at home, the inability of some parents to teach their children how to read, and learners' interest in reading are a few reasons why the problem of reading literacy has become a perennial issue. To develop reading programs for pupils, many areas can be worked on, including funding teachers' training, encouraging early

literacy initiatives, and creating interesting and culturally appropriate reading materials for Filipino pupils. This paper would help identify reading issues and provide workable solutions using technology to improve learners' performance.

Current State of Knowledge

From a general standpoint, Marikyan (2020) wrote that accepting and using information technologies can bring immediate and long-term benefits at organizational and individual levels, such as improved performance, financial and time efficiency, and convenience. The potential of technology to deliver benefits has long motivated management research to examine the willingness of individuals to accept innovative technology. The study on technology adoption became of primary importance in the 1980s, coinciding with the growth of personal computers. However, a central stumbling block to research on adopting personal computing was the lack of empirical insight into users' responses to the information system's performance.

Technology has quickly taken over our daily lives and changed how people engage with the outside world. Due to the extensive use of technology in education, digital tools are employed to improve students' reading abilities and habits. This article will examine how technology affects reading habits and abilities, and how it might assist children in developing fundamental reading skills. Children should and should not utilize technology to enhance their reading proficiency. If students cannot read well, it hurts their grades, English, and how to choose technology to complement curriculum and instruction. Technology has made reading more accessible, allowing students to access many reading materials anywhere. It has also made reading more engaging, with interactive features such as animations, videos, and gamification that motivate students to read more (Williams, 2023).

Studies continue to paint a dismal picture of literacy levels, especially amongst underserved populations. AI technology incorporating learning science findings holds great potential to help us overcome this challenge within our lifetime. In underserved populations and infrastructurally deficient settings, any technology intervention has to address poor infrastructure, lack of quality teachers, cost, and extensive change management. The paper reports on a multi-year, large-scale intervention in India, which has expanded to 9 other countries, including Sri Lanka. Results from a large-scale randomized control study of efficacy establish significant improvement in learning outcomes (Srinivasan, 2021).

In Indonesia, innovative technology is developing fast in the current digital era and is widely used in people's lives. This also impacts changes in reading comprehension and classroom learning techniques. Most reading comprehension activities are now online using various digital information, necessitating mastery of particular reading comprehension skills. These skills are necessary to comprehend many scientific disciplines. The capacity to read online (inquiry reading) is a crucial talent for students to master in today's educational world, given the amount of information that can be obtained online from all-digital sources in every daily activity (Organization for Economic Co-operation and Development, 2024).

The Indian experience and reading approaches are unique. Srinivasan (2021) accounts that in the last several years, educators, parents, and professionals in India have faced the growing dilemma of their students' inadequate reading abilities. The Department of Education in India claims that young people are among the world's worst readers. Surprisingly, young Indians are among the world's poorest readers if it is true that six years of education in the native tongue is adequate as a foundation. Companies in India are reportedly required to educate new hires how to read and write before they can go on to more advanced training programs, demonstrating the importance of literacy skills for success in any field. The Department of Education is aware that a growing number of students are entering higher education institutions without adequate reading and writing skills, which adds to failure and dropout rates. They made a grave mistake in the language of learning and teaching, the DoE claims, by trying to educate first-year pupils in a language in which they were not yet proficient.

Reading literacy is a fundamental ability required for academic achievement and lifetime learning. However, some primary school pupils struggle to become proficient readers, which causes them to struggle academically. In order to overcome these obstacles and raise struggling readers' reading literacy skills, technology provides creative solutions (Quimsing, 2020).

Reading is essential for learning in school and life, according to Idulog (2023). This ability enables everyone to connect what they have learned and what they already know, improve their comprehension of concepts and methods, and guarantee that these will be continually transmitted to the following generation. It is one of the fundamental abilities every student should possess to study, advance their education, and function in daily life. The foundation of most learning is reading.

According to the Philippine Daily Star Global's January 2024 article, Chi (2024), the World Bank's 2022 statistics on learning poverty show that at least 90% of Filipino children aged 10 have difficulty reading or comprehending simple text. Nonetheless, the pre-epidemic estimate of learning poverty in the Philippines was 70% even before the COVID-19 pandemic hindered children's education. Additionally, one study found specific issues with instructors' methods of

teaching pupils to read. Research revealed that even after receiving training, almost 200 instructors in the Bangsamoro area who participated in DepEd's literacy program had reading comprehension scores below 50%. According to the survey, only around 35% of instructors were at least proficient in reading fluency following the training program. Fluency is the speed and precision with which one decodes words.

Theoretical Framework

This study was anchored on the Theory of Technology Acceptance by Fred Davis (1986). The technology acceptance theory emanated from the Technology Acceptance Model (TAM) introduced by Fred Davis in 1986 for his doctoral dissertation. Adapting the Theory of Reasoned Action, TAM is tailored explicitly to model users' acceptance of information systems or technologies.

Davis utilized TAM in 1989 to explain how people use computers. The TAM developed by Davis (1989) attempts to describe the general factors influencing computer adoption, which helps explain user behavior across various end-user computing systems and user groups. Two distinct beliefs—Perceived Usefulness (PU) and Perceived Ease of Use (PEU)—were included in and evaluated by the basic TAM paradigm. The potential user's subjective belief that using a specific system (such as a single platform e-payment system) will enhance his or her action is known as perceived usefulness, and the degree to which the potential user anticipates the target system to be simple to use is known as perceived ease of use (Davis, 1989). In TAM, additional external variables may impact an individual's belief in a system.

The theory appeared sound in almost all fields of endeavor, particularly education. There is a national effort to produce globally competitive graduates, and technology acceptance lays the foundation. Technology is deemed appropriate for improving learners' reading skills, and the effort to do so must also commence with technology acceptance.

Davis' TAM explains how individuals adopt and integrate technology based on two key determinants: perceived usefulness, which refers to the extent to which users believe technology will enhance their performance, and perceived ease of use, the degree to which users find technology simple to operate and implement.

Objectives of the Study

This study aimed to determine the extent of technology utilization in improving the learners' reading fluency skills in a cluster of a medium-sized school's division in central Philippines for the School Year 2024-2025 as the basis for an enhanced reading program.

Methodology:

This section presents the research design, respondents, data gathering instrument, data gathering procedure, validity of the research instrument, reliability of the data research instrument, and statistical treatment used.

Research Design

This study utilized a descriptive research design to determine the extent of technology utilization in improving learners' reading fluency skills as a basis for an enhancement plan in one of the medium-sized divisions in the Central Philippines for the School Year 2024-2025.

The descriptive research design method focuses on the present situation and aims to find the new truth. The truth may have different forms, such as increased knowledge, a further generalization, or a new "law," an improved insight into a factor (Calmorin, 2016).

Furthermore, descriptive design is appropriate for this study because it aimed to discover what prevails in the present condition or relationships, held opinions and beliefs, processes and effects, and developing trends. The design is a scientific method that involves observing and describing the behavior of a subject without influencing it in any way.

Respondents of the Study

The study's respondents were the 103 public elementary school teachers distributed in 6 schools in the same cluster. Since the number of respondents is quite significant, a random sampling technique, which is purposive, was used via the Cochran formula to find the sample size. To get the percentage, the respondents from each section were divided by the total number of respondents and multiplied by the sample size. The researcher randomly selected the respondents from each section using the lottery technique.

Table 1 shows the distribution of the respondents according to their grade level.

Table 1
Distribution of the Respondents

SCHOOLS	TOTAL POPULATION (N)	SAMPLE SIZE (n)	Percentage (%)
A	74	55	53.24
B	9	7	6.47
C	21	16	15.11
D	9	7	6.47
E	6	4	4.32
F	20	15	14.39
TOTAL	139	103	100.00

Data Gathering Instrument

The researcher used a self-made questionnaire to gather information to help determine the extent of teachers' technology utilization to improve learners' reading fluency.

The questionnaire was divided into two parts. The first part gathered the profile information of the respondents to establish their age, highest educational attainment, length of service, and number of related trainings attended. The second part was the questionnaire proper, with 30 line items that the respondents could rate; these items were divided into three areas: online reading fluency exercises, participatory learning, and virtual formative assessments.

The respondents were asked to rate each item using the five-point Likert scale, which contains the following scores: 5 (always); 4 (often); 3 (sometimes); 2 (rarely), and 1 (almost never).

Validity

Depending on the specific purpose of the test, validity is the degree to which interpretations of the results are justified (Shields, 2015). Since the instrument for this study was self-made, its validity was established. To do that, the questionnaire was subjected to a face and content validation by a group of 3 validators who were experts in the field of education. As to the appropriateness of the items in the questionnaire, each validator was requested to rate the instrument using the criteria created and presented by Carter V. Good and Douglas E. Scates. The interpretations were as follows: Excellent (4.21 – 5.00); Very Good (3.41 – 4.20); Good (2.61 – 3.40); Fair (1.81 – 2.60); Poor (1.00 – 1.80). For this study, the validity score was 4.96, interpreted as "excellent," which means the instrument was highly valid.

Reliability

Usman (2016) states that reliability estimates assess the interrater reliability of instrument scores, internal consistency of measurement tools, and stability of measures. The degree to which interpretations of test findings are justified is known as validity, and it is contingent upon the specific purpose for which the test is designed. Since the research instrument is self-made, it is necessary to establish its reliability. Cronbach's Alpha was used to do that. The Cronbach Alpha is used whenever the researcher has items that are not scored as right or wrong. A measure of internal consistency, or how closely a group of objects is connected, is Cronbach's Alpha. It may be a scale of dependability metric. A "high" alpha number does not always indicate that the measure is one-dimensional.

For the instrument to be reliable, it should be within the very high range of reliability coefficient, and the reliability instrument, which is Cronbach's Alpha, was used. In this regard, the trial respondents were 30 public elementary school teachers from the same district in the same division who were not part of the actual respondents. To be reliable, the obtained value of the tests must be between 0.70 and 1.00 (Santos, 2016). The reliability index for this instrument is 0.700, which was interpreted as "acceptable," making the instrument reliable.

Data Gathering Procedure

The researcher submitted a formal letter addressed to the Schools Division Superintendent (SDS) informing her about this study, its purpose, and general coverage, and at the same time, seeking approval to conduct the study with the assurance that it would be done outside of school hours so as not to distract school routines. After securing the approval of the SDS, a letter addressed to the school heads was sent alongside a photocopy of the approved letter from the SDS. The data gathering instrument was administered outside of school hours, say lunch or in the afternoon, and the same was retrieved 2-3 days after its distribution.

The raw data was collected and tallied into a spreadsheet for further treatment. The said data was converted into numerical code guided by a coding manual. This allowed faster computer processing, statistical derivations, and tabular presentation. The Statistical Package for Social Sciences (SPSS) was used to process the encoded data on the computer.

Research Ethics Protocols

This study carefully followed all the usual ethical rules for research. To ensure the people who answered would not be harmed, the study kept their answers private and did not use their names throughout the research process. Right at the beginning, the researcher got their permission to participate and told them they could stop being part of the study at any time if they wanted to. Everyone who answered was also told how the study would work, how long it would take, and why they were being asked to participate. The researcher promised to be open, honest, and respectful to everyone involved and ensure the results would be presented truthfully and not twisted.

Analytical Schemes

The data analysis followed various procedures to achieve the study's objectives. These were descriptive and comparative schemes.

Objective No. 1 used a descriptive analytical scheme to determine the profile of the respondents in terms of age, highest educational attainment, length of service, and the number of related trainings.

Objective No. 2 also used the descriptive analytical scheme to determine the extent of technology utilization in enhancing learners' reading fluency skills: online reading fluency exercises, participatory learning, and virtual formative assessments.

Objective No. 3 employed a descriptive analytical scheme to determine the extent of technology utilization in enhancing learners' reading fluency skills when grouped and compared according to the aforementioned variables.

Objective No. 4 determined the significant difference in the extent of technology utilization in enhancing learners' reading fluency skills when grouped and compared according to the aforementioned variables. A comparative analytical scheme was used.

Results and Discussion:

Profile of the Respondents According to Age, Highest Educational Attainment, Length of Service, and Number of Relevant Trainings Attended

Table 2
Profile of Respondents

Variables	Categories	Frequency	Percentage
Age	Younger (Less than 38 years old)	56	54.40
	Older (38 years old and above)	47	45.60
	Total	103	100
Highest Educational Attainment	Lower (Bachelor's Degree Level)	47	45.60
	Higher (Post Graduate Level)	56	54.40
	Total	103	100
Length of Service	Few (less than 9 years)	51	49.50
	Many (9 years and above)	52	50.50
	Total	103	100
Number of Relevant Trainings Attended	Lower (less than six trainings)	47	45.60
	Higher (6 trainings and above)	56	54.40

Total

103

100

The respondent's profile reveals a relatively balanced distribution across key demographic variables, with slight leanings toward younger individuals, higher educational attainment, longer service duration, and greater training exposure. Most respondents (54.40%) are younger than 38, while 45.60% are older. More respondents (54.40%) hold postgraduate degrees than those with only a bachelor's degree (45.60%). The distribution is nearly even between those with fewer years of service (49.50%) and those with longer tenure (50.50%). More respondents (54.40%) have attended six or more trainings, while 45.60% have attended fewer.

The composition of the workforce indicates a relatively younger demographic, which may suggest a greater receptiveness to innovative pedagogical strategies, the integration of technology in education, and the adoption of adaptive learning methodologies. Additionally, a well-educated workforce contributes to enhanced analytical reasoning and advanced instructional practices, fostering a robust foundation for research-driven decision-making and continuous professional growth.

Regarding tenure, a balanced distribution exists between seasoned professionals with institutional expertise and newer educators who bring fresh perspectives. Initiatives facilitating collaboration between these groups could strengthen mentorship dynamics and drive pedagogical innovation.

Regarding professional development, a considerable proportion of the workforce actively engages in training opportunities, underscoring the importance of continuous learning. Expanding participation in specialized workshops focusing on digital tools, gamification techniques, and student-centered pedagogical frameworks could further refine instructional efficacy.

Descriptive Analysis in the Extent of Technology Utilization in Enhancing Learners' Reading Fluency Skills in Online Reading Fluency Exercises, Participatory Learning, and Virtual Formative Assessments

Table 3

Extent of Technology Utilization in Enhancing Learners' Reading Fluency Skills in Online Reading Fluency Exercises

Area	Mean	Interpretation
A. Online Reading Fluency Exercises		
<i>As a teacher, I ...</i>		
1. allow students to practice reading online with the proper intonation and cadence.	3.61	Great Extent
2. let students read the same passages multiple times to improve their speed and accuracy.	3.41	Moderate Extent
3. allow students to read along with a more experienced reader.	4.08	Great Extent
4. read aloud a sentence or paragraph, and students practice following along.	3.53	Great Extent
5. require students to read passages at different levels of complexity and independently or with a partner.	4.04	Great Extent
6. let students record themselves reading and listen back to evaluate their progress.	3.76	Great Extent
7. ask students to build a pyramid of sentences, starting with a simple sentence and adding more complex elements.	4.00	Great Extent
8. allow students to take self-paced reading practice online.	3.88	Great Extent
9. encourage children's periodical, timed oral reading and take note of their reading rate and accuracy, to monitor reading progress.	3.67	Great Extent
10. allow students to listen to good reading models and emulate them as they read independently.	3.56	Great Extent
Overall Mean	3.75	Great Extent

Table 3 shows the data on the extent of technology utilization in online reading fluency exercises.

The overall mean score of 3.75 (great extent) indicates that technology is widely utilized to enhance learners' reading fluency skills.

Educators actively utilize digital tools and online reading strategies to support learners.

The highest mean score is 4.08 (great extent) in item number 3 – "allow students to read along with a more experienced reader", and the lowest mean of 3.41 (great extent) in item number 2 – "let students read the same passages multiple times to improve their speed and accuracy".

The findings suggest that issues in speed and accuracy affect reading fluency, often requiring multiple readings of the same passages. Fluency is essential for comprehension, and research shows that rereading can be helpful, but it is not a universal solution. Since fluency involves more than just speed, such as comprehension and prosody, addressing all aspects holistically can improve reading efficiency. Given that different learners have varying needs and preferences, strategies like gamification, interactive reading activities, and digital tools could enhance fluency development more engagingly and effectively.

Elamadurthi (2023) explored the effectiveness of technology-assisted reading programs in enhancing young students' reading skills. The study monitored students' progress in areas like fluency, comprehension, spelling, and language to evaluate the success of electronic reading tools. Student participation in the reading campaign influenced their overall assessment of the program's effectiveness, highlighting the importance of adapting teaching strategies in response to challenges. The study also examined the advantages and limitations of using computers to support secondary school students' reading comprehension.

Table 4

Extent of Technology Utilization in Enhancing Learners' Reading Fluency Skills in Participatory Learning

Area	Mean	Interpretation
B. Participatory Learning		
<i>As a teacher, I ...</i>		
1. let students formulate questions, independently work on projects, and execute them.	4.27	Great Extent
2. allow students to rate their peers' online reading proficiency.	3.82	Great Extent
3. pair poor readers with fluent readers and ask them to observe and learn from them.	3.96	Great Extent
4. require students to teach each other how to read and learn from that experience.	3.49	Moderate Extent
5. organize a question-and-answer forum online and ask each student to formulate a question and let their classmates answer them.	3.85	Great Extent
6. create an intentional sequence of activities or online reading events to help learners achieve reading goals.	3.70	Great Extent
7. involve parents in online reading exercises.	3.50	Great Extent
8. tandem with co-teachers in conducting online reading and English classes.	3.81	Great Extent
9. allow students to do role-playing in some online reading activities.	3.64	Great Extent
10. let peers (students) evaluate each other's reading difficulties, and help discuss solutions.	3.51	Great Extent
Overall Mean	3.76	Great Extent

Table 4 shows the extent of technology utilization in participatory learning for reading fluency.

The overall mean score is 3.76, to a great extent. This indicates strong integration of participatory learning strategies using technology. This suggests teachers actively involve learners in collaborative, inquiry-based activities to enhance reading fluency.

The highest mean score is 4.27, interpreted as a great extent, in item 1 – "let students formulate questions or independently work on projects, and then execute them". They got the lowest mean of 3.49, interpreted as a great extent in item 4 – "require students to teach each other how to read and learn from that experience".

The results imply that the extent of technology utilization in participatory learning revealed that difficulties arise with using the buddy-buddy system in learning how to read.

Using technology for peer learning in reading presents challenges, such as reduced engagement, accessibility issues, and difficulties providing personalized feedback. Digital tools may not fully replicate face-to-face interaction, disrupting meaningful discussions and comprehension. Strategies to improve technology-based peer reading include using interactive platforms for real-time feedback, ensuring equal access to digital tools, blending online and in-person learning, structuring peer feedback with guided prompts, and teaching digital literacy skills for effective use of technology.

Parenti and Chen (2019) studied how technology influences reading fluency in U.S. K-12 classrooms. They highlighted the importance of aligning technology with lesson objectives and introduced VoiceThread to support reading development. The study focused on the benefits of engaging text with audio-visual interaction, emphasizing techniques like Repeated Reading and Readers Theater. The research connects literacy best practices with technological and pedagogical strategies, showing how Web 2.0 tools can be effectively integrated into classroom instruction.

Table 5

Extent of Technology Utilization in Enhancing Learners' Reading Fluency Skills in Virtual Formative Assessments

Area	Mean	Interpretation
C. Virtual Formative Assessments		
<i>As a teacher, I ...</i>		
1. monitor student progress and provide real-time feedback while students are doing online reading and learning.	3.31	Moderate Extent

2. can identify reading issues and provide solutions quickly.	3.86	Great Extent
3. identify the mindset needed to engage students using the formative assessment process in an online environment.	3.75	Great Extent
4. emphasize learning targets and feedback gathering that focuses on evidence of student understanding.	3.17	Moderate Extent
5. promote a shared understanding about virtual formative assessment practices and processes with co-teachers.	3.79	Great Extent
6. can make an effective plan to address students' reading issues.	3.27	Moderate Extent
7. use a consistent formative assessment to test learners' progress.	3.83	Great Extent
8. help track learners' progress using various online platforms, focusing on their formative competence.	3.73	Great Extent
9. provide feedback to parents.	3.79	Great Extent
10. use formative assessment tools to identify weaker areas in students' reading performances.	3.51	Great Extent
Overall Mean	3.60	Great Extent

Table 5 reveals the extent of technology utilization in virtual formative assessments for reading fluency, with the overall mean score of 3.60 interpreted as a great extent.

Item number 2 – “can identify reading issues and provide solutions quickly” obtained the highest mean score of 3.86, interpreted as “great extent”. While item number 4 – “emphasize learning targets and feedback gathering that focuses on evidence of student understanding” got the lowest mean score of 3.17, interpreted as “moderate extent”.

This item received the lowest score, suggesting that goal setting and feedback collection for formative assessment are only moderately emphasized. While feedback systems are in place, there may be shortcomings in using data-driven insights to monitor progress effectively. Teachers can enhance adaptive assessment models by incorporating performance analytics to create more focused learning pathways.

Andrade et.al. (2021) in their study entitled “Classroom Assessment as Co-Regulated Learning: A Systematic Review” explored classroom assessment as a mechanism for co-regulating learning, emphasizing the importance of interactive feedback processes between students, teachers, and technological tools. It highlights how effective assessment practices help articulate learning targets, collect feedback, and prompt instructional adjustments to enhance student understanding.

Descriptive Analysis in the Extent of Technology Utilization in Enhancing Learners' Reading Fluency Skills in Online Reading Fluency Exercises, Participatory Learning, and Virtual Formative Assessments when grouped according to Age, Highest Educational Attainment, Length of Service, and Number of Relevant Trainings Attended

Table 6

Extent of Technology Utilization in Enhancing Learners' Reading Fluency Skills in Online Reading Fluency Exercises According to Age

Categories	Younger		Older	
A. Online Reading Fluency Exercises	Mean	Interpretation	Mean	Interpretation
<i>As a teacher, I ...</i>				
1. allow students to practice reading online with the proper intonation and cadence.	3.55	High Extent	3.68	Great Extent
2. let students read the same passages multiple times to improve their speed and accuracy.	3.39	Moderate Extent	3.43	Moderate Extent
3. allow students to read along with a more experienced reader.	4.11	High Extent	4.04	Great Extent
4. read aloud a sentence or paragraph, and students practice following along.	3.57	High Extent	3.49	Moderate Extent
5. require students to read passages at different levels of complexity and independently or with a partner.	4.00	High Extent	4.09	Great Extent
6. let students record themselves reading and listen back to evaluate their progress.	3.71	High Extent	3.81	Great Extent
7. ask students to build a pyramid of sentences, starting with a simple sentence and adding more complex elements.	3.98	High Extent	4.02	Great Extent
8. allow students to take self-paced reading practice online.	3.91	High Extent	3.85	Great Extent

9. encourage children's periodical, timed oral reading and take note of their reading rate and accuracy, to monitor reading progress.	3.71	High Extent	3.62	Great Extent
10. allow students to listen to good reading models and emulate them as they read independently.	3.64	High Extent	3.47	Moderate Extent
Overall Mean	3.76	High Extent	3.75	Great Extent

6. The extent of technology utilization in online reading fluency exercises according to age is shown in Table 6.

The overall mean for the younger group is 3.76, while for the older group, it is 3.75, showing a minimal difference. Both age groups engage extensively with technology for reading fluency exercises, indicating that age is not a significant factor in technology adoption. Educators should ensure equal access to digital learning tools for all age groups while addressing individual learning preferences.

For the younger group, the highest mean of 4.11, interpreted as a great extent, was achieved in item number 3 - allow students to read along with a more experienced reader. The older group got the highest mean of 4.09, which was interpreted to a great extent in item number 5, which requires students to read passages at different levels of complexity and can read independently or with a partner.

Regarding the lowest mean, the younger group got a mean score of 3.39, interpreted as a moderate extent in item number 2 - "let students read the same passages multiple times to improve their speed and accuracy." This holds for the older group, which achieved a mean of 3.43, interpreted as a moderate extent in the same item number.

The results imply that both groups can be challenging in terms of utilizing technology as an online reading fluency exercise.

Both older and younger teachers face challenges in using technology for online reading fluency exercises, though the reasons may differ. Older teachers may struggle with adapting to new digital tools due to limited prior exposure, discomfort with technology, or difficulties in integrating digital platforms into traditional teaching methods. Younger teachers, while generally more familiar with technology, may encounter challenges in selecting the most effective tools, managing technical issues, or ensuring meaningful student engagement.

A recent study by Oakley (2024) highlights that digital technologies for reading fluency are often used as enhancements to traditional methods rather than fully integrated solutions. This suggests that both age groups may need more structured training and support to maximize the benefits of technology in reading instruction. Providing targeted professional development and ensuring user-friendly digital tools can help educators overcome these difficulties.

Table 7

Extent of Technology Utilization in Enhancing Learners' Reading Fluency Skills in Participatory Learning According to Age

Categories	Younger		Older	
B. Participatory Learning	Mean	Interpretation	Mean	Interpretation
<i>As a teacher, I ...</i>				
1. let students formulate questions, independently work on projects, and then execute them.	4.21	Great Extent	4.34	Great Extent
2. allow students to rate their peers' online reading proficiency.	3.75	Great Extent	3.89	Great Extent
3. pair poor readers with fluent readers and ask them to observe and learn from them.	3.86	Great Extent	4.09	Great Extent
4. require students to teach each other how to read and learn from that experience.	3.54	Great Extent	3.43	Moderate Extent
5. organize the online question and answer forum, and ask each student to formulate a question and let their classmates answer it.	3.89	Great Extent	3.81	Great Extent
6. create an intentional sequence of activities or online reading events to help learners achieve reading goals.	3.68	Great Extent	3.72	Great Extent
7. involve parents in online reading exercises.	3.50	Great Extent	3.51	Great Extent
8. tandem with co-teachers in conducting online reading and English classes.	3.77	Great Extent	3.85	Great Extent
9. allow students to do role-playing in some online reading activities.	3.55	Great Extent	3.74	Great Extent

10. let peers (students) evaluate each other's reading difficulties, and help discuss solutions.	3.54	Great Extent	3.49	Moderate Extent
Overall Mean	3.73	High Extent	3.79	High Extent

Table 7 shows the extent of technology utilization in enhancing learners' reading fluency skills in participatory learning according to age, with an overall mean of 3.73 interpreted as a great extent and the older group with 3.79 interpreted as a great extent.

Item number 1 – "Let students formulate questions or independently work on projects, and then execute them" got the highest mean of 4.21, which was interpreted to a great extent. At the same time, the older group got the highest mean of 4.34, interpreted as a great extent in the same item number.

For the lowest mean score, the younger group got 3.54 in item number 7 – "involve parents in online reading exercises" while the older group had a mean of 3.43, interpreted as a moderate extent in item number 4 – "require students to teach each other how to read and learn from that experience".

The results imply that the younger group finds it difficult to involve the parents in online reading. In contrast, the older group has difficulty applying the buddy-buddy system in reading as part of their experiential learning.

Younger educators often struggle to engage parents in online reading activities due to varying levels of digital literacy among families, limited access to technology, and challenges in maintaining parental involvement in virtual learning environments. On the other hand, older educators may find it challenging to implement the buddy system in reading, as it requires adapting to new collaborative learning methods and integrating peer-based strategies effectively.

Espitia Cruz & Kwinta's (2024) study explores the "Buddy System" as a pedagogical innovation to enhance online interaction, highlighting the importance of structured peer collaboration in improving reading fluency. Their findings suggest that educators benefit from targeted training and support to effectively implement digital and peer-assisted learning strategies, regardless of age. Clear guidelines, interactive platforms, and accessible resources can help overcome these challenges.

Table 8

Extent of Technology Utilization in Enhancing Learners' Reading Fluency Skills in Virtual Formative Assessments According to Age

Categories	Younger		Older	
C. Virtual Formative Assessments	Mean	Interpretation	Mean	Interpretation
<i>As a teacher, I ...</i>				
1. monitor student progress and provide real-time feedback while students are doing online reading and learning.	3.34	Moderate Extent	3.28	Moderate Extent
2. can identify reading issues and provide solutions quickly.	3.70	Great Extent	4.06	Great Extent
3. identify the mindset needed to engage students using the formative assessment process in an online environment.	3.71	Great Extent	3.79	Great Extent
4. emphasize learning targets and feedback gathering that focuses on evidence of student understanding.	3.25	Moderate Extent	3.09	Moderate Extent
5. promote a shared understanding about virtual formative assessment practices and processes with co-teachers.	3.82	Great Extent	3.74	Great Extent
6. can make an effective plan to address students' reading issues.	3.32	Moderate Extent	3.21	Moderate Extent
7. use a consistent formative assessment to test learners' progress.	3.86	Great Extent	3.79	Great Extent
8. help track learners' progress using various online platforms, focusing on their formative competence.	3.71	Great Extent	3.74	Great Extent
9. provide feedback to parents.	3.80	Great Extent	3.77	Great Extent
10. use formative assessment tools to identify weaker areas in students' reading performances.	3.64	Great Extent	3.36	Moderate Extent
Overall Mean	3.62	Great Extent	3.58	Great Extent

Table 8 shows the extent of technology utilization in virtual formative assessments according to age.

The overall mean score for the younger is 3.62, and for the older it is 3.58, both high levels. The similarity suggests that educators across age groups effectively integrate technology for assessing reading fluency.

The younger group obtained the highest mean score of 3.86 interpreted as great extent in item number 7 – “use a consistent formative assessment to test learners’ progress” and the older group with highest mean of 4.06 interpreted as great extent in item number 2 – “can identify reading issues and provide solutions quickly”.

For the lowest mean score, the younger group achieved 3.25 interpreted as moderate extent in item number 4 – “emphasize learning targets and feedback gathering that focuses on evidence of student understanding” and the older group got 3.21 interpreted as moderate extent in item number 6 – “can make an effective plan to address students’ reading issues”.

The results imply that they lack experience gathering feedback geared toward evidence of students’ progress. At the same time, the older group lacks skills in plan formulation geared towards students’ reading issues.

Younger educators may struggle with gathering feedback effectively to track student progress, as they may lack experience interpreting assessment data and using it to inform instruction. Meanwhile, older educators may face challenges in designing targeted intervention plans for reading difficulties, possibly due to limited exposure to newer pedagogical strategies.

Research by Keane & Curran (2025) discusses validating student feedback and the need for a systematic approach to ensure meaningful evaluation. Professional development focused on assessment literacy and strategic planning can help educators across age groups enhance their effectiveness in supporting student reading progress.

Additionally, the above statements/results are aligned with the illustrative case study investigation of Rahma (2024) to learn how Indonesian in-service teachers perceived teaching reading in a digital era and the challenges they encountered. The data were submitted by 30 teachers who participated in the subject post for Indonesian junior high schools. Data collection strategies include participatory classroom observation, interviews, and guided written reflection. The study’s findings highlight issues concerning teachers’ perceptions and teachers’ challenges while teaching reading in a digital setting. As many as 63% of teachers believe that the proportion of time teachers spend practicing reading skills from online sources is 40%–50% of total teaching hours at school. Furthermore, 40% believe that the criteria for teacher success in reading are when pupils improve their reading comprehension skills. The analysis also revealed that teachers encountered several challenges: (1) lack of knowledge about models and media for learning to read in a digital context, (2) lack of students’ ability to read multiple-text sources, and (3) lack of motivation and awareness among students in reading.

Table 9

Extent of Technology Utilization in Enhancing Learners’ Reading Fluency Skills in Online Reading Fluency Exercises According to Highest Educational Attainment

Categories	Lower		Higher	
	Mean	Interpretation	Mean	Interpretation
A. Online Reading Fluency Exercises				
<i>As a teacher, I ...</i>				
1. allow students to practice reading online with the proper intonation and cadence.	3.70	Great Extent	3.54	Great Extent
2. let students read the same passages multiple times to improve their speed and accuracy.	3.36	Moderate Extent	3.45	Moderate Extent
3. allow students to read along with a more experienced reader.	4.11	Great Extent	4.05	Great Extent
4. read aloud a sentence or paragraph, and students practice following along.	3.60	Great Extent	3.48	Moderate Extent
5. require students to read passages at different levels of complexity and independently or with a partner.	4.02	Great Extent	4.05	Great Extent
6. let students record themselves reading and listen back to evaluate their progress.	3.70	Great Extent	3.80	Great Extent
7. ask students to build a pyramid of sentences, starting with a simple sentence and adding more complex elements.	4.00	Great Extent	4.00	Great Extent
8. allow students to take self-paced reading practice online.	4.00	Great Extent	3.79	Great Extent
9. encourage children's periodical, timed oral reading and take note of their reading rate and accuracy, to monitor reading progress.	3.87	Great Extent	3.50	Great Extent
10. allow students to listen to good reading models and emulate them as they read independently.	3.60	Great Extent	3.54	Great Extent
Overall Mean	3.80	Great Extent	3.72	Great Extent

Table 9 shows the extent of technology utilization in online reading fluency exercises according to the highest educational attainment.

Overall mean comparison shows that for the lower group it is 3.80, and for the higher group it is 3.72, both at a high level. This means that both groups utilize technology to a high extent, though teachers with lower educational attainment score slightly higher in engagement.

For the group with lower educational attainment, they achieved the highest mean score of 4.11 interpreted as great extent in item number 3 – “allow students to read along with a more experienced reader” while the group with high educational attainment got the highest mean score of 4.05 interpreted as great extent in item number 3 - allow students to read along with a more experienced reader and 4.05 in item number 5. require students to read passages at different levels of complexity, and can read’

However, those with low educational attainment obtained the lowest mean score of 3.36 interpreted as moderate extent in item number 2 – “let students read the same passages multiple times to improve their speed and accuracy” while the those with high educational attainment got the lowest mean score of 3.45 interpreted as moderate extent in item number 2 – “let students read the same passages multiple times to improve their speed and accuracy”.

The results imply that learners benefit from repeated reading exercises to enhance fluency regardless of educational attainment. However, the extent of technology utilization in these exercises may vary based on familiarity with digital tools and access to resources.

A simple analysis could highlight that teacher with lower educational attainment may rely on traditional repeated reading strategies to enhance fluency, as they might have had fewer opportunities to integrate advanced digital tools into their teaching. While

Teachers with higher educational attainment may also find repeated reading beneficial, but they might incorporate additional technological interventions, such as interactive reading platforms or AI-assisted fluency assessments.

Isma’s (2023) study examined reading performance in Indonesia and the challenges students face in understanding English texts. Two tools were used: a test to measure reading performance and a Google Form questionnaire to gather students’ self-reported difficulties. The results showed an average test score of 47.24, reflecting low reading performance. Additionally, most students reported struggling with comprehension. These difficulties negatively impact their reading skills. The study suggests integrating learning media, technological tools, and effective reading strategies to address these issues to enhance students’ English proficiency. These recommendations provide practical guidance for educators and researchers.

Table 10

Extent of Technology Utilization in Enhancing Learners’ Reading Fluency Skills in Participatory Learning According to Highest Educational Attainment

Categories	Lower		Higher	
B. Participatory Learning	Mean	Interpretation	Mean	Interpretation
<i>As a teacher, I ...</i>				
1. let students formulate questions, independently work on projects, and execute them.	4.32	Great Extent	4.23	Great Extent
2. allow students to rate their peers’ online reading proficiency.	3.81	Great Extent	3.82	Great Extent
3. pair poor readers with fluent readers and ask them to observe and learn from them.	3.89	Great Extent	4.02	Great Extent
4. require students to teach each other how to read and learn from that experience.	3.53	Great Extent	3.45	Moderate Extent
5. organize the question and answer forum online, and ask each student to formulate a question and let their classmates answer it.	3.83	Great Extent	3.88	Great Extent
6. create an intentional sequence of activities or online reading events to help learners achieve reading goals.	3.64	Great Extent	3.75	Great Extent
7. involve parents in online reading exercises.	3.43	Moderate Extent	3.57	Great Extent
8. tandem with co-teachers in conducting online reading and English classes.	3.79	Great Extent	3.82	Great Extent
9. allow students to do role-playing in some online reading activities.	3.66	Great Extent	3.63	Great Extent
10. let peers (students) evaluate each other’s reading difficulties, and help discuss solutions.	3.60	Great Extent	3.45	Moderate Extent
Overall Mean	3.75	Great Extent	3.76	Great Extent

Table 10 shows the extent of technology utilization in participatory learning according to the highest educational attainment.

Overall mean scores are: lower: 3.75 and higher: 3.76, both to a great extent. Both groups engage in participatory learning to a high extent, showing minimal difference in overall mean. This suggests that educators across varying educational levels recognize the importance of technology-driven participatory learning. Institutions should focus on equitable access to digital collaboration tools, ensuring that instructional strategies cater to diverse educator backgrounds.

Those with higher educational attainment got the highest mean score of 4.32 interpreted as great extent in item number 1 – “let students formulate questions or independently work on projects, and then execute them” and those with higher educational attainment got the highest mean score of 4.23 interpreted as great extent in the same item number.

On the other hand, those with lower educational attainment got the lowest mean score of 3.43, interpreted as a moderate extent in item number 7 – “involve parents in online reading exercises”. Those with higher educational attainment got the lowest mean score of 3.45, interpreted as a moderate extent in item number 10 – “let peers (students) evaluate each other’s reading difficulties, help discuss solutions to it”

The results imply that those with lower educational attainment have a low extent of technology utilization to persuade learners to participate actively. Thus, it may emphasize parental involvement in online reading exercises to provide additional support at home, reinforcing fluency skills outside the classroom.

While those with higher educational attainment are challenged with letting learners do the self-evaluation, one may focus on peer evaluation, encouraging students to assess each other’s reading difficulties and collaboratively discuss solutions, fostering independent learning and critical thinking.

The research study of Idulog (2024) examined the current state of reading abilities among Filipino students and potential areas for improvement. The poor reading skills can be attributed to several factors, including the lack of resources and socio-economic factors. However, potential areas for improvement have been identified, such as promoting early literacy programs, investing in teacher training, and developing reading materials that are culturally relevant and engaging for Filipino students.

Conclusions:

The study found that respondents were generally younger, with higher educational attainment, longer service, and more training, indicating a professionally prepared and adaptable teaching force. Technology was utilized to a great extent in enhancing learners’ reading fluency across online reading exercises, participatory learning, and virtual formative assessments. While overall usage was high, specific practices such as repeated reading and peer teaching were less emphasized, suggesting areas for improvement. No significant differences were found in technology use based on age or service length, but a significant difference emerged in participatory learning based on training attendance, highlighting the importance of professional development. Regardless of demographic variables, teachers consistently showed strong commitment to integrating technology into reading instruction. Recommendations include encouraging targeted ICT training, implementing tech-based reading programs, strengthening progress monitoring, involving stakeholders, allocating regular reading time, and expanding research to explore other influential variables in students’ reading fluency development.

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