‘READVOLUTION’: ENHANCING READING LITERACY AMONG PRIMARY SCHOOL PUPILS THROUGH AN INNOVATIVE READING INTERVENTION

‘READVOLUTION’: MEMPERKASA LITERASI MEMBACA DALAM KALANGAN MURID SEKOLAH RENDAH MELALUI INTERVENSI MEMBACA YANG INOVATIF

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Abstract:

Primary literacy remains a significant challenge. Cutting-edge digital offerings are needed to accommodate the "Alpha Generation." This study appraises READvolution, a web-based "Smart Literacy" portal. Modernisation of reading, achieved via interactive engagement and pedagogical scaffolding, was the central design principle for the platform. Through its interactive features and adaptive scaffolding, instant feedback is delivered to pupils, enabling them to personalise their reading experiences and minimise frustration. Using a descriptive research design, the study analysed the perceptions of 39 primary school pupils (n=39) after a two-week intervention. Four thematic constructs were measured using a 15-item questionnaire. These included perceived enjoyment, ease of use, perceived usefulness, and reading motivation. Findings exposed an overwhelmingly positive reception. Pupils reported high mean scores for Enjoyment and Ease of Use ($\bar{x}$ = 4.59). They expressed a distinct preference for the digital interface over traditional textbooks. The "Smart" elements of the platform notably raised reading confidence and lowered learning anxiety. A key finding of the study indicates READvolution's perceived success. Positive reading attitudes are effectively fostered by the application, largely because it aligns with students' digital inclinations. These results indicate the critical importance of integrating user-centric, web-based platforms into remedial curricula, aiming to enhance student self-efficacy and modernise literacy instruction. This research further emphasises the significance of the learner's voice in developing resilient 21st-century educational tools.

Keywords: Literacy Intervention, READvolution, Pupil Perceptions, Smart Literacy, Primary Education, Digital Learning.

Kata Kunci:

Intervensi Literasi, READvolution, Persepsi Murid, Literasi Pintar, Pendidikan Rendah, Pembelajaran Digital

Abstrak:

Literasi membaca kekal menjadi cabaran utama yang menuntut penyelesaian digital inovatif bagi memenuhi keperluan "Generasi Alpha." Kajian ini menilai READvolution, sebuah portal "Literasi Pintar" berasaskan web yang direka untuk memodenkan pengalaman membaca melalui penglibatan interaktif dan perancah pedagogi (pedagogical scaffolding). Menggunakan reka bentuk kajian deskriptif, kajian ini menganalisis persepsi 39 orang murid sekolah rendah (n=39) susulan intervensi selama dua minggu. Data dikumpul melalui soal selidik 15 item yang mengukur empat konstruk tematik: keseronokan yang dirasai, kebolehgunaan, keberkesanan yang dirasai, dan motivasi membaca. Dapatan kajian menunjukkan penerimaan yang amat positif. Murid melaporkan skor min yang tinggi bagi aspek Keseronokan dan Kebolehgunaan ($\bar{x}$ = 4.59), serta menyatakan kecenderungan yang jelas terhadap antara muka digital berbanding buku teks tradisional. Elemen "Pintar" pada platform tersebut secara signifikan telah meningkatkan keyakinan membaca dan mengurangkan kegelisahan pembelajaran. Kajian ini merumuskan bahawa READvolution dilihat sebagai satu kejayaan, dengan keberkesanannya memupuk sikap membaca yang positif melalui penyelarasan dengan keutamaan digital murid. Keputusan ini menunjukkan bahawa penyepaduan platform berasaskan web yang berpusatkan pengguna ke dalam kurikulum pemulihan adalah sangat penting untuk meningkatkan efikasi kendiri murid dan memodenkan instruksi literasi. Penyelidikan

ini menegaskan kepentingan suara pelajar dalam membangunkan alat pendidikan abad ke-21 yang berdaya tahan.

Introduction

Literacy is central to primary education as it opens the door to other academic fields. Today, reading literacy is not just about printed text. It also means multimodal and digital fluency. Despite educational efforts, a significant number of primary students, particularly in remedial or urban settings, continue to struggle to meet established benchmarks (Latef et al., 2023, pp. 88-101). Such difficulties often lead to diminished confidence and subsequent disengagement. Moreover, the "Alpha Generation" introduces further complexity, as their information-processing approaches, shaped by ubiquitous technology, diverge from earlier generations. Studies suggest these digital natives respond best to interactive, visually stimulating, and self-paced learning environments (Mahmud et al., 2026). However, many reading programmes still rely on static textbooks, which can raise students' "affective filter," a mental barrier that shuts down learning when boredom or anxiety sets in.

Therefore, the READvolution intervention was developed specifically to close this gap. It is a Smart Literacy initiative that aims to change how pupils read. Unlike traditional methods, it combines pedagogical scaffolding with interactive digital engagement, allowing pupils to receive instant feedback and engage in adaptive activities that help them progress in literacy in a low-stakes, engaging environment. This study addresses the need to modernise literacy teaching. READvolution shifts classroom instruction from print to digital to match students' realities. This article examines pupils' viewpoints on the shift.

Traditional interventions in primary schools often face a significant problem: low engagement (Vanlommel & Boom-Muilenburg, 2024)). Even with remedial programmes, many pupils still find reading daunting (Mahmud et al., 2026, pp. 1807-1813), particularly struggling readers who experience anxiety when reading dense textbooks (Khairuddin et al., 2026, pp. 7013-7034). The psychological barrier or high affective filter limits pupils' learning, regardless of curriculum changes (Kultas, E., 2026). Furthermore, for the Alpha Generation, a mismatch frequently exists between classroom teaching approaches and students' digital habits, as the continued reliance on paper-based literacy classes negatively impacts student motivation. Pupils find it hard to focus on textbooks that lack interactivity and instant feedback (Saifuddin et al., 2024).

Many digital tools exist, but few are Smart Literacy ecosystems like READvolution. These pairs are scaffolding with a user-focused web interface. Nonetheless, we lack data on how students view digital shifts (Mazlan & Hapni, 2023). Without knowing pupils' opinions of portals like SmartLiteracy, instructors cannot ensure long-term use (Waimin & Kamsin, 2026, pp. 60-70; Mazlan & Hapni, 2023). Thus, this study explores how well primary pupils receive a web-based reading platform to bridge the gap between digital interest and literacy achievement.

This study investigates primary school students' responsiveness to a digitised literacy environment, examining user experience and psychological engagement to evaluate whether the READvolution web portal can practically replace traditional reading materials and how easy it is to use. To achieve the aforementioned objectives, the study considers the following research objectives:

1. To measure how READvolution affects pupils' motivation and reading interest (RO1).
2. To find out how useful pupils find the "Smart Literacy" features for their reading skills (RO2).

Literature Review

A key literacy barrier in Malaysian primary schools is the Affective Filter (Chew, 2023), a concept popularised by Stephen Krashen to describe how emotional factors influence language acquisition. In remedial reading, high filters include anxiety, low self-esteem, and boredom, all of which function as psychological barriers that hinder pupils' learning processes (Chew, 2023). Local studies (Baharuddin, N. Q., & Hashim, H., 2020) demonstrated that struggling readers in Malaysia often feel stigmatised by traditional forms of help, which can lead to learned helplessness in class (Baharuddin & Hashim, 2020, pp. 7-16). Note that READvolution addresses this by providing a low-stakes digital setting. On the other hand, the SmartLiteracy portal provides instant feedback, allows pupils to retry tasks in private, and reduces peer comparison. Switching from paper to this digital platform lowers the affective filter, as mistakes feel less public and less scary in a flipped classroom than in a traditional class (Baharuddin, N. Q., & Hashim, H., 2020).

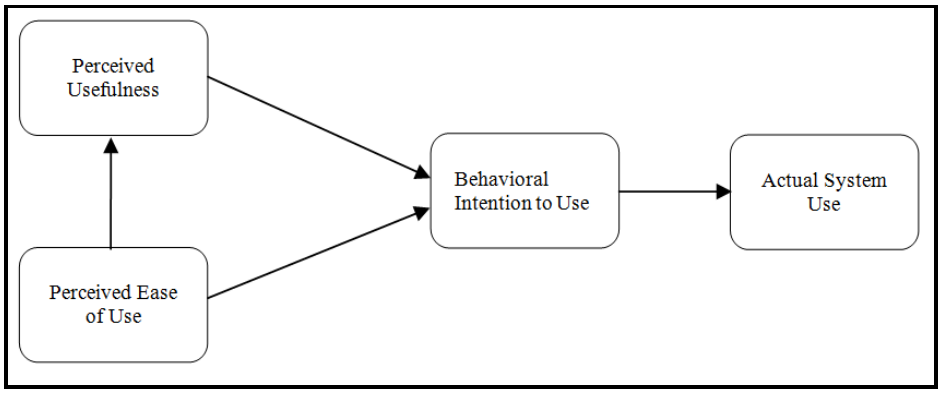
The success of educational software rests on two Technology Acceptance Model (TAM) pillars: "Ease of Use" and "Perceived Usefulness" (Figure 1). For primary pupils, usability is both a technical and pedagogical requirement (Tang et al., 2023). Hence, this study utilises TAM to assess how READvolution's smart design, simple navigation, and child-friendly aesthetics facilitate smooth entry into reading tasks. When learners find a tool easy to use, their self-efficacy grows, an important precursor to literacy mastery (DiBenedetto & M.K., Schunk, D.H., 2022).

Today's primary school pupils belong to Alpha Generation, the first cohort to be raised in a fully pervasive digital ecosystem. As noted by Prensky (2001), these "digital natives" have a cognitive preference for multimodal content. Traditional literacy models regularly rely on a "monomodal" approach (text-only), which fails to stimulate the multiple sensory channels used by modern children. READvolution leverages Multimodality Theory through integrating text with audio assistance, interactive visuals, and immediate digital feedback. By offering a "Smart Literacy" experience that mirrors the digital environments children use at home, the portal closes the divide between classroom instruction and informal digital play, making reading feel organic rather than coerced (Bandara et al., 2024).

Moreover, the integration of game design elements into non-game contexts, or Gamification, has developed as a powerful tool in Malaysian primary education. According to Self-Determination Theory (SDT), learners are more motivated when they perceive autonomy and competence. Research on Malaysian digital programmes (Cavus et al., 2023a) indicated that gamified feedback, stars, progress bars, and interactive rewards significantly boost intrinsic motivation among low-achieving pupils. The READvolution portal integrates these "revolutionary" elements to maintain attention and increase time-on-task. By recasting solitary reading as interactive "missions," the intervention cultivates a positive attitude toward literacy that conventional textbooks often fail to engender (Nasir & Yaccob, 2026; Wee & Choong, 2019, pp. 97–106).

READvolution's development supports the Malaysia Education Blueprint (2013–2025), notably Shift 7's push to use Information Communication Technology (ICT) to raise learning quality nationwide. Correspondingly, local studies stress that digital literacy tools must reflect Malaysia's cultural and linguistic context (Abdul Rahim et al., 2023). As a locally hosted Institute Pendidikan Guru (IPG) initiative, READvolution is a grassroots contribution to national digital objectives (Rahman, 2024), moving past traditional Computer-Assisted Language Learning (CALL) toward an integrated "Smart Literacy" approach that advances the Ministry of Education's (MOE) aim of producing resilient, tech-literate citizens (Alakrash & Razak, 2021).

Figure 1
Technology Acceptance Model (TAM)



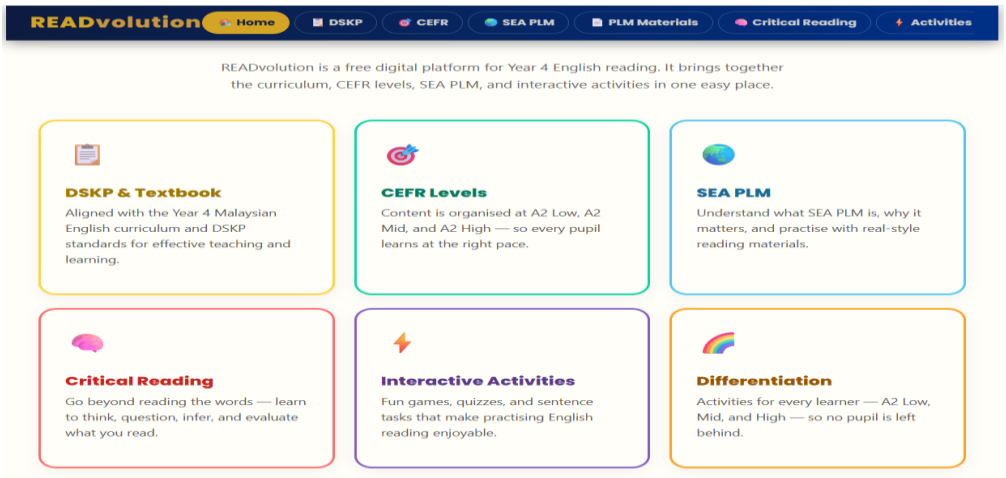
Methodology

This study adopted a descriptive research design using a quantitative survey approach, as this design is widely regarded as effective for measuring attitudes, opinions, and perceptions within a specific population (Yusoff & Janor, 2014). By utilising a systematic questionnaire, the study endeavoured to provide a statistical snapshot of how primary school pupils interact with and perceive the READvolution portal (Refer to Figure 2 and Figure 3).

Figure 2
The READvolution Portal



Figure 3
The READvolution Portal



Note that 39 primary pupils (n = 39) from a school in the Seberang Perai area participated. They were purposively sampled to focus on students currently enrolled in literacy support or remedial reading programmes. Representing Generation Alpha, the cohort is broadly familiar with digital technology. Correspondingly, the sample size aligns with descriptive pilot studies evaluating user experience for localised educational interventions (Ahmad et al., 2014).

On the other hand, data were collected using a 15-item Likert questionnaire administered via Google Forms. The instrument was child-friendly, written in simplified language for primary-age respondents (Azmi et al., 2023). The 15 items were grouped into four constructs: Ease of Use, Perceived Usefulness, User Experience, and Psychological Engagement.

1. Perceived Enjoyment and Interest: (e.g., Items 1, 6, 11, 15)
2. Perceived Usefulness for Literacy: (e.g., Items 2, 5, 9, 14)
3. Ease of Use and Autonomy: (e.g., Items 3, 10)
4. Motivation and Self-Efficacy: (e.g., Items 4, 7, 8, 12, 13)

Respondents indicated their level of agreement on a 3 or 5-point Likert scale, ranging from (e.g., "Strongly Disagree" to "Strongly Agree").

The intervention lasted two weeks. The procedure followed three distinct phases:

- Phase 1 (Introduction): Pupils were introduced to the ipgktbsmartliteracy. my portal. Teachers demonstrated how to access the site and access the "Smart Literacy" modules.
- Phase 2 (Implementation): Pupils engaged with the READvolution portal during their scheduled reading lessons. The intervention focused on self-paced interaction, allowing pupils to choose stories and activities that matched their interests.
- Phase 3 (Evaluation): At the end of the two weeks, pupils were given access to the Google Form questionnaire. Teachers assisted in reading the questions aloud to ensure comprehension, though pupils selected their responses independently to maintain data validity.

Consequently, data collected from the Google Form were exported to a spreadsheet for statistical analysis. The study utilised descriptive statistics, primarily focusing on the Mean ($\bar{x}$) and Standard Deviation (SD) for each item and construct. The results were then interpreted using a mean score ranking system to categorise pupil perception as Low, Moderate, or High (Bargagliotti et al., 2021).

Results and Discussion

The overall results reveal an overwhelmingly positive perception of the READvolution portal. As presented in Table 1, the cumulative average Mean score for the intervention was 4.45, with an overall SD of 0.69. Based on a 5-point scale, these scores fall within the "Very High" agreement range, suggesting that the target demographic highly received the digital portal. The data displays a "Very High" level of positive perception through all dimensions of the READvolution portal.

Table 1
Mean and SD of Pupil Perceptions (n=39)

Item	Question Description	Mean ($\bar{x}$)	SD
.	Enjoyment of the READvolution programme	4.54	0.55
2.	Improvement of reading skills	4.41	0.71
3.	Ease of use	4.49	0.64
4.	Desire to read more often	4.41	0.75
5.	Materials are easy to understand	4.54	0.64
6.	Enjoyment of activities	4.59	0.64
7.	Preference over traditional textbooks	4.46	0.64
8.	Feeling confident when using it	4.38	0.75
9.	Better understanding of what is read	4.51	0.68
10.	Ability to take time to learn	4.46	0.72
11.	Makes reading more interesting	4.49	0.68
12.	Paying more attention during activities	4.41	0.71
13.	Motivation to complete reading tasks	4.44	0.72
14.	Reading more correctly	4.51	0.70
15.	Wanting to use it again	4.67	0.53

Item 15, which assessed the pupils' desire to use the portal repeatedly in the future, yielded the highest Mean score of **4.67** (SD = 0.53). This indicates a strong, sustainable interest in the platform. Similarly, Items 6 (Enjoyment of activities) and 1 (Enjoyment of the programme) scored **4.59** and **4.54,** respectively, confirming that the portal's "gamified" and immersive nature successfully engaged the learners.

Note that pupils perceived a significant improvement in their literacy mechanics. Item 14 (Reading more correctly) and Item 9 (Better understanding of what is read) both achieved high Mean scores of **4.51**. This suggests that the pupils felt the "Smart Literacy" features (audio-visual cues and scaffolding) directly assisted their comprehension and accuracy.

A key finding was Item 7, where pupils demonstrated a clear preference for the READvolution interface over traditional textbooks (M = 4.46, SD = 0.64). Item 3 (Ease of Use) also confirmed

the portal's technical accessibility (M = 4.49), indicating the web-based platform was sufficiently user-friendly for primary-aged Generation Alpha learners to navigate with minimal frustration.
Item 8 (feeling confident when using the portal) had the lowest mean (M = 4.38, SD = 0.75). Although this still indicates overall agreement, the larger SD suggests greater individual variability in self-efficacy, underscoring the need for continued teacher support during the digital transition.

Discussion

The Digital-Native Preference

The results for Item 7 provide the strongest evidence for the "Revolutionary" aspect of the intervention, with 92.3% of pupils favouring the digital portal instead of textbooks. This confirms that interactive, screen-based media significantly engage Generation Alpha learners more than traditional print (SAIFUDDIN et al., 2023). The high ease-of-use scores (92.3% Agreement) suggest that the "Smart" User Interface (UI)/User Experience (UX) design of ipgktbsmartliteracy.my fits perfectly with the motor and cognitive skills of primary-age children.

Lowering the Affective Filter

Items 11 and 1 received overwhelmingly positive responses (89.8% found them interesting; 97.4% enjoyed them), indicating that the intervention effectively lowered the affective filter. The portal transformed a high-pressure classroom task into an interactive digital experience, reducing anxiety and fostering confidence (84.6%) and attentiveness (87.1%) among pupils.

Self-Paced Learning and Usefulness

A critical finding is that 87.2% of pupils valued the ability to "take their time" (Item 10). This self-direction is often missing from traditional group-reading lessons. Such perceived autonomy, combined with the belief that they were reading "more correctly" (94.9%), builds strong Self-Efficacy. In literacy development, the student's belief in their own progress is often as important as the skill itself, as it encourages the sustained practice necessary for long-term fluency (Chew, 2023).

Implications

The study’s findings have important implications for primary literacy pedagogy, as the strong positive reception of READvolution suggests that digital literacy tools are no longer optional supplements but are now integral components of the modern classroom. For Generation Alpha, the delivery medium is as influential as the instructional content (Cimene et al., 2024).

For educators and curriculum designers, the key implication is the need to embed "Smart" multimodal frameworks into remedial programmes, as the data indicate that students prize features such as immediate digital feedback and learner autonomy (Fang et al., 2023). Platforms that encourage pupils to chart their own learning paths can lower cognitive load compared with traditional teacher-led instruction, improving engagement and learning outcomes (Kadir et al., 2023).

The study suggests technology-based interventions can act as a classroom "leveller," offering struggling readers a private, low-stakes space to develop skills without the social stigma of traditional remedial groups (Nasir & Yaccob, 2026).

Conclusion

In brief, the READvolution intervention bridged the gap between student interest and literacy engagement. Analysis of 39 primary pupils illustrates that the portal is perceived not merely as a tool. However, it is a pedagogically superior alternative to printed textbooks. By offering a fun, easy, and highly motivating environment, READvolution addresses core causes of literacy failure, low intrinsic motivation and a high affective filter, making it a promising option for remedial and mainstream literacy instruction.

Therefore, the study concludes that when the medium of instruction aligns with the learner's digital reality, the psychological barriers to reading, such as anxiety and boredom, are significantly mitigated. READvolution proves that "Smart Literacy" is a viable and necessary evolution in the Malaysian educational context. Ultimately, if literacy is to be revolutionised, the tools used must mirror the interactive, multimodal, and accessible nature of the world in which the students live (Mastam et al., 2024, pp. 128-150).

Recommendations

Integration of Long-term Empirical Metrics
While the current study provides robust evidence regarding pupil perceptions, future research should adopt a longitudinal approach, with particular emphasis on pairing attitudinal data with empirical pre- and post-test measurements. This would allow researchers to measure the exact correlation between high digital engagement and actual literacy gains in fluency, phonics, and comprehension, providing a holistic view of the intervention’s effectiveness.

Scalability and Content Diversification
To ensure the long-term sustainability of the READvolution model, the platform should be expanded to include a broader range of "Smart" levels that cater to different proficiency levels. Hence, expanding the library to include diverse genres such as digital comics, interactive non-fiction, and culturally localised Malaysian folk tales will help maintain student interest as they progress through higher levels of literacy.

Strategic Teacher Professional Development
The facilitator's digital literacy often limits the success of a digital portal. It is recommended that schools and IPGs provide specialised professional development workshops. These sessions should focus on transitioning from traditional "instructional" roles to "facilitator" roles within a Smart Literacy environment. This ensures that portals like READvolution are integrated as a core pedagogical supplement rather than relegated to occasional or recreational activities.

Parent-Community Involvement
Given that READvolution is a web-based portal accessible via ipgktbsmartliteracy.my, there is a significant opportunity to extend learning into the home. Hence, future iterations of the programme should include a parent-dashboard or "at-home" reading missions to foster a more comprehensive literacy ecosystem that involves the wider community in the pupil's reading revolution.

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References

Abdul Rahim, N. 'A., Shuhidan, S. M., Husaini, H., Siti Khadijah, U. L., & Bidin, M. A. F. (2023). *The relationship between digital literacy skills, learning instruments, culture and student motivation among Indigenous students in Malaysia*. *Journal of Information and Knowledge Management (JIKM), 13*(2).

Ahmad, B., Ramadas, A. & Fatt, Q. K. (2014). A pilot study: the development of a culturally tailored Malaysian Diabetes Education Module (MY-DEMO) based on the Health Belief Model. BMC Endocrine Disorders 14. https://doi.org/10.1186/1472-6823-14-31

Ahmad Khairuddin, A. M., Aminudin, N. S., Muhammad Zamarin, N. A. B., Samsuri, N. A. B., & Rahmat, N. H. (2026). *Bridging pedagogy and psychology: An analysis of the influence of reading strategies on reading anxiety*. *International Journal of Research and Innovation in Social Science (IJRISS), 10*(2). https://doi.org/10.47772/IJRISS.2026.10200504

Alakrash, H. M. & Razak, N. A. (2021). Technology-Based Language Learning: Investigation of Digital Technology and Digital Literacy. Sustainability 13(21). https://doi.org/10.3390/su132112304

Azmi, N. A., Zamri, N. A., Heo, C. C. & Basri, T. S. (2023). Development and Validation of a Questionnaire Assessing the Knowledge, Attitude and Practices Towards Medically Important Insects Among Schoolchildren in Malaysia. Journal of Health and Translational Medicine. https://doi.org/10.21315/jummec2023.30.2.5

Baharuddin, N. Q. & Hashim, H. (2020). Using digital reading in ESL Malaysian primary classrooms: strengths and shortcomings from learners' perspectives. Journal of Educational and Learning Studies 3(1), p. 7. https://doi.org/10.32698/0832

Bandara, N., Chathurika, R. & Katukurunda, K. G. (2024). An Overview of Teaching Methods for Fostering Generation Alpha (Gen Alpha) Learning Process. International Journal of Research Publication and Reviews. https://doi.org/10.47611/journals.ijrpr.v5i8.4265

Bandura, A. (1997). *Self-efficacy: The Exercise of Control*. W.H. Freeman.

Bargagliotti, A. E., Martonosi, S. E., Orrison, M. E., Johnson, A. H., & Fefer, S. A. (2021). *Using ranked survey data in education research: Methods and applications*. *Journal of School Psychology, 85*, 17–36. https://doi.org/10.1016/j.jsp.2020.12.005

Cavus, N., Ibrahim, I., Ozoemena Okonkwo, M., Ayansina, N., & Modupeola, T. (2023). The Effects of Gamification in Education: A Systematic Literature Review. BRAIN. Broad Research in Artificial Intelligence and Neuroscience. 14. 211–241. 10.18662/brain/14.2/452.

Chew, F. P. (2023). Evaluation of the LINUS Program in Malaysian Three Types of National Primary Schools. Research Aspects in Arts and Social Studies Vol. 9. https://doi.org/10.9734/bpi/raass/v9/5144B

Chin, A. S. & Ghani, K. A. (2021). The Use of Think-Aloud in Assisting Reading Comprehension among Primary School Students. Journal of Cognitive Sciences and Human Development. https://doi.org/10.33736/jcshd.2456.2021

Cimene, F. T., Mamburao, M., Plaza, Q., Nitcha, H., Somalipao, M., Raña, E., Baseo, E., Siao, Q., Mauna, A., & Cimene, D. R. (2024). *Generation Alpha students' behavior as digital natives and their learning engagement*. *Psychology and Education: A Multidisciplinary Journal*, 258–273. https://doi.org/10.5281/zenodo.14007254

DiBenedetto, M.K., Schunk, D.H. (2022). Assessing Academic Self-efficacy. In: Khine, M.S., Nielsen, T. (eds) Academic Self-efficacy in Education. Springer, Singapore. https://doi.org/10.1007/978-981-16-8240-7_2

Fang, H., Wang, X., Hong, X., & Shu, L. (2023). *Research on a framework for analysing interactive behaviours in a smart classroom based on multimodal data and its application*. In *Proceedings of the 2023 8th International Conference on Distance Education and Learning (ICDEL '23)* (pp. 205–210). Association for Computing Machinery. https://doi.org/10.1145/3606094.3606112

Kadir, M. S., Yeung, A. S., Caleon, I. S., Diallo, T. M. O., Forbes, A., & Koh, W. X. (2023). The effects of load reduction instruction on educational outcomes: An intervention study on hands-on inquiry-based learning in science. Applied Cognitive Psychology, 37(4), 814–829. https://doi.org/10.1002/acp.4077

Krashen, S. D. (1982). *Principles and Practice in Second Language Acquisition*. Pergamon Press

Kultas, E. (2026). The effect of reading fluency strategies on improving primary school students' reading attitudes and their role in reducing reading anxiety.*Acta Psychologica*. https://doi.org/10.1016/j.actpsy.2026.106711

Latef, A., Frohlich, D., Calic, J., Muhammad, N. H. & Radzuan, A. W. (2023). Technological knowledge and acceptance among rural primary school in Malaysia. International Journal of Creative Future and Heritage (TENIAT) 11(1), pp. 88-101. https://doi.org/10.47252/teniat.v11i1.1033

Mahmud, W. M., Yusoff, Z. J. & Embong, R. (2026). Determinants of Reading Challenges among Urban Primary School Pupils. International Journal of Research and Innovation in Social Science 10(3), pp. 1807-1813. https://doi.org/10.47772/IJRISS.2026.100300126

Mastam, N. M., Mokhtar, K. & Zaharudin, R. (2024). Bridging the Digital Divide in Malaysia: Enhancing Digital Literacy for Inclusive Students in Educational Systems. Asia Pacific Journal of Youth Studies 15(2), pp. 128–150. https://doi.org/10.56390/apjys2024.6.128.6.6

Mazlan, M. N. & Hapni, F. S. (2023). Beyond the classroom: Students' perspectives on e-learning portal in blended and online learning. Journal of ICT in Education 10(2). https://doi.org/10.37134/jictie.vol10.2.8.2023

Ministry of Education Malaysia. (2013). *Malaysia Education Blueprint 2013-2025 (Preschool to Post-Secondary Education*. Putrajaya.

Nasir, N. S. & Yaccob, N. S. (2026). AI-integrated Reading with Google Read Along: ESL Primary Learners Gamified Intervention. EDUCATUM Journal of Social Sciences. https://doi.org/10.37134/ejoss.vol12.sp2.12.2026

Prensky, M. (2001). Digital Natives, Digital Immigrants Part 1. On the Horizon, 9(5), 1–6.

Saifuddin, T., Dilshad, W. B., Afzal, A. & Parveen, A. (2024). Behavioural Manifestations Of The Digital Native and Exploratory Study Of Gen Alpha In The Primary Classroom. https://doi.org/10.5565/rev/tpm.4095

Tang, X., Zainal, S. R. & Li, Q. (2023). Multimedia use and its impact on the effectiveness of educators: a technology acceptance model perspective. Humanities and Social Sciences Communications 10. https://doi.org/10.1057/s41599-023-02458-4

Vanlommel, K. & Boom-Muilenburg, E. v. (2024). How can we understand and stimulate evidence-informed educational change? A scoping review from a systems perspective. Journal of Educational Change 25(3). https://doi.org/10.1007/s10833-024-09506-z

Yusoff, R. & Janor, R. M. (2014). Generation of an Interval Metric Scale to Measure Attitude. SAGE Open 4(1). https://doi.org/10.1177/2158244013516768

Waimin, E. S. & Kamsin, I. F. (2026). *Students' Perceptions of AINS Effectiveness in Rural Primary Schools in Malaysia*. International Journal of Information and Education Technology 16(1), pp. 60-70. https://doi.org/10.18178/ijiet.2026.16.1.2483

Wee, S. & Choong, W. (2019). Gamification: Predicting the effectiveness of variety game design elements to motivate users' energy conservation behaviour intrinsically. Journal of Environmental Management 233, pp. 97–106. https://doi.org/10.1016/j.jenvman.2018.11.127