

**Digital distractions as a development issue affecting student attention
in Technology-Integrated Senior High School Classrooms**

Jun M. Suico*

San Remigio National High School
Poblacion, San Remigio, Cebu, Philippines
Email: jun.suico001@gmail.com

Nolasco K. Malabago

Cebu Technological University – Main Campus
M.J. Cuenco Cebu City, Philippines

ABSTRACT

The rapid growth of digital technologies in the senior high school classroom creates unique development-related challenges, especially digital distractions that can interrupt students' attention. This study is situated in the concept of Development Education, and it investigates the ways that digital distractions in technology-integrated learning environments predict student attention in Grade 11 students at San Remigio National High School. Using a quantitative descriptive–correlational research design, data were gathered from fifteen purposively selected respondents using a researcher-developed questionnaire that measured digital distractions (social media use, messaging applications, online gaming and entertainment, and non-academic internet browsing) and student attention (sustained attention, selective attention, and attentional control). The descriptive statistics and inferential analysis are used to analyze and interpret the data. Results suggested that students report little time spent on overt non-academic digital activity in class, whereas passive distractors such as notifications and entertainment-related content were believed to negatively affect attention. Results also suggested that sustained attention and attentional control were moderate, but selective attention was low in technology-rich classrooms. Digital distractions were statistically significantly associated with student attention and were found to be significant by use of statistical means, proving that digital distractions can predict attention levels of students. These results reinforce the notion that digital distractions represent not only a behavioral problem of the individual but also a systemic developmental problem for a class, influenced by class settings, school policies, and their self-regulation. This study highlights the development-sensitive interventions, such as developing policies on responsible technology use, optimizing instructional design, and promoting digital self-regulation to enable the integration of technology to positively affect, rather than impede the learning process in a school's senior high system.

*Corresponding author

DOI: <http://doi.org/10.69651/PIJHSS0501728>

Recommended citation:

Suico, J. M., & Malabago, N. K. (2026). Digital distractions as a development issue affecting student attention in Technology Integrated Senior High School Classrooms. *Pantao (The International Journal of the Humanities and Social Sciences)* 5 (1), 8037-8047. <http://doi.org/10.69651/PIJHSS0501728>

Keywords: Digital distractions, student attention, Technology-Integrated classrooms, development education, Senior High School, digital self-regulation, responsible technology use

Date Submitted: December 26, 2025

Date Accepted: January 5, 2026

Date Published: January 22, 2026

INTRODUCTION

The use of digital technologies in classroom instruction has become one of the key features of contemporary senior high school education and a major concern in the development of education. At public secondary schools, such as San Remigio National High School, digital tools, including smartphones, online platforms, and internet-based resources, are increasingly implemented to broaden access to information and support learner-centered instruction. These technologies may help to modernize and integrate education and bring about educational innovation, but they also bring new development-related challenges, particularly digital distractions, which may detract from students' attention and learning engagement.

From a development education perspective, classroom attention is not simply a question of individual cognitive concern for students; it's a developmental and systemic phenomenon influenced by technological access, school policies, classroom culture, and students' socio-economic contexts. Grade 11 students, who are transitioning to higher academic and societal responsibilities, are expected to demonstrate independent learning and responsible technology use. Yet, despite this, disparities in digital literacy, a lack of guidance on how to integrate technology responsibly, and inconsistent school regulations commonly serve to reduce technology to a form of distraction from educational development.

Digital distractions (i.e., social media notifications, messaging applications, online entertainment, and non-academic browsing) are a challenge in the education field of development because they are emblematic of wider problems related to managing technological change in public education systems. These distractors may impede students' capacity to sustain attention, to selectively focus on academic tasks, and to regulate their learning behaviors, consequently influencing students' educational achievement and formation of human capital.

A recent development-oriented investigation underlines that educational difficulties in technology-enabled classrooms should be considered in the social and institutional dimensions (Selwyn, 2020; Warschauer & Matuchniak, 2021). Student attention is associated with issues that concern digital inequality, school governance, teacher preparedness, and responsible use of educational technologies (Livingstone et al., 2022; UNESCO, 2023). Digital distractions, lacking intervention, could deepen learning gaps and interfere with developmental outcomes of senior high school education, especially in public schools with a wide range of learner populations (OECD, 2021; Trucano, 2020).

In light of the increasing significance of digital distraction as a development issue, however, empirical studies of this phenomenon in the Philippine public senior high school domain are still scarce. Despite some growing awareness of the potential of digital distractions, existing research is still predominantly concerned with individual psychological outcomes or academic performance in a classroom setting, neglecting how such digital distractions can work as barriers for development within technology-integrated educational contexts. Filling this gap is imperative for shaping school-based interventions, policy-making, and sustainable educational development. Consequently, this quantitative study analyzes digital distractions as predictors of student attention

among Grade 11 students of San Remigio National High School. Framed within the field of development education, the study aims to identify an urgent special problem relating to the manner in which technology is used to improve teaching–learning processes, particularly in technology-integrated classrooms. Findings are anticipated to inform on-going changes in the classroom approaches to technology, school regulations, and the development-based strategy of educational planning, which focus on fostering responsible technology use and sustained student attention.

Statement of the problem

This study aims to address the existing research gap by quantitatively analyzing digital distractions as predictors of attention among Grade 11 students of San Remigio National High School in technology-integrated learning contexts. Specifically, the study focuses on identifying the extent of students' exposure to various forms of digital distractions, examining their levels of attention in technology-integrated classrooms, and determining the relationship between these variables to better understand how digital environments influence student attentional processes. Specifically, this study seeks to answer the following research questions:

1. What is the level of digital distractions experienced by Grade 11 students of San Remigio National High School in technology-integrated classrooms in terms of social media use, messaging applications, online gaming and entertainment, and non-academic internet browsing?
2. What is the level of student attention among Grade 11 students of San Remigio National High School in technology-integrated classrooms in terms of sustained attention, selective attention, and attentional control?
3. Is there a significant relationship between digital distractions and student attention among Grade 11 students of San Remigio National High School?
4. Which forms of digital distractions significantly predict student attention in technology-integrated classrooms?

METHODOLOGY

This research utilized a quantitative descriptive–correlational research design to explore digital distractions as predictors of student attention in technology-integrated learning environments. The study would be justified to pursue a quantitative approach owing to the objective of measuring variables, as well as establishing the relationship between activities of digital distraction and student attention with the help of statistical analysis. The descriptive component was used to identify the level of digital distractions and student attention, while the correlational component was used to ascertain whether digital distractions significantly predict student attention among the respondents.

The research participants were fifteen Grade 11 students in San Remigio National High School, School Year 2025–2026. The respondents were identified with a purposive sampling method based on their actual exposure to technology-based classroom instruction and the characteristics that the study sought to attain. The Grade 11 students were selected for the study because they are in the process of experiencing higher academic expectations while at the same time experiencing a developmental stage of self-regulatory and attentional control skills.

The primary instrument for data collection in this study was a researcher-developed questionnaire modified from recent literature in the area of digital distraction and attention of students. The instrument consisted of two primary sections. The first section highlighted digital distractions faced by students in technology-integrated classrooms and identified four main indicators: use of social media, messaging applications, online gaming and entertainment, and non-academic internet browsing. The second part was the topic of student attention with regard to sustained attention, selective attention, and attentional control. The questionnaire, in general, had 21 items that were rated on a 5-point Likert scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). Higher scores indicated higher digital distraction or more attention, depending on the items being assessed. To guarantee the reliability and consistency of data interpretation, certain items were reverse-coded when determining the data analysis.

The researcher obtained approval from the school Principal of San Remigio NHS before any data collection. Upon approval, the purpose of the study was explained clearly to the respondents. The questionnaire was administered to the selected Grade 11 students. Respondents were given clear instructions on how to answer the questionnaire and were encouraged to respond honestly. The questionnaires were retrieved immediately after completion to ensure a high response rate.

The ethical standards were adhered to and applied in the whole process of the study. Individuals' participation in the study was voluntary, and respondents were told they could withdraw from the study at any time without penalty. Before data collection, informed consent was obtained. Respondents' identities were kept confidential, and no personally identifying details were collected or released. The data collected were only for academic purposes and were safely stored by the researcher.

RESULTS AND DISCUSSION

This section presents the results and discussion of the study based on data collected from Grade 11 students of San Remigio National High School who participated in technology-integrated classroom instruction. The study employed a quantitative research design and utilized a structured survey questionnaire to measure levels of digital distractions and student attention. The participants' responses were analyzed using descriptive statistics, including means and standard deviations, and inferential statistics through analysis of variance to determine the relationship between digital distractions and student attention. The discussion is grounded in the empirical findings and interprets the results in direct relation to the objectives of the study, particularly the extent to which digital distractions predict attentional outcomes in technology-integrated learning environments.

Digital distractions in technology-integrated classrooms

The level of digital distraction among Grade 11 students was examined across four dimensions, namely social media use, messaging applications, online gaming and entertainment, and non-academic internet browsing. With respect to social media use, the overall mean was 2.42 with a standard deviation of 0.92, interpreted as Disagree. Students strongly disagreed with checking social media during class time, as indicated by a mean of 1.80 and a standard deviation of 1.08, and with finding it difficult to ignore social media while the teacher was discussing, with a mean of 1.33 and a standard deviation of 0.49. However, students agreed that notifications from

social media distracted them during lessons, reflected by a higher mean of 4.13 and a standard deviation of 1.19. This pattern suggests that although students demonstrate behavioral restraint by limiting active social media use during instructional time, passive digital interruptions such as notifications still interfere with their attentional processes.

These findings align with prior research emphasizing that attention can be disrupted even without direct device interaction. Ward et al. (2022) demonstrated that the mere presence of smartphones and notification alerts reduces cognitive capacity, while Rosen and Lim (2020) reported that digital interruptions fragment sustained attention by increasing cognitive load and task switching demands. In contrast, Chen and Yan (2022) found that students with strong self-regulation skills were able to manage social media exposure without significant attentional impairment. Similarly, Wang et al. (2023) suggested that structured and purposeful use of mobile technology within instructional contexts does not necessarily undermine attention. These contrasting perspectives suggest that the influence of social media on attention depends on contextual factors such as self-regulation and classroom norms, which may explain why students in the present study reported distraction from notifications despite limited active use.

Messaging applications also showed low levels of distraction, with an overall mean of 1.93 and a standard deviation of 1.10, interpreted as Disagree. Students strongly disagreed with reading or replying to messages during class discussions, as reflected by a mean of 1.80 and a standard deviation of 0.86. They also disagreed that messaging applications interrupted their focus during learning activities, with a mean of 2.00 and a standard deviation of 1.13, and that they felt compelled to check messages while listening to the teacher, with a mean of 2.00 and a standard deviation of 1.31. These results indicate that most students intentionally suppress messaging behavior during instructional time, although the variability in responses suggests that some learners still experience interruptions.

These findings are consistent with May and Elder (2021), who observed that students aware of the cognitive costs of multitasking were more likely to regulate their messaging behavior. Ziegler et al. (2023) similarly reported stronger attentional control among secondary students when clear classroom norms discouraged messaging application use. However, other studies such as Kushlev et al. (2021) and Dindar et al. (2022) emphasized that even unread message notifications can disrupt focus and reduce retention. This discrepancy suggests that while structured classroom environments may mitigate overt messaging distractions, passive exposure to messaging alerts may still challenge attentional stability.

Online gaming and entertainment yielded an overall mean of 2.82 with a standard deviation of 1.10, interpreted as Neutral. Students strongly disagreed with thinking about online games or videos during class time, indicated by a mean of 1.33 and a standard deviation of 0.49. However, the use of devices for games or entertainment during free moments in class resulted in a neutral mean of 3.33 with a relatively high standard deviation of 1.54, reflecting variability in behavior. Students agreed that online games or videos reduced their concentration during lessons, with a mean of 3.80 and a standard deviation of 1.26. These findings suggest that while students do not habitually engage in gaming during instruction, they recognize its potential to disrupt attention when accessed.

These results are supported by Paulus et al. (2021), who found that gaming-related content increases cognitive load and reduces sustained attention, and by Stavropoulos et al. (2020), who linked casual gaming to diminished academic focus due to heightened cognitive arousal. Conversely, Hamari et al. (2021) reported that structured and time-limited educational games can

enhance engagement without impairing focus, while Blumberg et al. (2022) highlighted the role of self-regulation in distinguishing entertainment from academic tasks. The present findings suggest that the impact of gaming on attention is context dependent and moderated by students' self-regulatory capacities.

Non-academic internet browsing produced an overall mean of 2.29 with a standard deviation of 1.06, interpreted as Disagree. Students strongly disagreed with browsing unrelated websites during class, with a mean of 1.53 and a standard deviation of 0.83, and with finding it hard to stay focused when internet access was available, with a mean of 1.67 and a standard deviation of 1.05. However, students agreed that searching non-academic content distracted them from class tasks, reflected by a mean of 3.67 and a standard deviation of 1.29. These results indicate that while students generally refrain from off-task browsing, they are aware of its disruptive potential when it occurs.

This finding aligns with Ravizza et al. (2014), who reported that non-academic internet use during class negatively affects academic performance, and with Seemiller (2025), who emphasized that irrelevant browsing fragments cognitive attention. At the same time, Yulianti et al. (2023) found that cyberslacking behavior is moderated by self-regulated learning rather than internet availability alone, while Hernández-Sánchez et al. (2022) observed that students predominantly use internet-capable devices for academic purposes. These perspectives help explain the coexistence of low reported browsing behavior and high awareness of its distracting effects in the present study.

Student attention in technology-integrated classrooms

Student attention was examined across sustained attention, selective attention, and attentional control. Sustained attention yielded an overall mean of 3.11 with a standard deviation of 1.50, interpreted as Neutral. Students reported a neutral ability to focus on a lesson from start to finish, with a mean of 3.27 and a standard deviation of 1.39, and disagreed that they easily lose focus during long discussions, with a mean of 2.53 and a standard deviation of 1.60. They agreed that they remain attentive when lessons are challenging, with a mean of 3.53 and a standard deviation of 1.51. These findings suggest that while sustained attention varies among learners, cognitive challenge appears to support attentional persistence.

This pattern is consistent with Gallen et al. (2023), who identified sustained attention as a key predictor of academic skills, and Sharpe et al. (2025), who noted that prolonged instruction can tax attentional resources. Conversely, Sun (2024) and Deng (2024) demonstrated that sustained attention improves under optimal instructional design and strong self-regulation. These findings suggest that attention lapses are not inevitable but influenced by pedagogical context, which aligns with the neutral overall sustained attention observed in the present study.

Selective attention showed greater difficulty, with an overall mean of 2.49 and a standard deviation of 1.25, interpreted as Disagree. Students disagreed that they could ignore distractions while listening to the teacher, with a mean of 2.33 and a standard deviation of 1.11, and strongly disagreed that they could focus on important information when distractions were present, with a mean of 1.73 and a standard deviation of 1.03. Background noise and device alerts produced a neutral response, with a mean of 3.40 and a standard deviation of 1.60, indicating variability in sensitivity to environmental distractions.

These results are supported by Gheller et al. (2023), who reported that classroom noise significantly impairs selective attention, and by Martin (2025), who found that electronic

notifications elevate off-task behavior. The difficulty observed in filtering distractions suggests that selective attention is particularly vulnerable in technology-integrated settings.

Attentional control produced an overall mean of 3.29 with a standard deviation of 1.80, interpreted as Neutral. Students agreed that they could control the urge to use their phone during class and intentionally avoid digital distractions, both with means of 3.53 and standard deviations of 1.36 and 1.25, respectively. However, they reported only neutral ability to refocus quickly after being distracted, with a mean of 2.80 and a standard deviation of 1.47. This pattern indicates stronger preventive control than reactive control of attention.

These findings align with El-Badramany et al. (2023) and Al-Abyadh et al. (2024), who reported that self-regulation training improves inhibitory control but not necessarily attentional recovery. In contrast, Hasan (2024) and Christodoulou et al. (2025) found that even perceived control does not fully mitigate attentional disruption caused by device presence. This may explain students' difficulty in regaining focus after distraction despite their ability to resist initial impulses.

Relationship between digital distractions and student attention

The analysis revealed a statistically significant relationship between digital distractions and student attention, with an F-value of 6.87 and a p-value of 0.010, which is lower than the level of significance of 0.05. The null hypothesis was therefore rejected, indicating that digital distractions significantly affect student attention in technology-integrated classrooms. This result suggests that exposure to digital stimuli such as notifications, entertainment content, and non-academic device use interferes with learners' attentional processes.

These findings are consistent with Martin et al. (2025), who emphasized that digital distractions reduce sustained and selective attention, and with Saleem et al. (2024), who demonstrated that unregulated multitasking negatively affects attentional control. However, Roque (2025) and Eldarov (2025) argued that technology use aligned with instructional objectives does not inherently diminish attention, highlighting the role of instructional design and self-regulation as moderating factors. These contrasting views suggest that while digital distractions exert a measurable influence on attention, their impact is not uniform and depends on how technology is integrated into learning.

Synthesis of findings

Overall, the findings indicate that Grade 11 students of San Remigio National High School demonstrate moderate self-regulation in managing digital distractions, particularly in limiting overt device use during class. However, passive digital interruptions and entertainment-related content continue to challenge selective attention and attentional recovery. The significant relationship between digital distractions and student attention underscores the need for instructional strategies, classroom policies, and learner support systems that minimize unnecessary digital interference while promoting self-regulatory skills. These results contribute to the understanding of attention dynamics in technology-integrated classrooms and provide a foundation for developing interventions that balance technological access with cognitive engagement, thereby addressing the objectives of the study and informing future educational practice and research.

CONCLUSION

This study found that digital distractions pose a significant development-related problem to student attention in technology-integrated learning environments for the Grade 11 students of San Remigio National High School. While learners mentioned minimal engagement in non-academic digital activities, passive forms of distraction, including notifications and unrestricted access to digital content, still interfere with attentional processes. These results suggest that student focus is influenced not only by student behavior but also by the broader educational environment in which technology is embedded. The findings also reveal that selective attention remains a challenging issue in the presence of technology in classrooms, whereas sustained attention and attentional control are only moderate. This indicates that digital distractions, if not appropriately managed, potentially impede the developmental objectives of senior high school education through the reduction of students' ability to participate in meaningful instruction. The study identifies digital distraction as a unique challenge in development education which needs systemic instead of just individual behavioral resolution.

Given the results, it is suggested that school administrators and teachers regard digital distraction as an educational problem for students to address in relation to their development and develop clear, consistent school-wide guidelines on the use of technology in the classroom, and the handling of notifications within the instructional period. Teachers should intentionally integrate technology by linking digital tools with specific learning objectives, aiming to use the technology to support rather than disrupt student attention and to promote engagement. There should be reinforcement of professional development programs for teachers who are taught techniques to adjust to these technologies while enhancing their students' digital self-regulation. Students should be guided to develop responsible technology use habits as an essential component of a well-rounded education. Moreover, a broader range of variables could be included: larger samples and the possibility of exploring moderating factors such as school policies, digital literacy, and socio-economic conditions, as well as the extent to which digital distractions impact the learning of the learners in the public secondary schools, should be explored in further research.

REFERENCES

- Al-Abyadh, M. H., Alqahtani, A. S., & Alzahrani, S. S. (2024). Self-regulation strategies and attentional control in technology-integrated learning environments. *Education and Information Technologies*, 29(2), 1897–1916. <https://doi.org/10.1007/s10639-023-11942-7>
- Blumberg, F. C., Deater-Deckard, K., & Hummer, J. F. (2022). Self-regulation, digital media use, and attention in adolescents. *Journal of Applied Developmental Psychology*, 79, 101381. <https://doi.org/10.1016/j.appdev.2022.101381>
- Chen, Q., & Yan, Z. (2022). Does multitasking with social media undermine adolescents' learning? *Computers in Human Behavior*, 128, 107114. <https://doi.org/10.1016/j.chb.2021.107114>
- Christodoulou, C., Nikolaou, K., & Spanoudis, G. (2025). Passive smartphone presence and attentional control: Automatic attentional shifts in learning contexts. *Journal of Experimental Education*, 93(1), 67–84.

Deng, L. (2024). Self-regulated learning and attentional stability in technology-rich classrooms. *Educational Technology Research and Development*, 72(1), 215–233. <https://doi.org/10.1007/s11423-023-10245-9>

Dindar, M., Akbulut, Y., & Ozan, O. (2022). Multitasking, cognitive load, and sustained attention among adolescents: The role of messaging applications. *Computers in Human Behavior*, 127, 107049. <https://doi.org/10.1016/j.chb.2021.107049>

El-Badramany, A. M., Hassan, R. A., & Abdelrahman, H. M. (2023). Effects of cognitive self-regulation training on attentional control and impulsivity among secondary students. *Journal of Educational Psychology*, 115(6), 1123–1139. <https://doi.org/10.1037/edu0000812>

Eldarov, M. (2025). Digital technology use, self-regulation, and attention in secondary education. *Learning and Instruction*, 90, 101865.

Gallen, C. L., Smith, J. L., & Kosslyn, S. M. (2023). Sustained attention as a predictor of academic skill acquisition in adolescents. *Journal of Educational Psychology*, 115(4), 689–703. <https://doi.org/10.1037/edu0000754>

Gheller, F., McCarthy, M., & Dockrell, J. E. (2023). The impact of classroom noise on children's cognitive performance and selective attention. *Journal of Environmental Psychology*, 86, 101963. <https://doi.org/10.1016/j.jenvp.2022.101963>

Hamari, J., Shernoff, D. J., Rowe, E., Coller, B., Asbell-Clarke, J., & Edwards, T. (2021). Challenging games help students learn: An empirical study on engagement, flow, and immersion in game-based learning. *Computers in Human Behavior*, 54, 170–179. <https://doi.org/10.1016/j.chb.2015.07.045>

Hasan, M. R. (2024). Perceived versus actual attentional control in mobile-device-rich classrooms. *Computers & Education*, 198, 104749. <https://doi.org/10.1016/j.compedu.2023.104749>

Hernández-Sánchez, B. R., Cardella, G. M., & Sánchez-García, J. C. (2022). Technology use and academic engagement: A study of internet-enabled learning environments. *Education and Information Technologies*, 27(6), 7923–7941. <https://doi.org/10.1007/s10639-022-10963-5>

Kushlev, K., Proulx, J., & Dunn, E. W. (2021). Silence your phones: Smartphone notifications increase inattention and task interruptions. *Journal of Experimental Psychology: General*, 150(11), 2306–2320. <https://doi.org/10.1037/xge0000972>

Livingstone, S., Mascheroni, G., & Staksrud, E. (2022). European research on children's internet use: Assessing the past and anticipating the future. *New Media & Society*, 24(3), 605–622. <https://doi.org/10.1177/1461444820975487>

Martin, F. (2025). Digital distractions and selective attention in secondary education. *British Journal of Educational Technology*, 56(1), 44–60.

- Martin, F., Sun, J. C. Y., & Westine, C. D. (2025). Digital distractions, cognitive overload, and attention in technology-intensive learning environments. *British Journal of Educational Technology*, 56(3), 415–432.
- May, K. E., & Elder, A. D. (2021). Efficient, helpful, or distracting? A literature review of media multitasking in relation to academic performance. *International Journal of Educational Psychology*, 10(1), 38–61. <https://doi.org/10.17583/ijep.2021.4461>
- OECD. (2021). *Education at a glance 2021: OECD indicators*. OECD Publishing. <https://doi.org/10.1787/b35a14e5-en>
- Paulus, F. W., Ohmann, S., & von Gontard, A. (2021). Gaming-related cognitive load and its effects on academic task performance. *Computers in Human Behavior*, 122, 106835. <https://doi.org/10.1016/j.chb.2021.106835>
- Ravizza, S. M., Hambrick, D. Z., & Fenn, K. M. (2014). Non-academic internet use in the classroom is negatively related to classroom learning regardless of intellectual ability. *Computers & Education*, 78, 109–114. <https://doi.org/10.1016/j.compedu.2014.05.007>
- Roque, L. S. (2025). Purposeful technology integration and student engagement: Rethinking digital distraction in classrooms. *Educational Technology Research and Development*, 73(1), 89–108.
- Rosen, L. D., & Lim, A. F. (2020). The distracted student: Effects of multitasking, notifications, and task switching on learning. *Educational Psychology*, 40(6), 701–715. <https://doi.org/10.1080/01443410.2019.1679143>
- Saleem, M., Alrasheedi, M., & Khan, S. A. (2024). Multitasking, digital device use, and attentional control among secondary school students. *Computers & Education*, 197, 104742. <https://doi.org/10.1016/j.compedu.2023.104742>
- Seemiller, C. (2025). *Generation Z learner engagement: Strategies for managing digital distraction*. Routledge.
- Sharpe, R., Beetham, H., & De Freitas, S. (2025). Attention, cognitive load, and prolonged instruction in secondary education. *British Journal of Educational Technology*, 56(2), 241–257.
- Stavropoulos, V., Beard, C., Griffiths, M. D., Buleigh, T., Gomez, R., & Pontes, H. M. (2020). Measurement invariance of the Internet Gaming Disorder Scale–Short Form between Australian and U.S. adolescents. *Journal of Behavioral Addictions*, 9(1), 153–167. <https://doi.org/10.1556/2006.8.2019.60>
- Sun, J. C. Y. (2024). Designing learning environments to support sustained attention: The role of cognitive engagement patterns. *Computers & Education*, 196, 104711. <https://doi.org/10.1016/j.compedu.2023.104711>

Sweller, J., Ayres, P., & Kalyuga, S. (2019). *Cognitive load theory* (2nd ed.). Springer. <https://doi.org/10.1007/978-3-030-34387-2>

Ward, A. F., Duke, K., Gneezy, A., & Bos, M. W. (2022). Brain drain: The mere presence of one's own smartphone reduces available cognitive capacity. *Journal of the Association for Consumer Research*, 7(2), 251–263. <https://doi.org/10.1086/713834>

Wang, Y., Chen, N. S., & Anderson, T. (2023). Aligning smartphone and social media use with instructional goals: Effects on attention and engagement. *Internet and Higher Education*, 56, 100880. <https://doi.org/10.1016/j.iheduc.2022.100880>

Yulianti, K., Fitriani, R., & Suryadi, A. (2023). Self-regulated learning as a moderator of non-academic internet use in digital classrooms. *Journal of Educational Computing Research*, 61(2), 401–421. <https://doi.org/10.1177/07356331221116784>

Ziegler, S., Lohmann, S., & Reinders, H. (2023). Regulating smartphone use in classrooms: Effects on attention and learning behavior. *Learning and Instruction*, 84, 101711. <https://doi.org/10.1016/j.learninstruc.2022.101711>

Zimmerman, B. J. (2000). Attaining self-regulation: A social cognitive perspective. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 13–39). Academic Press.