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Research Article

Cognitive and Social Effects of a Two-Week Digital Detox on Filipino Adolescents: A Quasi-Experimental Study

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ABSTRACT

The increasing integration of digital technologies into adolescent life has reshaped cognitive and social behavior, often leading to heightened anxiety, reduced attention spans, and excessive screen dependence. Filipino youth face unique challenges due to high digital engagement rates and cultural factors emphasizing constant connectivity. This quasi-experimental study investigated the cognitive effects of a two-week digital detox intervention among Grade 12 Senior High School students in a private university in the City of Manila. Using standardized assessments, pretest-posttest comparisons were conducted across three domains: attention, memory, and problem-solving capacity. Findings revealed statistically significant improvements in attention ($t(79) = 2.03$, $p = 0.046$, $d = 0.23$) and memory ($t(79) = 3.16$, $p = 0.002$, $d = 0.36$), though problem-solving showed no significant post-detox gains ($t(79) = 1.78$, $p = 0.079$). These results suggest that brief digital detox periods enhance self-regulatory processes such as focus and cognitive planning, particularly in high-usage individuals. Pearson correlation indicated a moderate positive association between pre-detox digital use intensity and post-intervention attentional improvements ($r = 0.32$, $p = 0.004$), indicating increased intervention responsiveness among digital-heavy users. However, the lack of significant correlations in memory and problem-solving domains suggests a need for longer, more structured interventions to yield measurable improvements in executive functioning. The study demonstrates the potential of structured digital detox routines as a viable cognitive wellness tool in high school settings. Future research should explore extended program durations and integrate psychosocial supports to maximize benefits and ensure sustained academic and social functioning improvements.

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Introduction

The development of digital technologies has caused significant changes in adolescents' interactions and developmental trajectories worldwide. According to UNC-Chapel Hill (2023), constant checking of social media has been shown to trigger changes in the development of the adolescent brain, causing increased sensitivity to peer feedback and the formation of compulsive usage patterns, often leading to dependence.

Worldwide, Youth (2023) indicated that 90% of teens have ever used social media, and 75% have at least one active profile. YouTube, TikTok, and Instagram illustrate how digital media are embedded in aspects of adolescents' social lives. This can be supported by worldwide statistics showcasing smartphone usage and the prevalence of addiction-related behaviors (Kumar, 2024; Moller, 2024; Revankar, 2024). Additionally, Dworkin (2021) reports that around 95% of all teenagers have a smartphone, and almost 45% report being online "almost constantly." Moreover, during the COVID-19 pandemic, the screen time of all adolescents increased drastically, with a direct correlation between increased exposure to digital media and increased risks of anxiety and depression. A literature review conducted by Draženović et al. (2023) synthesizes numerous global studies revealing a consistent link between increased screen time and worsening mental health in adolescents. Their findings indicate that prolonged digital media use exacerbates feelings of loneliness and anxiety, contributes to poorer sleep quality, and heightens stress susceptibility.

Consequently, in the Philippines, there is a tendency toward increasing concerns among youth, heightened by the cultural and socio-economic peculiarities of the region. According to a study conducted by the University of the Philippines Population Institute (2022), from 2013 to 2021, the percentage of depressive symptoms and suicide ideation among Filipino youth doubled. In 2021, 7.5% of Filipino youth reported suicide attempts, considerably more than a few years ago. These mental health problems are highly related to digital behavior. As per Balita (2024), data indicates a wide gap between generations in internet use, with 86% of young adults active internet users and only 14% of aged adults (55 years and above). According to Labana et al. (2020), Filipino teenagers spend approximately 9 hours daily on the Internet, placing them at the top of global rankings for online time. They are engaged in social media, computer games, and other internet activities, which is suggested as one of the main reasons for the mental health crisis among youth in the Philippines.

Significantly, the relationship between digital media use and adolescent mental health has been extensively studied, with mixed results. As shown by Marciano et al. (2022), excessive use of digital media can lead to poor sleep quality, reduced physical activity, and increased feelings of loneliness and anxiety. At the same time, digital media are a critical social resource, especially during the coronavirus pandemic and the limits imposed on physical socialization. The study by Kindred and Bates (2023) conducted during the pandemic has shown that digital social networks have succeeded. However, adolescents are more stressed and anxious because of information overload and the ever-present pressures to remain online. Digital media now deliver social feedback in unpredictable ways and at high frequency, which makes them very potent reinforcers of behavior. Moreover, they motivate users to return to devices with powerful intermittent rewards. A combination of factors makes the overuse of digital media habit-forming at best and addictive at worst,

which can seriously affect mental health (Pandya & Pragya Lodha, 2021).

Local research has been rapidly expanding its focus from harmful effects on individual brain systems to include processes relating to social relations among students and between teachers and their pupils. It highlights an emerging mental health crisis that needs timely data to measure and respond effectively. More recent work has suggested that impulsive task-switching due to frequent multitasking on digital platforms can interfere with cognitive control and make it harder to sustain attention on individual tasks, negatively impacting exam performance (Cardoso-Leite et al., 2021). Furthermore, contemporary neuroscience research has demonstrated changes within brain areas associated with emotional regulation for those frequently engaging in digital media interactions (Korte, 2020). This can worsen mood disorders and anxiety, especially for students who depend on social media for socialization. Moreover, Lee and Cheng (2023) found an increased absence from face-to-face interaction on digital platforms, which is estimated to be poorer than social behavior. This is especially alarming because it directly connects digital media use to diminishing basic social skills crucial for normal development.

Although considerable global and local research has been undertaken regarding the effect of digital media on adolescent mental and social health, there is a notable gap in the literature examining how digital detox periods away from digital technology access may affect adolescent mental and social health. Most studies emphasize the negative consequences of high and uncontrolled exposure to digital media, but very few systematically analyze the possible positive aspects of structured distancing from it. Hence, this study seeks to fill this gap by investigating the effects of such detox periods on cognition and interpersonal relationships among DLSU Manila SHS high school students. This paper aims to assess whether and in what ways short-term digital disconnection can alleviate the adverse psychological effects of chronic digital media use, thus offering a potentially feasible actionable tool for educators and parents alike in developing better habits or practices related to new technologies that may confer eventual benefits for student mental health within an evolving digital ecosystem.

Research Objective

The general objective of the present study is to explore the effects of a two-week digital detox on cognitive functions and interpersonal relationship patterns in Senior High School students at De La Salle University Manila.

Specifically, the study aims to attain the following objectives:

1. To determine the level of digital detox, basic cognitive functions, and social interaction patterns in DLSU SHS students before the institution of a digital detox period.
2. To determine changes in cognitive abilities, such as attention, memory, and problem-solving capabilities, immediately after two weeks of digital detox.
3. To propose an approach to implementing systematic digital detox measures that could be used in education to enhance cognitive function and social interaction.
4. To determine if digital detox is a determinant of their level of basic cognitive functions and level of social interaction patterns

Conceptual Framework

This study investigates the effects of a digital detox on brain development and social interaction among senior high school students (Figure 1). Digital detox is characterized by students voluntarily refraining from using digital devices, including smartphones, tablets, and computers, for a specified period. The two domains (brain development and social interaction) are considered dependent variables, while digital detox serves as the independent variable. For brain development,

particular attention is paid to basic cognitive functions, specifically examining attention, memory, and problem-solving capabilities. These changes are measured before and after the designated detox period. Attention is measured by how well students focus on tasks without distractions from digital devices. Memory is assessed through retention and recall abilities. Problem-solving capabilities are evaluated through critical thinking and decision-making skills. Previous research by Deshbhratar (2017) found significant improvements in attention and cognitive function following digital detox interventions, with increased reaction times on the ANT post-detox suggesting enhanced cognitive efficiency.

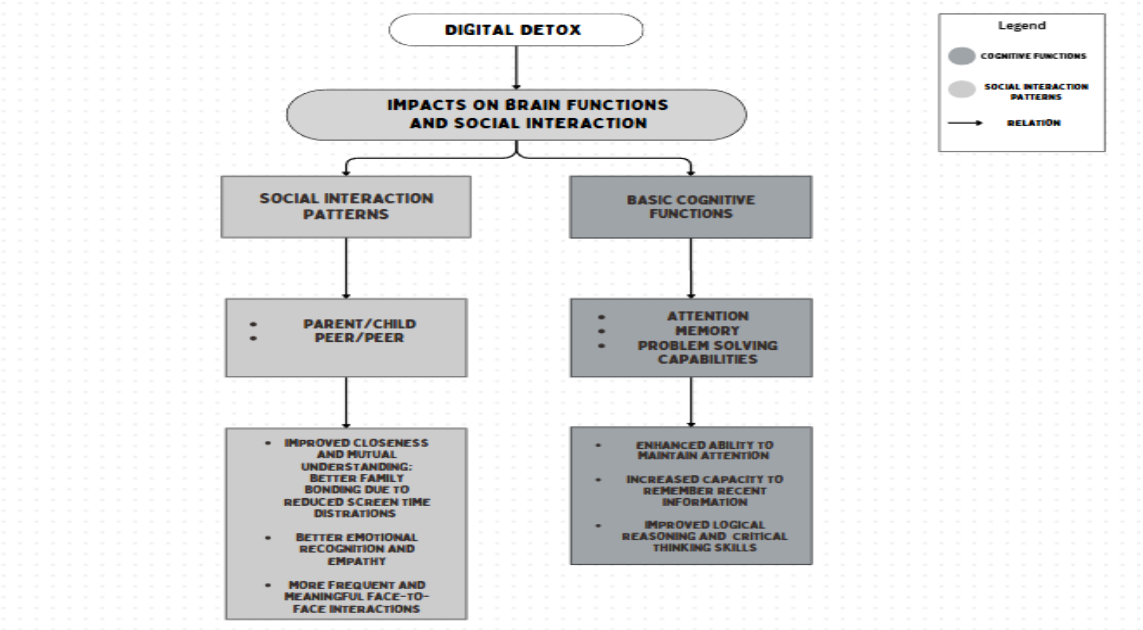

Figure 1. Conceptual Schema

Methods

Research Design

This research utilized a quasi-experimental design to explore the impact of digital detox on adolescent cognitive functions and social interactions. This design was ideal for educational and behavioral studies in which random assignment could not occur. This method enabled the exploration of cause and effect by studying the effects of introduced factors (the independent variables) on observables (the dependent variables). This study's independent variable was participation in a two-week digital detox program, with limited use of electronic devices (especially portable ones). The dependent variables were cognitive functions and social interaction patterns.

The study employed a pre-test/post-test design, which allowed for comparisons of measurements before and after the intervention within one group of participants. This enabled identified changes to be more confidently attributed to the digital detox program.

Population and Sampling Method

All respondents in the study were Grade 12 De La Salle University Senior High School students. This demographic was selected because senior high school students are at a critical stage of cognitive and social development, making them an ideal group for determining the impact of digital behaviors on these areas. Their frequent use of digital devices for academic and social purposes made

them particularly relevant to a study examining the effects of a digital detox.

Additionally, the controlled academic setting allowed better regulation of variables, enhancing the reliability of pre-test and post-test data. The university's academic environment allowed for better variable management, ensuring implementation consistency and reducing external confounding factors. Participants were selected using convenience sampling, with 80 students participating.

Data Collection Instruments

In this research, the methodological framework combined qualitative methods alongside quantitative instruments to examine the influence of digital detox on cognitive processing. The research design included a pre-test and post-test using customized survey instruments and cognitive assessments.

The researchers employed several standardized and adapted assessments to assess the effects of digital detox on adolescents in both cognitive and social contexts:

1. Attentional Function Index (AFI): This index was developed by Cimprich (1992) and modified to include attention regulation in daily activities. Participants rated their attentional capabilities on a 5-point Likert scale from "Not at all" (1) to "Extremely well" (5), with higher scores indicating greater attentional deficit.
2. Prospective-Retrospective Memory Questionnaire (PRMQ): Developed by Smith et al. (2000), this assessed memory performance, particularly regarding the frequency of forgetting in everyday life. It consists of items about prospective remembering (future tasks) and retrospective remembering (memories), rating the frequency from "Never" (1) to "Very often" (5) on a 5-point Likert scale, with higher scores indicating greater memory deficit.
3. Problem-Solving Inventory (PSI): Developed by Heppner and Peterson in 1982, this measure assessed how participants perceived their problem-solving behaviors. The instrument's sections deal with confidence in problem-solving, approach-avoidance style, and personal control, rated using a 5-point Likert scale, with higher scores indicating greater problem-solving deficit.
4. Digital Detox Self-Regulation Survey: Created by the researchers following Sehic (2024), this was administered pre- and post-intervention to record digital usage habits, emotional responses to detox, and perceived behavioral changes. This instrument captured device ownership, frequency of usage, purpose, and psychological or physical symptoms experienced due to overusing devices.

All instruments were content validated and reliability tested through piloting with a portion of the target population. Based on feedback, improvements were made to enhance clarity and applicability to the Filipino adolescent context.

Data Collection Procedure

Data was collected using two primary methods: survey questionnaires and cognitive tests. The survey questionnaires gathered information on participants' social interaction patterns and screen time habits, evaluating changes in daily screen time, frequency of social media usage, and perceived dependence on digital communication.

Cognitive tests assessed memory, attention, and reasoning skills, focusing on participants' cognitive abilities before and after the digital detox intervention. An open-ended question was also included to gather qualitative insights into participants' experiences and perceptions of digital detox.

Data collection occurred in two phases:

1. Pre-test at study initiation to establish baseline cognitive function and social interaction levels
2. Post-test at the end of the two-week detox period

Digital Detox Intervention

The digital detox intervention was implemented over two weeks. Participants were instructed to abstain from using digital devices (smartphones, tablets, computers) on weekdays during specified hours (10:00 PM - 1:00 AM). They were given a digital usage log to record adherence and challenges. Participants received daily reminders about the detox schedule. During detox, they were encouraged to engage in alternative activities such as reading physical books, journaling, or face-to-face interactions.

Data Analysis

Data were analyzed using IBM SPSS Statistics version 26.0. Prior to analysis, data were screened for normality using Shapiro-Wilk tests and visual inspection of histograms. All variables were normally distributed ($p > .05$), justifying the use of parametric tests.

Descriptive statistics (frequencies, percentages, means, and standard deviations) were computed to examine the pre- and post-intervention performance across the three primary cognitive domains: attention, memory, and problem-solving. Paired-samples t-tests were used to determine whether observed differences in mean scores between the pre-test and post-test phases were statistically significant.

Effect sizes were calculated using Cohen's d, with values of 0.2, 0.5, and 0.8 representing small, medium, and large effects, respectively. The Pearson correlation coefficients assessed relationships between pre-intervention digital usage intensity and post-intervention cognitive improvements. For all analyses, alpha was set at .05.

Qualitative responses to the open-ended question were analyzed using thematic content analysis to identify common themes and provide additional context to the quantitative findings.

Ethical Considerations

Informed consent was obtained from all participants, with additional parental consent for minors. Participants were informed of their right to withdraw at any time without consequences. All data were anonymized and handled confidentially. The digital detox protocol was designed to be minimally disruptive to academic requirements, and participants were provided with emergency contact options if legitimate academic needs arose during detox hours.

Results

Demographic Characteristics

A total of 80 Grade 12 students participated in the study. The sample comprised 46 females (57.5%) and 34 males (42.5%), with ages ranging from 17 to 19 years ($M = 17.8$, $SD = 0.72$). All participants owned at least one digital device, with smartphones being the most common (100%), followed by laptops (92.5%) and tablets (67.5%). On average, participants reported 7.3 hours ($SD = 2.4$) of daily screen time before the intervention.

Pre-test Baseline Measures

Cognitive Function Baseline

Table 1 presents descriptive statistics for baseline cognitive measures. At pre-test, participants demonstrated moderate levels of function across all three cognitive domains, with mean scores of 3.52 ($SD = 0.68$) for Attention Function, 3.15 ($SD = 0.59$) for Memory Ability, and 3.20 ($SD = 0.54$) for Problem-Solving Capacity

Table 1. Descriptive Statistics for Pre-test Cognitive Measures

Cognitive Domain	Mean	SD	Min	Max	Interpretation
Attention Function	3.52	0.68	2.08	4.81	Moderate Deficit
Memory Ability	3.15	0.59	2.08	4.26	Moderate Deficit
Problem-Solving Capacity	3.20	0.54	2.33	4.01	Moderate Deficit

Note: Scores based on standardized scales, where higher scores indicate greater deficits in cognitive function. Scale interpretation: 1.00-2.33 = Low deficit (better function); 2.34-3.67 = Moderate deficit; 3.68-5.00 = High deficit (poorer function).

Digital Usage Patterns

Pre-intervention assessment of digital usage patterns revealed that social media consumption was the most common digital activity (M = 3.85 hours/day, SD = 1.72), followed by academic work (M = 2.64 hours/day, SD = 1.15) and entertainment (M = 2.31 hours/day, SD = 1.26). Most participants (78.75%, n = 63) reported checking their phones within five minutes of waking up, and 81.25% (n = 65) reported using their phones immediately before sleeping.

Post-test Outcomes and Significant Differences

Changes in Cognitive Function

Table 2 presents the comparative analysis of pre-test and post-test cognitive function scores. Paired samples t-tests revealed statistically significant improvements in Attention Function ($t(79) = 2.03$, $p = 0.046$) and Memory Ability ($t(79) = 3.16$, $p = 0.002$). The effect sizes were small for Attention ($d = 0.23$) and small-to-moderate for Memory ($d = 0.36$). No significant change was observed in Problem-Solving Capacity ($t(79) = 1.78$, $p = 0.079$).

Table 2. Paired Samples t-test Results for Cognitive Functions Pre and Post-Digital Detox

Cognitive Domain	Pre-Test, Mean (SD)	Post-Test, Mean (SD)	Mean Difference	t-value	df	p-value	Cohen's d	Interpretation
Attention Function	3.52 (0.68)	3.43 (0.62)	0.09	2.03	79	0.046*	0.23	Significant improvement (small effect)
Memory Ability	3.15 (0.59)	2.90 (0.54)	0.25	3.16	79	0.002**	0.36	Significant improvement (small-to-moderate effect)
Problem-Solving Capacity	3.20 (0.54)	3.11 (0.48)	0.09	1.78	79	0.079	0.20	No significant change

Note: * $p < .05$, ** $p < .01$. Lower post-test scores indicate improvement in cognitive function as scales measure deficit levels

Item-Level Analysis

Further analysis of individual items revealed the most substantial improvements in specific cognitive components. For Attention Function, the greatest improvements were observed in "Keeping your mind on what others are saying" (pre M = 3.70, post M = 4.04, difference = 0.34) and "Keeping yourself from saying or doing things you did not want to say or do" (pre M = 3.77, post M = 4.12, difference = 0.35), both significant at $p < .05$.

For Memory Ability, the most notable improvements were in "Do you forget appointments if you are not prompted by someone else or by a reminder?" (pre M = 3.01, post M = 2.51, difference = 0.50) and "Do you forget to tell someone something you had meant to mention a few minutes ago?" (pre M = 3.26, post M = 2.61, difference = 0.65), both significant at $p < .01$.

Relationship Between Digital Usage and Cognitive Improvement

To address the fourth research objective regarding whether digital detox is a determinant of cognitive function, we examined correlations between pre-intervention digital usage intensity and post-intervention cognitive improvements (Table 3).

Table 3. Correlation Between Pre-Detox Device Usage Intensity and Cognitive Function Improvement

Cognitive Domain	Pearson r	p-value	Interpretation
Attention Function	0.32	0.004**	Moderate positive correlation (significant)
Memory Ability	0.18	0.107	Weak positive correlation (not significant)
Problem-Solving Capacity	0.15	0.186	Weak positive correlation (not significant)

Note: ** $p < .01$. Improvement scores calculated as (Pre-test score - Post-test score), with positive values indicating greater improvement

A significant moderate positive correlation was found between pre-intervention digital usage intensity and improvements in Attention Function ($r = 0.32$, $p = 0.004$). This suggests that participants with higher baseline digital device usage tended to experience greater attentional improvements following the detox intervention. However, the correlations between pre-intervention usage and improvements in Memory Ability ($r = 0.18$, $p = 0.107$) and Problem-Solving Capacity ($r = 0.15$, $p = 0.186$) were not statistically significant.

Digital Detox Implementation and Adherence

Adherence Levels

Figure 2 illustrates participants' adherence to the digital detox program. The majority (51.25%, n = 41) reported "mostly following" the detox schedule, while 33.75% (n = 27) reported full adherence. Only 5.00% (n = 4) reported being "unable to follow" the program completely.

When examining adherence frequency (Table 4), 47.50% (n = 38) of participants reported following the detox schedule on "most days," 21.25% (n = 17) on "some days," and 18.75% (n = 15) on "every day," with only 3.75% (n = 3) each reporting "rarely" or "never" following the schedule.

Implementation Challenges

The most reported challenges to adherence (Table 5) were academic access requirements (72.50%, n = 58), family obligations (56.25%, n = 45), and difficulty breaking habits (48.75%, n = 39). Only 17.50% (n = 14) of participants reported time tracking challenges.

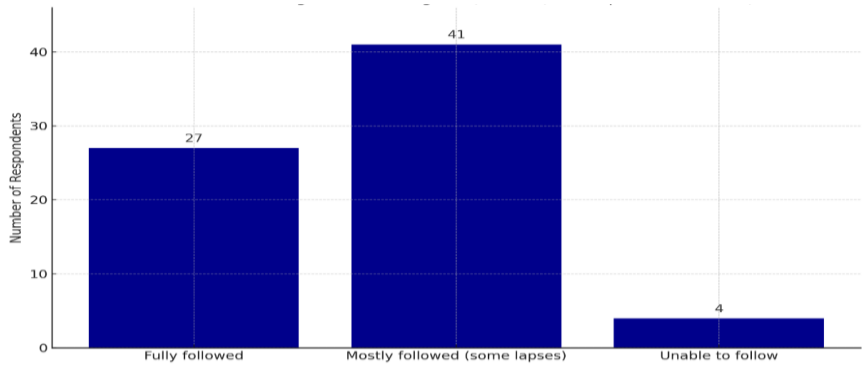

Figure 2. Adherence To Digital Detox Program (Mon–Fri, 10:00 P.M. – 1:00 A.M.)

Table 4. Adherence to Schedule (n=76)

Adherence Frequency	Frequency	Percentage (%)
Every day	15	18.75%
Most days	38	47.50%
Some days	17	21.25%
Rarely	3	3.75%
Never	3	3.75%
Total	76	95.00%

Note: The total accounts for 76 out of 80 participants (95%). Four of the participants did not answer the item

Table 5. Challenges Faced During Digital Detox Implementation (n=80)

Challenge	Frequency	Percentage (%)
Academic Access Requirements	58	72.50
Family Obligations	45	56.25
Difficulty Breaking Habits	39	48.75
Lost Track of Time	14	17.50
Total*	156 (multiple responses)	

*Note: *Multiple responses*

Self-Reported Changes and Future Intentions

Regarding self-reported changes in focus and attention span after the digital detox (Figure 3), 46.25% (n = 37) of participants reported experiencing a "slight improvement," followed by 40.00% (n = 32) reporting a "significant improvement." Only 8.75% (n = 7) reported "no change."

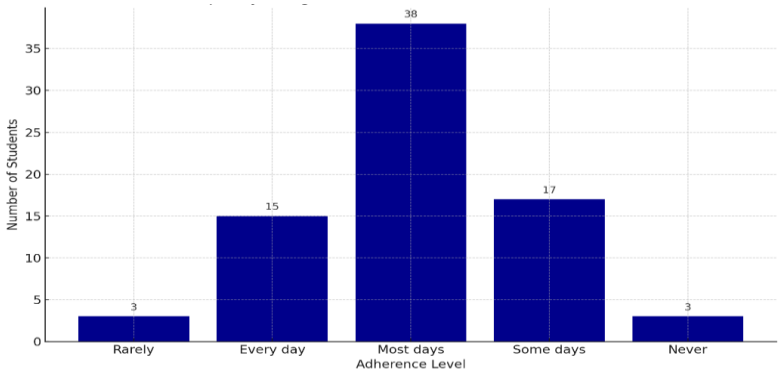

Figure 3. Frequency Of Digital Detox Adherence (10:00 PM – 1:00 AM)

Importantly, 86.25% (n = 69) of participants expressed willingness to continue practicing digital detox routines in the future (Table 5), suggesting the intervention's high acceptability.

Table 5. Self-Reported Cognitive Changes After Digital Detox (n=80)

Change Level	Frequency	Percentage (%)
Significant Improvement	32	40.00
Slight Improvement	37	46.25
No Change	7	8.75
Slight Decline	3	3.75
Significant Decline	1	1.25

Discussion

This study explored the effects of a structured two-week digital detox on cognitive functions among Filipino Senior High School students. Our findings provide empirical support for the cognitive benefits of reducing digital device usage, particularly in the domains of attention and memory.

Effects on Attention Function

The significant improvement in Attention Function scores ($p = 0.046$, $d = 0.23$) suggests that even a brief period of reduced digital exposure can enhance attentional control. This aligns with previous research by Cardoso-Leite et al. (2021), which found that decreasing digital multitasking improves sustained attention. The modest effect size indicates that while meaningful, these attentional gains represent an initial step rather than a transformative change.

The positive correlation between baseline digital usage and attentional improvement ($r = 0.32$, $p = 0.004$) is particularly noteworthy, suggesting that heavier digital users may benefit more substantially from detox interventions. This finding supports the notion that those with higher digital dependency may experience greater cognitive recalibration when digital input is reduced, as suggested by Shanmugasundaram and Tamilarasu (2023).

The greatest improvements in specific attentional components were observed in social listening ("Keeping your mind on what others are saying") and self-regulation ("Keeping yourself from saying or doing things you did not want to say or do"). This suggests digital detox may enhance social-attentional processes crucial for classroom learning and peer interactions.

Effects on Memory Ability

The intervention's impact on Memory Ability was the most pronounced effect observed ($p = 0.002$, $d = 0.36$). This improvement likely reflects enhanced cognitive consolidation processes during reduced digital stimulation. Wang et al. (2022) similarly found that minimizing digital distractions improves working memory and information retention.

The lack of significant correlation between baseline usage and memory improvement suggests that memory benefits may be generally accessible regardless of prior digital habits. The most substantial improvements were observed in prospective memory components (remembering appointments and planned communications). This suggests that digital detox may enhance future-oriented memory functions critical for academic planning and organization.

Effects on Problem-Solving Capacity

The absence of significant change in Problem-Solving Capacity ($p = 0.079$) aligns with Coyne and Woodruff's (2023) observation that higher-order executive functions typically

require longer intervention periods to demonstrate measurable improvement. Problem-solving abilities involve complex cognitive networks that may be more resistant to short-term behavioral modifications.

This finding indicates brief detox interventions may preferentially impact simpler attentional processes before affecting more complex executive functions. It also suggests that longer or more intensive interventions may be necessary to observe meaningful improvements in problem-solving capabilities.

Digital Detox Implementation and Feasibility

The relatively high adherence rates (85% of participants following the protocol at least "some days") demonstrate the feasibility of implementing structured digital detox programs in educational settings. This is particularly noteworthy given this demographic's high integration of digital technologies in academic and social contexts.

The identified implementation challenges—academic requirements, family obligations, and habit strength—provide valuable insights for designing future interventions with greater contextual sensitivity. Future programs should consider incorporating flexible scheduling options, academic exemptions, and graduated implementation to address these barriers.

The high proportion of participants (86.25%) expressing willingness to continue digital detox practices suggests that adolescents recognize the benefits of digital limitation despite initial implementation challenges. This high acceptability rate supports the potential for sustainable implementation of digital wellness initiatives in educational settings.

Addressing Research Objectives

Baseline Cognitive Function Levels

The first research objective sought to determine baseline levels of cognitive function before the digital detox intervention. Our assessment revealed moderate deficit levels across all cognitive domains (Attention: M = 3.52, SD = 0.68; Memory: M = 3.15, SD = 0.59; Problem-Solving: M = 3.20, SD = 0.54). These findings align with previous research indicating that high digital engagement may be associated with moderate impairments in attentional control, memory function, and executive processing (Wacks & Weinstein, 2021).

The relatively high baseline scores in digital-specific attention items ("I always carry my smartphone with me": M = 4.81; "I consume news more on digital devices than through traditional sources": M = 4.71) highlight the substantial integration of digital technologies into adolescents' cognitive patterns and information processing habits.

Changes in Cognitive Abilities Post-Detox

The second research objective focused on determining changes in cognitive abilities following the two-week detox. Our findings revealed statistically significant improvements in attention ($p = 0.046$, $d = 0.23$) and memory ($p = 0.002$, $d = 0.36$), with no significant change in problem-solving capacity ($p = 0.079$).

These results indicate that even a brief period of structured digital limitation can yield measurable improvements in specific cognitive domains, particularly those involving attentional regulation and memory processes. The differential response across cognitive domains suggests that detox effects may follow a hierarchical pattern, with simpler attentional processes responding more readily than complex executive functions.

Approach to Implementing Digital Detox Measures

The third research objective proposed an approach to implementing systematic digital detox measures in educational settings. Based on our implementation experience and adherence data, we propose a multi-component approach:

Targeted Timing: Implementing detox during specific hours (10:00 PM - 1:00 AM) proved feasible for most participants, suggesting that focusing on evening/night hours may maximize adherence while minimizing academic disruption.

Graduated Implementation: Beginning with limited detox periods and gradually extending duration could help address the "difficulty breaking habits" barrier reported by 48.75% of participants.

Academic Integration: Providing accommodations and alternative learning modalities during detox periods would address the "academic access requirements" barrier reported by 72.50% of participants.

Family Engagement: Involving family members in detox practices could reduce the "family obligations" barrier reported by 56.25% of participants and potentially extend cognitive benefits to the home environment.

Peer Support Structures: Implementing detox through peer groups or class cohorts could leverage social dynamics to reinforce adherence and normalize digital limitation practices.

Digital Detox as a Determinant of Cognitive Function

The fourth research objective sought to determine whether digital detox influences cognitive function. The significant correlation between pre-intervention digital usage and post-intervention attentional improvements ($r = 0.32$, $p = 0.004$), coupled with significant pre-post differences in attention and memory domains, provides evidence that digital detox can influence cognitive function.

The domain-specific nature of these effects suggests that digital detox may function as a selective cognitive determinant, primarily affecting attentional and memory processes while having a limited immediate impact on complex problem-solving capabilities. The relationship appears strongest for attention regulation, particularly among heavy digital users, who may experience greater "rebound" effects when digital stimulation is reduced.

Limitations and Future Directions

Several limitations warrant consideration when interpreting the current findings. First, the absence of a control group limits causal inference. While the pre-post design allows for within-subject comparisons, we cannot definitively attribute observed changes to the detox intervention versus other factors such as testing effects or concurrent events. Future studies should employ randomized controlled designs to strengthen evidence for intervention effects.

Second, the two-week intervention may be insufficient for detecting changes in complex cognitive domains like problem-solving. Extended interventions with follow-up assessments would provide insights into long-term cognitive impacts and potential delayed effects in higher-order executive functions.

Third, reliance on self-report measures may introduce response bias, particularly for the digital usage and adherence data. Incorporating objective measures such as device usage tracking applications, standardized cognitive tests, and direct observation would enhance measurement validity in future research.

Fourth, the convenience sampling approach and single institution focus limit generalizability to broader adolescent populations. Future studies should employ more diverse and representative samples across multiple educational settings.

Future research should explore several promising directions. First, examining the differential effects of digital detox across demographic variables (age, gender, socioeconomic status) would provide insights into potential moderating factors. Second, investigating dose-response relationships between adherence levels and cognitive outcomes could establish optimal detox parameters. Third, exploring the specific

mechanisms underlying cognitive improvements (e.g., reduced cognitive load, improved sleep quality, enhanced mindfulness) would clarify the pathways through which detox affects brain function.

Additionally, longitudinal studies tracking the sustainability of cognitive improvements and digital behavior changes would illuminate the long-term efficacy of brief interventions. Finally, examining how digital detox might be integrated into educational curricula and wellness programs could yield practical applications for cognitive wellness promotion

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Conclusion

This study demonstrates that a two-week digital detox intervention can produce modest but statistically significant improvements in attention and memory functions among adolescents, with greater attentional benefits observed in heavier digital users. The findings support the potential of structured digital limitation as a practical cognitive wellness strategy in educational settings. While brief interventions may not substantially impact complex problem-solving abilities, they appear to enhance basic attentional and memory processes underlying academic performance effectively.

Despite academic and social challenges, the high acceptability and moderate adherence rates suggest that digital detox programs are feasible within the educational context. Future interventions should integrate psychosocial supports, extend program duration, and employ randomized controlled designs to strengthen evidence for cognitive benefits.

These findings contribute to the growing literature on digital wellness interventions and offer practical insights for educators and mental health professionals seeking to address the cognitive impacts of increasing digital immersion among adolescents. Schools may help students develop healthier relationships with technology by implementing targeted digital detox programs while supporting cognitive development and academic performance.

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