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Leveraging Mindfulness and Information and Communication Technology (ICT) to Enhance Attention Amidst Digital Distractions in Primary Education

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ABSTRACT

The increasing presence of digital distractions poses significant challenges to pupils' ability to sustain attention in primary education. Mindfulness techniques have shown promise in supporting attention regulation and cognitive development. This study examined the effectiveness of mindfulness practices in enhancing attention and cognitive flexibility among primary school pupils in the Oyo East Local Government Area, Nigeria. A descriptive survey design was adopted, involving 120 randomly selected pupils from grades five and six. Data were collected using a validated questionnaire. Findings revealed that the implementation of mindfulness techniques significantly improved pupils' ability to focus and resist distractions from digital devices. Furthermore, participation in the mindfulness program led to a marked enhancement in cognitive flexibility, particularly in shifting attention between tasks. These results underscore the value of mindfulness as a practical, ICT-supported approach for fostering essential cognitive skills in today's digitally influenced learning environments.

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1. INTRODUCTION

The digital era has introduced unprecedented levels of connectivity, but it has also brought about a surge in digital distractions, particularly among young learners. In primary education, sustaining pupils' attention is crucial for effective learning and academic development. However, the ubiquity of digital devices has made it increasingly difficult for children to focus on classroom tasks, raising concerns among educators and parents alike. Amid these challenges, mindfulness techniques have emerged as a promising approach to improving pupils' attention, self-regulation, and cognitive control.

Mindfulness is the practice of maintaining non-judgmental awareness of the present moment, including one's thoughts, emotions, and bodily sensations (Kabat-Zinn, 2021). When introduced in educational settings, mindfulness can support pupils in managing distractions and enhancing focus through practices such as mindful breathing, guided meditation, and sensory awareness. Research has shown that mindfulness training enhances sustained attention and reduces distractibility (Jha *et al*., 2015; Zeidan *et al*., 2016; Tang *et al*., 2019). Additionally, mindfulness has been linked to improvements in classroom behavior, emotional regulation, and academic performance (Lomas *et al*., 2015; Carroll, 2023).

Mindfulness-based interventions have also demonstrated a positive impact on children's cognitive development. Studies have highlighted improvements in cognitive flexibility—the mental ability to shift attention between tasks and adapt to changing demands (Felver *et al*., 2016; Zoogman *et al*., 2015). As attention and adaptability are essential for navigating the distractions of the digital world, these findings underscore the relevance of mindfulness practices in primary education. Pupils who receive mindfulness training are better equipped to remain on task, regulate emotions, and engage productively in learning activities (Roeser *et al*., 2014; Schonert-Reichl *et al*., 2015; Zenner *et al*., 2014).

In the context of primary school classrooms, attention is foundational to academic success, knowledge retention, and positive social interaction (Weiss *et al*., 2020). Conversely, inattentiveness can lead to poor academic outcomes, classroom disruptions, and increased frustration among pupils and teachers (McCutcheon *et al*., 2019). With digital distractions becoming more pervasive, it is essential to explore effective strategies that can help pupils manage their attention and cognitive engagement. Mindfulness offers a viable, low-cost, and ICT-supported approach to achieving these goals.

This study investigates the efficacy of mindfulness techniques in enhancing attention and cognitive flexibility among primary school pupils in the Oyo East Local Government Area, Nigeria. Specifically, it examines whether mindfulness practices improve pupils' ability to focus amidst digital distractions and whether they enhance cognitive flexibility—the ability to shift attention between tasks. The novelty of this study lies in its focus on mindfulness as a structured intervention within the context of primary education, addressing a timely issue in digital-age classrooms. The findings aim to contribute to current efforts in promoting attention skills, emotional resilience, and learning effectiveness in young learners.

The main purpose of this study is to investigate the efficacy of mindfulness techniques in primary education amidst digital distractions in the Oyo East Local Government Area of Oyo State, Nigeria. The purpose of this study was specifically to:

(i) To explore the potential of mindfulness techniques to enhance pupils' ability to focus and resist distractions from digital devices in the classroom.

(ii) To investigate the impact of a mindfulness program on pupils' cognitive flexibility, particularly their ability to shift attention between tasks.

Based on the research purposes, the following two null research hypotheses will be tested.

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(i) H01: The implementation of mindfulness techniques does not result in a significant improvement in pupils' ability to focus and resist distractions from digital devices in the classroom.
(ii) H02: Participation in a mindfulness program does not lead to a significant enhancement in pupils' cognitive flexibility, specifically their ability to shift attention between tasks.

2. METHODS

The study adopted a descriptive survey research approach to examine the effectiveness of mindfulness techniques in primary education, focusing on primary school pupils in the Oyo East Local Government Area, Oyo State. The target population comprised public primary school pupils in grades five and six in the selected area, with a sample size of 120 pupils randomly chosen for participation. A questionnaire named "Efficacy of Mindfulness Techniques in Primary Education" (EMTPE) was developed, consisting of ten questions designed to gather pertinent data. The questionnaire underwent content validation by two primary educators to ensure its validity. Additionally, the instrument's reliability was assessed by administering it to 40 primary school pupils in grades five and six with similar characteristics to the main sample. The test-retest reliability method yielded a reliability coefficient of 0.68. Analysis of Variance (ANOVA) was performed on the collected data to test two research hypotheses at a significance level of 0.05.

3. RESULTS AND DISCUSSION

3.1. H_{01}: The Implementation of Mindfulness Techniques Does Not Result in a Significant Improvement in Pupils' Ability to Focus and Resist Distractions from Digital Devices in the Classroom

The results in **Table 1** showed that there is a significant difference between groups in terms of pupils' ability to focus and resist distractions ($F(9, 111) = 749.550$, $p < 0.05$). The significant F-value indicates that the implementation of mindfulness techniques has had a notable effect on pupils' ability to focus and resist distractions from digital devices in the classroom. This finding contradicts the null hypothesis (H01), suggesting that mindfulness techniques do result in a significant improvement in pupils' ability to focus and resist distractions from digital devices.

Table 1. ANOVA table on pupils' ability to focus and resist distractions from digital devices in the classroom.

Source	Sum of Square	df	Mean Square	F	Sig.
Between Groups	1252.083	9	139.120	749.55	0.000
Within Groups	20.417	111	0.186		
Total	1272.500	120			

3.2. H_{02}: Participation in a Mindfulness Program Does Not Lead to a Significant Enhancement in Pupils' Cognitive Flexibility, Specifically Their Ability to Shift Attention Between Tasks

From **Table 2**, the results indicate that there is a significant difference between groups in terms of enhancement in cognitive flexibility ($F(1, 115) = 294.140$, $p < 0.005$). The significant F-value suggests that participation in the mindfulness program has a notable effect on pupils' cognitive flexibility. The mean square values further support this finding, with a much higher

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value for the between-groups variation compared to within-groups variation. Therefore, based on these results, it can be concluded that participation in the mindfulness program leads to a significant enhancement in pupils' cognitive flexibility, particularly in their ability to shift attention between tasks.

Table 2. ANOVA table on mindfulness program to enhancement in pupils' cognitive flexibility, specifically their ability to shift attention between tasks.

Source	Sum of Square	df	Mean Square	F	Sig.
Between Groups	819.596	5	163.919	294.14	0.001
Within Groups	63.529	115	0.557		
Total	883.125	120			

3.3. Discussion of the Findings

Hypothesis one strongly supports the effectiveness of mindfulness techniques in improving pupils' ability to focus and resist distractions from digital devices in the classroom. This is corroborated by the previous work (Zenner *et al*., 2014), which asserted that the implementation of a mindfulness-based intervention program for adolescents is significant in improving sustained attention and working memory. Similarly, some researchers (Bieleninik *et al*., 2016) conducted a study with elementary school children, demonstrating that mindfulness training enhanced pupils' focus and reduced their susceptibility to distractions.

Hypothesis two indicates that there is a significant difference between groups in terms of enhancement in pupils' cognitive flexibility, particularly in their ability to shift attention between tasks. The results were in line with previous works (Tang *et al*., 2019), who explored the effects of mindfulness meditation on cognitive flexibility in adults. Their findings demonstrated that mindfulness meditation training improved participants' ability to switch attention between tasks and resist distractions, a core aspect of cognitive flexibility. Additionally, some researchers (Jha *et al*., 2020) investigated the effects of mindfulness training on working memory and cognitive control in students. Their study revealed that mindfulness training enhanced cognitive flexibility, allowing students to adapt their thinking and attentional focus according to task demands

4. CONCLUSION

The findings of this study demonstrate the significant impact of mindfulness techniques on primary school pupils' ability to focus and resist distractions from digital devices in the classroom. Contrary to the null hypothesis, the implementation of mindfulness techniques resulted in a notable improvement in pupils' attention and capacity to manage digital distractions. Moreover, participation in the mindfulness program led to a significant enhancement in pupils' cognitive flexibility, particularly their ability to shift attention between tasks. These results underscore the efficacy of mindfulness interventions in improving key cognitive skills essential for academic success in today's digital age. Based on the findings and conclusions of this study, it is recommended that:

(i) Schools should train teachers on mindfulness techniques.
(ii) Schools should incorporate mindfulness techniques into daily routines to help pupils develop attentional skills and manage digital distractions effectively.
(iii) Parents should be encouraged to support mindfulness initiatives both at home and in school.

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5. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. Authors confirmed that the paper was free of plagiarism.

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