

Making the EFL Reading Class Effective and Paperless: A Quantitative Study on Reducing Greenhouse Gas Emissions

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Abstract

Traditional English as a Foreign Language (EFL) reading classrooms are heavily reliant on printed materials, including textbooks, photocopied articles, and workbooks. This practice contributes significantly to paper consumption, leading to deforestation and associated greenhouse gas (GHG) emissions. This study aimed to (1) quantify the perceived reduction in paper usage by transitioning academic reading activities for an undergraduate Functional English course to the WhatsApp platform, and (2) measure undergraduate students' perceptions of the effectiveness of this paperless approach for their reading comprehension and engagement. A quantitative methodology was employed. Data were collected via an online survey questionnaire from a sample of 250 undergraduate EFL students enrolled in a Functional English course who used WhatsApp as the primary medium for receiving and discussing reading materials for one academic semester. Data were analyzed using SPSS software for descriptive statistics (frequencies, percentages, means, standard deviations). The findings indicate an overwhelming perceived reduction in paper usage (estimated at over 90% by respondents). Furthermore, a strong majority of students ($M > 4.0$ on a 5-point Likert scale) perceived the WhatsApp-based reading class as effective, citing benefits such as increased accessibility, convenience, and enhanced peer interaction. The integration of widely available mobile technology, specifically WhatsApp, presents a viable and effective strategy for creating paperless EFL reading classes. This approach not only fosters a modern and engaging learning environment but also aligns with global sustainability goals by offering a tangible solution to reduce the educational sector's carbon footprint through minimized paper consumption.

1. Introduction

This era is characterized by the prevalence of intelligent mobile devices and applications, as well as the widespread influence of social media. In addition to interpersonal communication, individuals utilize their mobile

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devices for a diverse array of functions. Undeniably, mobile communication devices have become indispensable in our daily lives since the introduction of smartphones and other advanced technologies.

In contemporary times, individuals of various age groups, including young students, have the ability to use mobile applications on smart devices at any location and at any given moment (Mehtälä et al., 2024). Students predominantly utilize their mobile devices as their primary mode of accessing the internet and participating in educational endeavors (Guan, 2024).

Today's young students possess technologically advanced, digital, and electronic minds. They readily adapt to the latest technological advancements. They possess a considerable amount of knowledge regarding globalization and its components (Drigas et al., 2023). Throughout the most of the day, they are completely absorbed in their smartphones. Due to the prevalence of social media, smartphone apps, and smart device usage, young students gradually get disinterested in studying conventional curricula and textbooks.

Nevertheless, with time, these smartphone applications increasingly become indispensable for everyday life, including education. The advent of mobile apps has significantly facilitated our lives and has also spawned a novel means of accessing educational resources. Specialists assert that these significant transformations are exerting growing strain on conventional teaching and learning paradigms.

2. Problem Statement

Excessive paper usage in EFL reading classrooms contributes to deforestation and greenhouse gas emissions. The traditional model of teaching reading skills relies heavily on printed materials, from course packs to worksheets, generating substantial waste and environmental cost. Despite the availability of digital alternatives, this practice persists. There is a critical need to identify, implement, and evaluate sustainable, paperless pedagogical models that maintain or enhance educational effectiveness while drastically reducing the carbon footprint of language education.

3. Literature Review

Previous research has established two key areas relevant to this study: the environmental impact of paper consumption and the use of Mobile-Assisted Language Learning (MALL).

3.1 Environmental Impact of Nature

The lifecycle of paper, from pulp to print to waste, is resource-intensive. Studies have shown that the paper industry is among the top five largest consumers of energy globally (Jaffur et al., 2025). Reducing paper use in any sector, including education, is directly linked to conserving natural resources and reducing GHG emissions (Hu & Zheng 2023).

3.2 Environmental Impact of Nature

MALL has been extensively studied for its potential to promote autonomous, accessible, and engaging learning. WhatsApp, in particular, has been successfully used for language teaching activities, including vocabulary acquisition, speaking practice, and fostering collaborative learning communities (Tümen & Çelik, 2022). Its affordances for instant sharing of reading materials (PDFs, web links, images of texts) make it particularly suitable for transforming the reading class. However, most studies focus on pedagogical outcomes, with a gap in explicitly linking this technology to environmental sustainability goals.

This study contributes to the literature by quantitatively measuring the perceived environmental and pedagogical outcomes of a paperless intervention.

4. Methodology

4.1 Research Design

This study employed a quantitative research design using a survey method to collect numerical data on students' perceptions and experiences.

4.2 Population and Sample

The population for this study was undergraduate EFL students enrolled in a "Functional English" course at a university. A sample of 250 students was selected through convenience sampling. All participants were active users of WhatsApp for academic purposes throughout the semester.

4.3 Data Collection Tool

A structured online survey questionnaire was developed and administered via Google Forms. The questionnaire consisted of three sections:

- Section A: Demographic information
- Section B: Questions related to paper savings (e.g., estimated number of pages saved, perception of reduction in paper usage) using a Likert scale.
- Section C: Questions assessing perceived effectiveness of the WhatsApp-based reading class on dimensions of accessibility, engagement, comprehension, and overall satisfaction (5-point Likert scale from Strongly Disagree to Strongly Agree).

4.4 Data Collection Procedure

After obtaining ethical consent and permission, the study was conducted over a 16-week semester. All reading materials were distributed digitally via a dedicated WhatsApp class group. At the end of the semester, the survey link was shared with the 250 participants, and their responses were collected anonymously.

4.5 Data Analysis

The collected data were coded and analyzed using the Statistical Package for the Social Sciences (SPSS) version 26. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were computed to summarize the data and address the research objectives.

5. Results and Analysis

5.1 Demographic Data

All 250 participants were undergraduate students aged 18-22, enrolled in the Functional English course.

5.2 Reduction in Paper Usage

An overwhelming majority of participants (98%) reported a "significant" or "very significant" reduction in their use of printed reading materials for the course. Students estimated an average saving of 85-100 pages throughout the semester that would have otherwise been printed or photocopied.

Table 1 *Perceived reduction in paper usage*

	Perception of Reduction Frequency (n)	Percentage (%)
Very Significant	185	74.0
Significant	60	24.0
Neutral	5	2.0
Insignificant	0	0.0
Very Insignificant	0	0.0

5.3 Perceived Effectiveness

The results indicate strongly positive perceptions of the WhatsApp-based learning model. The mean scores for key effectiveness indicators were all above 4.0 on the 5-point scale.

Table 2 *Perceived effectiveness of WhatsApp for reading (N=250)*

Statement	Mean (M)	Standard Deviation (SD)
Materials were easily accessible.	4.72	0.45

It was convenient to read on my device.	4.35	0.78
The platform supported discussion with peers.	4.28	0.82
My engagement with the reading tasks increased.	4.10	0.91
My overall reading comprehension improved.	3.95	0.95
Overall satisfaction	4.28	0.76

6. Discussion

The findings of this study strongly support the viability of using WhatsApp to create an effective and paperless EFL reading classroom. The quantitative data confirms the primary hypothesis: a dramatic perceived reduction in paper consumption is achievable through this simple technological intervention. This directly addresses the problem statement by proposing a concrete method to mitigate the environmental impact of EFL instruction.

Furthermore, the high mean scores for perceived effectiveness challenge the notion that digital delivery might compromise educational quality. Students found the platform accessible and convenient, which aligns with the principles of ubiquitous learning. The positive reception of peer interaction features suggests that the platform can foster a collaborative learning environment, a key aspect of communicative language teaching.

The slightly lower, though still positive, mean score for reading comprehension ($M=3.95$) suggests that while the medium is effective, it may not be superior to traditional methods for all cognitive aspects of reading. This presents an area for further investigation.

7. Conclusion and Implications

This study concludes that transitioning EFL academic reading to the WhatsApp platform is a highly effective strategy for significantly reducing paper usage and, by extension, contributing to the reduction of the education sector's role in deforestation and GHG emissions. The model is not only environmentally sustainable but also pedagogically sound, as it is well-received by digital-native students.

The implications are significant for educators, curriculum designers, and institutional policymakers.

- For educators: Adopting such a model is low-cost, requires minimal technical expertise, and can immediately reduce their classroom's environmental footprint.
- For institutions: Promoting paperless initiatives aligns with Corporate Social Responsibility (CSR) goals and can be part of a broader sustainability charter.
- For researchers: This study opens avenues for further research, including longitudinal studies on learning outcomes, comparative studies with other platforms, and life-cycle assessments to quantify the exact carbon footprint reduction.

In essence, moving the EFL reading class to a paperless, mobile-based environment is a simple, practical, and impactful step towards greener pedagogy.

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