



Impact of Dual Purpose Mobile App for Environmental Education through Entertainment using Social Media Platforms

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Abstract

In this age of digital innovation, the integration of sustainability and Mobile App development comes as a timely and relevant tool for technological advancement and environmental education. Mobile communication provides a fast and convenient medium of providing information. This study investigates awareness of Environmental Mobile Apps and examines how a dual-purpose Environmental Mobile App leverages social media platforms. Using a descriptive-exploratory approach, an in-depth, face-to-face interviews were conducted with 13 young adults (between 18 and 49 years) who are proficient with mobile apps and social media. A semi-structured guide supported the data collection. The transcriptions were analyzed using content analysis. The results show that 23.08% participants learned about Environmental Mobile Apps through their studies, while 76.92% did not. All participants recognized that social media raises app visibility. 69.23% of participants highlighted the educational advantages of Environmental Apps under the theme ‘Education and Research Purposes.’ 30.77% agreed that combining entertainment with educational features would improve learning under the theme ‘Education and Entertainment.’ The findings strongly suggest that future Environmental Mobile Apps should integrate both entertainment and educational elements to engage and raise awareness via social media, especially for young adults in the age bracket between 18 and 49 years.

Keywords: Environmental Education, Mobile Learning, Gamification, Social media, Entertainment, Human cartoons.

Introduction

The consumer attitude all over the world relates to an increase in population against fewer agricultural and natural resources. However, consumer behaviour of people can be controlled through environmental education, and this can be achieved through the use of eco-apps (Nghiem and Carrasco, 2016). This paper aims to showcase how a Mobile App combining entertainment and environmental education using human cartoons, interactive quizzes, and personalized feedback can promote positive environmental behaviours. Unlike existing educational Apps, this App allows users to create their own cartoon avatars, complete real-world environmental challenges, and earn recognition within a community leaderboard (Kurni et al., 2026).

Games serve widely as leisure tools. Researchers observe that young people process academic information more quickly and efficiently through digital technology than through traditional media (Beavis, 2015). This shift supports the ongoing move towards online teaching and learning. Tertiary institutions are increasingly encouraging gamification tools that will enhance the engagement and motivation of students. Universities also promote digital literacy into the educational systems (Gonzalez-Yubero et al., 2023). Gamification has also been accepted as an effective learning tool for critical thinking and enhancing problem-solving skills of students in disciplines such as Science, Environment and Sustainability (Sousa, 2021). Popular social media platforms like Facebook, Instagram, X (formerly Twitter), Reels, and YouTube attract much greater awareness (Roberts and David, 2025). This underscores the need to increase the visibility of environmental Apps. Businesses use social media platforms to market and communicate (Khanom, 2023). Many young people spend significant time on social media for entertainment, while others use it for commercial and educational purposes (Faruk et al., 2021).

Environmental communication aims to promote positive environmental practices by sharing information and fostering relationships (Pillmann, 2000). Previously, environmental education relied mainly on in-person events and traditional media (Nichols et al., 2022). However, digital communication now plays an increasingly important role through websites and mobile devices (Lin and Ardoin, 2023). Digital technology provides broad, timely access to user-friendly environmental information.

This enables people to make better-informed behavioural choices. The level of environmental awareness depends on understanding and ease of access to information (Haq et al., 2025). Consequently, the method and clarity of communication directly affect public awareness and action on environmental issues.

This study was undertaken to advance the United Nations Sustainable Development Goals (SDGs): SDG-4 (Quality Education), SDG-6 (Clean Water and Sanitation), SDG-12 (Responsible Production and Consumption), SDG-13 (Mitigating Climate Change), and other global environmental objectives such as SDG 14 (Life below water) and SDG-15 (Life on Land). These goals was addressed through the development of an Environmental Mobile App aligned with these priorities.

Justification of study

The emergence of social media has provided a smart and easy way to share information in the form of videos and pictures. It is also a vehicle for entertainment. Popular social media apps include WhatsApp, Facebook, LinkedIn and TikTok (Roberts and David, 2025). The surge in WhatsApp use has made it the preferred choice for many over traditional SMS. Many prefer the use of WhatsApp because they enable people to effectively communicate their emotions and also enable people to properly contextualise their conversations (Nyakana et al., 2023). Again, its admirable features, emojis and other elements make it more advantageous for its users (Montag et al., 2015; Church and de Oliveira, 2013). Unfortunately, there is sparse scientific data on the use of these social media Apps. However, recent studies indicated that some people are addicted to the use of some of these social media Apps (Sultan, 2014). Social media is a platform that young adults (between the ages of 18 and 49 years) can leverage for socio-economic development and personal growth. According to Ackland and Tanaka (2016, World Bank), the emergence of social media has significantly impacted how people access information. This has occurred despite social media being less than 25 years old. There is very sparse and inadequate academic study on the impact of social media in developing countries (Ackland and Tanaka, 2016).

Even though many people widely accept the popular social media Apps (WhatsApp, TikTok, Twitter etc.), few people use mobile Apps like “Environment Challenge”, “Earth5R”, “Environmental Studies”, “Environmental Law-MasterNow”, “Environmental Engineering” and “Environmental Economics.” The statistical data below show a rapid increase in WhatsApp usage as shown in Figure 1:

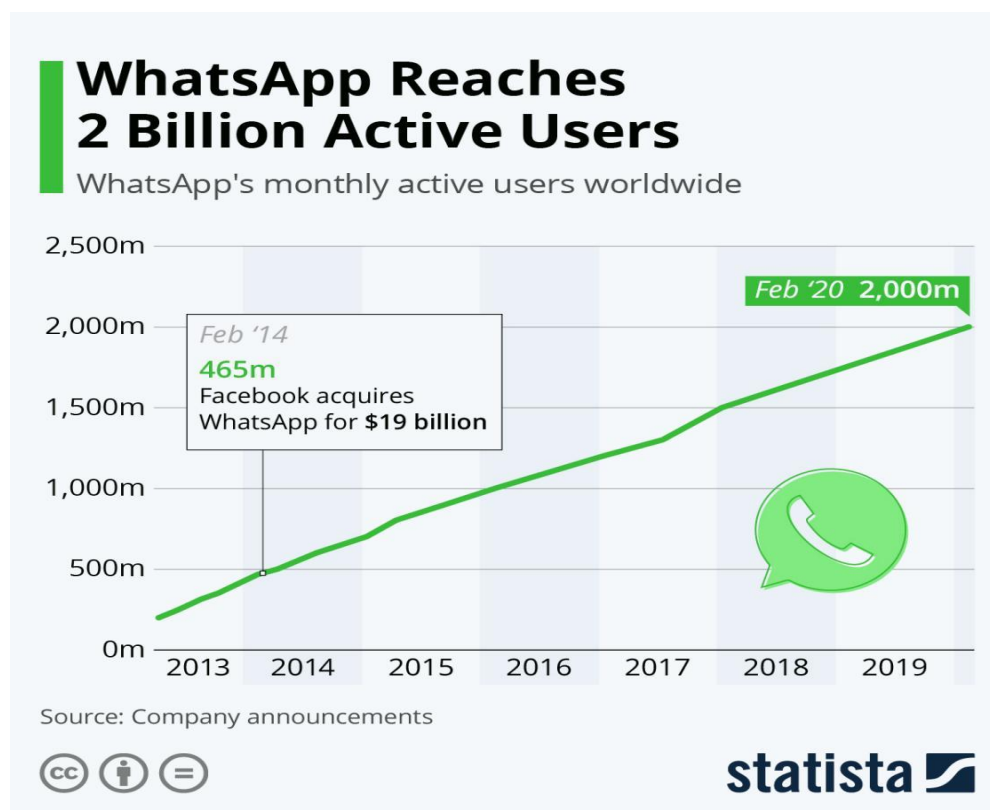
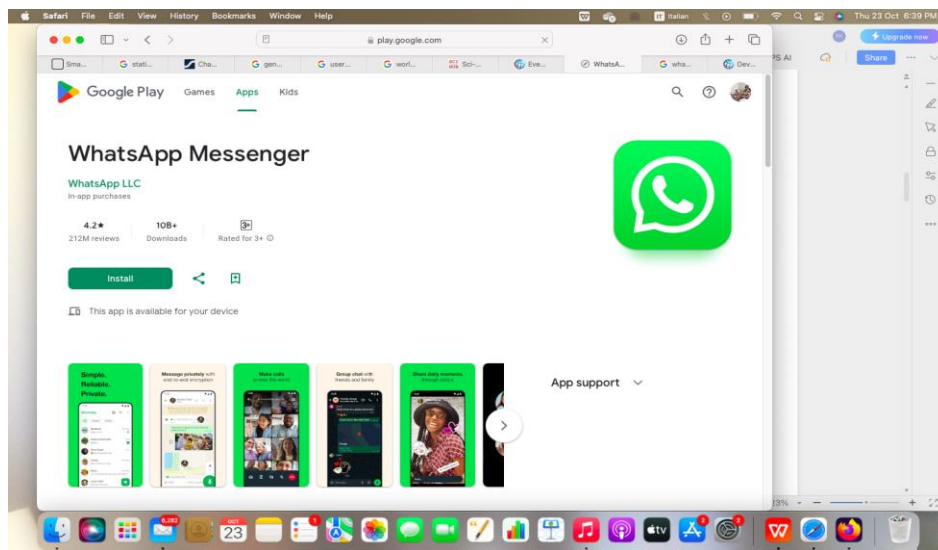


Figure 1: Graph showing the usage of WhatsApp

Source: Richter (2020, Statista).

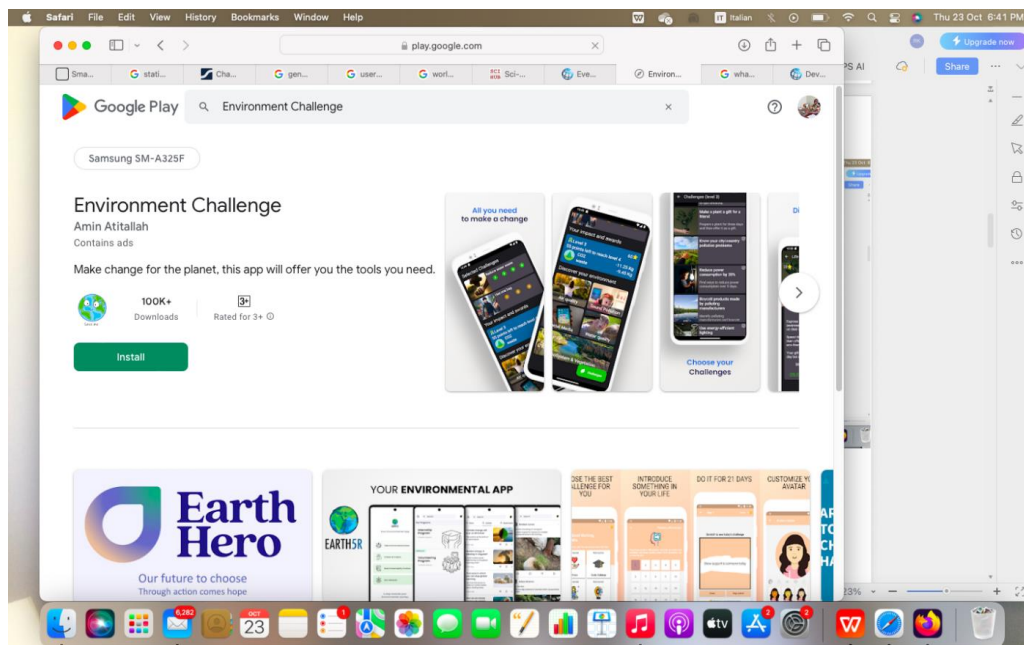
By October 23, 2025, more than 10 billion downloads for WhatsApp users on the Google Play Store. Figure 2 below illustrates this finding:



Source: Google Play Store

Figure 2: Image showing number of downloads of WhatsApp users

When searching for one of the “most popular” environmental Apps (Environment Challenge) on October 23, 2025, over 100 000 downloads were found. This is shown in Figure 3:



Source: Google Play Store

Figure 3: Image showing the number of downloads of Environment Challenge Mobile App.

This suggests that awareness of the “Environment Challenge” mobile application, designed solely for educational purposes related to environmental issues, remains limited. It is likely that environmental experts primarily use such mobile applications for research. However, an important question arises: Do environmental issues affect individuals regardless of their professional discipline? This paper aims to address the limited publicity of environmental mobile applications and proposes innovative approaches to environmental education by integrating engaging features. For instance, popular social media

applications such as WhatsApp, TikTok and Reels attract users through interactive features; similar strategies may be applicable to existing or forthcoming environmental mobile applications. WhatsApp not only offers real-time messaging, but also supports images, videos and emojis, enhancing user experience. These features contribute to more effective communication and mutual understanding among users (Nyakana et al., 2023). . Additionally, major social media applications like WhatsApp are accessible via the Google Play Store and receive broad promotion on leading social networking platforms such as Facebook, thereby increasing their visibility and usage.

Conceptualisation and Operationalisation of dual purpose Environmental Mobile Apps

The adoption of innovative features, such as interactive human cartoons, gamified educational content, customisable avatars, and integrated social sharing in Environmental Mobile Apps for environmental education will attract more young adults to patronise them (Roberts and David, 2025). Human cartoons help simplify complex, highly technical ideas for easier understanding and ensure the message is accessible to non-experts. Gamified content and social sharing features further encourage engagement and knowledge retention (González-Yubero et al., 2023). .

The majority of existing Environmental Mobile Apps can be improved by adding unique human cartoon features, such as illustrated guides and interactive videos (2, 5, or 10 minutes), that stand out by combining environmental education with entertainment and relaxation. These materials can be placed on “visible platforms” for wider publicity, enhancing user attraction and knowledge retention (Roberts and David, 2025). For example, human cartoons are already used in Science Communication to effectively educate and engage users.



Figure 4: Human cartoons educating the public on environmental issues.

Source: World Bank, 2017.

The human cartoons convey a message to the public to stop deforestation, as it is an unsustainable practice. Deforestation has a negative impact on Climate Change, biodiversity loss, among others. However, the fundamental message here is to avoid deforestation, which is communicated in a simpler, more educational way.



Figure 5: Human cartoons educating the public on sanitation and hygiene.

Source: World Bank, 2017.

The image in Figure 5 also illustrates that it is good practice to always wash our hands to prevent/minimise microbial contamination. Microbial infestations, such as fungi, viruses and bacteria, can cause illnesses. However, the fundamental message has been explicitly communicated so that even non-experts in Environmental Science, Microbiology, etc., can understand it.

The images in figures 4 and 5 can also be converted into 2-minutes, 5-minutes, and 10-minutes videos. Another very important aspect of it is making these images/short-minute videos available on “visible social media platforms.” These are all innovations in the teaching and learning of Environmental Science, and indeed of any other discipline.

To operationalise this concept and have its impact felt in the real-world of environmental education, the first author can be contacted for technical advice.

Methodology

Design

The study was a descriptive-exploratory research which focused on exploring the visibility of Environmental Mobile Apps through the influence of social media against those (Mobile Apps) whose visibility are restricted to only Google Play and Apple Store. This research design was useful in exploring respondents’ awareness of Environmental Mobile Apps on Google Play Store/Apple Store and further investigates the potential impact of an Environmental App with novel features, entertainment and education in the form of human cartoons.

Sample and Sampling

Purposive sampling was adopted in this study. This was adopted in selecting respondents for the objective of this study- all thirteen (13) respondents are people who are familiar with the operation of computers, smart phones and tablets and are again conversant with Mobile Apps in general. Data saturation was reached at the 13th respondent. Respondents for the study included people between the ages of 18 and 49 years. The respondents were people who understood English or “Ewe.” However, the setting of the study is predominated mostly by English and “Ewe.” Consent was first obtained from the respondents and the purpose of this survey was made known to them. Data saturation was reached between the 12th and 13th participants as further in-depth interviews do not yield fresh data and insights about environmental mobile apps. From the 12th and 13th participants, core concepts were repeated without new trends and patterns.

Data collection

In-depth interviews were conducted face-to-face with respondents. These interviews lasted between 30-40 minutes each. It was carried out using a semi-structured guide with the following sections: Demographic characteristics, Awareness/Publicity of Environmental Apps, Visibility through social media and Impacts of existing Environmental Apps. There were follow-up



questions and clarification of initial answers arising from the interview sessions. All sessions were recorded. The recording of the participants were done using voice recorders as well as field notes.

Transcription

The exact words of the respondents were transcribed after each interview session. The researcher understands the local dialects, however all respondents understood English. This made the transcription process much easier. Ethics were ensured during the translation process.

Analysis

The study employed the principles of content analysis. Each transcript was analysed multiple times for the purpose of generating initial codes. The generated codes were grouped into themes and sub-themes for each category. Qualitative data expert assisted with the co-coding in order to have more accurate and credible themes and sub-themes. For the purpose of anonymity, identification codes were used in the study.

Rigor

Pretesting of the interview questions was done in order to rectify potential challenges and ensure quality and validity of data. Follow-up questions were asked to enhance in-depth understanding of the answers. By way of ensuring the exact meanings of the respondents' feedback, verbatim transcriptions were instantly carried out. Qualitative data expert assisted with the co-coding and finalisation of the respondents' feedback. This helps ensure that everything categorised is a true reflection of the respondents' experiences with Environmental Mobile Apps. This also helps in achieving the objectives of the study.

Ethics

Human ethics in engaging with human participants were strictly observed. These ethics when dealing with human participants include informed consent from respondents, respect for participants, maximising benefits while minimising harm. Ethical clearance was granted by the University of South Africa (UNISA): 2022/CAES_HREC/179.

Results

Demographic characteristics of the survey

Thirteen (13) respondents were interviewed within the age bracket of 18-49 years. They consisted of eight (8) males and five (5) females. Five (5) of the respondents are students at the tertiary institutions, while eight (8) have completed tertiary education. Eight (8) of the respondents were employed as civil servants.. Five (5) were also unemployed. All thirteen (13) respondents are people who are very familiar with the use of modern technology on mobile devices. Coincidentally, one of the respondents is also a computer expert/software developer.

Table 1: Socio-economic characteristics of respondents (n=13)

Identification Code	Age Bracket	Sex	Literacy Level	Occupation	Location
M1	30-39	Male	Tertiary Education	Civil Servant	Suburban Ho
M2	40-49	Male	Tertiary Education	Civil Servant	Suburban Ho
M3	40-49	Male	Tertiary Education	Civil Servant	Urban Ho
M4	18-24	Male	Tertiary Education	Unemployed	Urban Ho
M5	18-24	Male	Tertiary Education	Unemployed	Urban Ho
M6	18-24	Male	Tertiary Education	Unemployed	Urban Ho
M7	18-24	Male	Tertiary Education	Unemployed	Urban Ho
M8	25-29	Male	Tertiary Education	Civil Servant	Urban Ho



F1	40-49	Female	Tertiary Education	Civil Servant	Urban Ho
F2	30-39	Female	Tertiary Education	Civil Servant	Urban Ho
F3	25-29	Female	Tertiary Education	Unemployed	Urban Ho
F4	40-49	Female	Tertiary Education	Civil Servant	Urban Ho
F5	30-39	Female	Tertiary Education	Civil Servant	Rural Ho

Awareness/Publicity of Environmental Mobile Apps

Awareness of the existence of Environmental Mobile Apps was assessed through interviews, in which respondents were asked a set of semi-structured, open-ended questions to test their knowledge. Their responses demonstrate whether they know what Environmental Mobile Apps are.

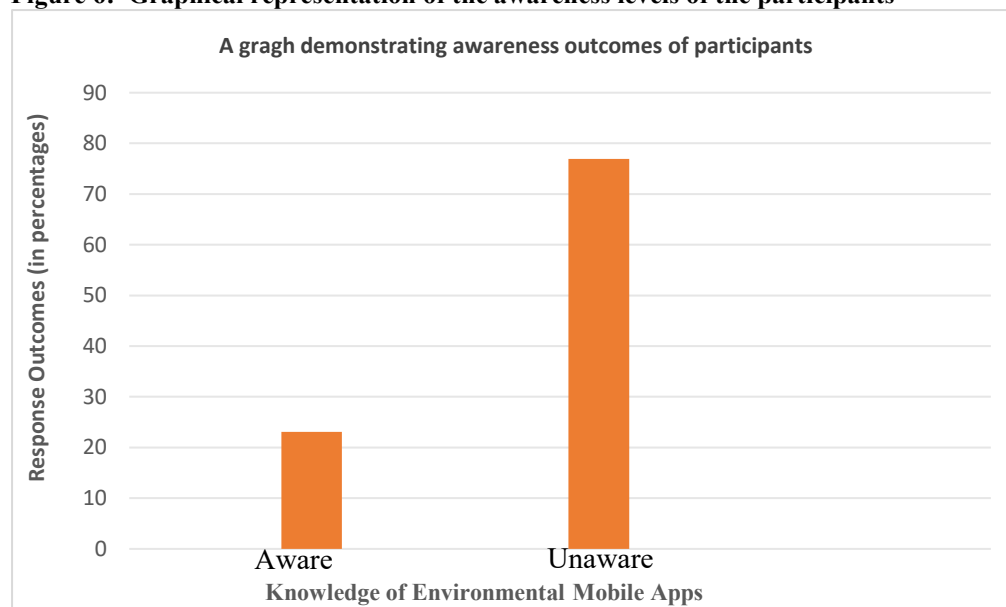
Awareness through research/education

Responses provided by the very few participants suggested that they were curious about what Environmental Mobile Apps are after their Lecturer introduced them to the topic “Environmental Education and Environmental Sustainability.” A student also admitted that by virtue of the programme she is currently studying she is compelled to know what Environmental Mobile Apps are, she also did a personal research about them. However, 76.92% of the participants do not know what Environmental Mobile Apps are, few showed interest to know what they are.

M1 and F1 admitted that they got to know about it through a lecture they attended at Ho Technical University-Department of Environmental Science. F3 also indicated that he got to know of environmental mobile Apps by virtue of the programme he studies at Ho Technical University. He said he is familiar with Google Map, Global Positioning System (GPS) as an Architecture student.

Another group of participants with codes; M2, M3, M4, M5, M6, M7, F2, F4, F5 and M8 also indicated that they have not heard of Environmental Mobile App before, but they are only familiar with WhatsApp, Tik Tok, Instagram and others.

Figure 6: Graphical representation of the awareness levels of the participants



Visibility through Social Media

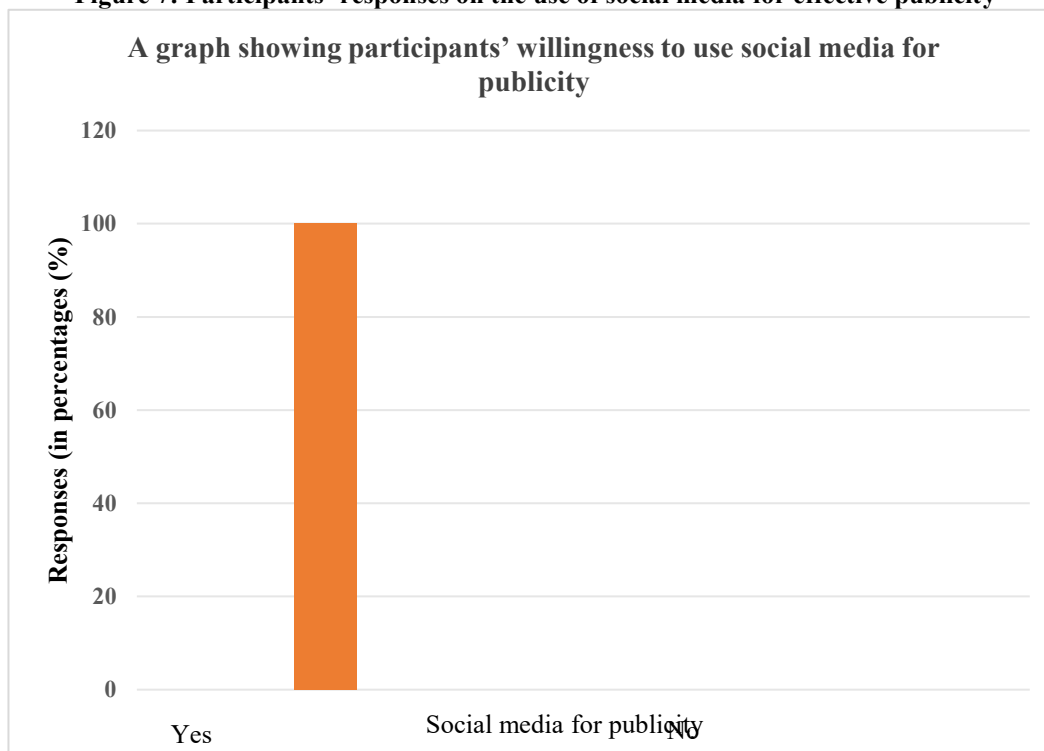
Respondents were interviewed on whether social media would help increase the visibility of Environmental Mobile Apps. Responses from the participants exposed the advantages of using social media as a tool in increasing awareness. Participants

acknowledged social media as a tool in creating awareness. They mentioned that most existing mobile Apps which are widely known and used by many are through social media platforms.

Social media for visibility

Responses provided by participants which accede to the role social media plays in advertising or publicising an innovation. All of the thirteen (13) participants responded in the affirmative citing reasons of being in the era of attention and that most people are very active on social media platforms. This therefore provides a relatively easy avenue to publicise Environmental Mobile Apps.

Figure 7: Participants' responses on the use of social media for effective publicity



Impacts of Existing Mobile Apps- The Special Case of Environmental Mobile Apps

Majority of the respondents do not know about Environmental Mobile Apps, though they use it in their daily activities to predict weather conditions, find locations among others. The “traditional mobile Apps” they are aware of are; WhatsApp, Tik-Tok, Shorts, Instagram and many others. Impacts of these “known or traditional mobile Apps” were likened with what Environmental Mobile Apps can deliver. Participants acknowledged the impacts of Environmental Mobile Apps in the areas of Education and Research, while others also proposed an Environmental Mobile App that will provide both Education and Entertainment-this was after little education was carried out to them of what Environmental Mobile Apps are.

Education and Research Purposes And Education and Entertainment

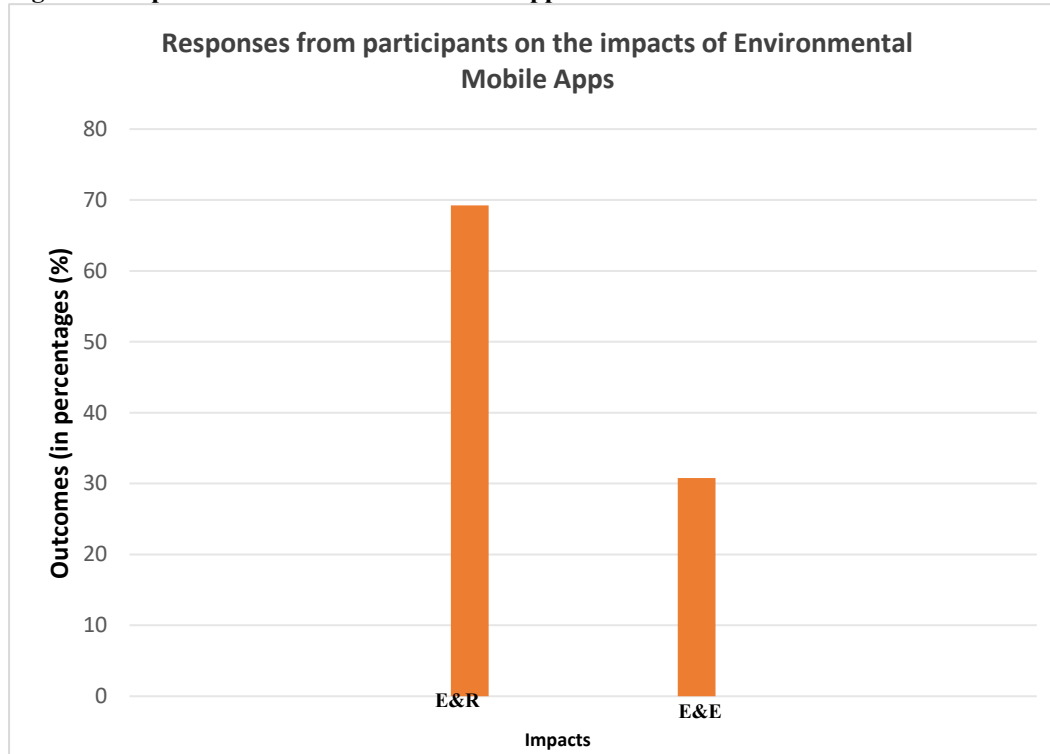
Participants opined that mobile Apps in general are useful tools for educational and research purposes. Participants with this assertion are grouped under the category “Education and Research Purposes (E&R)” for the impact Mobile Apps in general bring to us.

M1, M2, M3, M4, M5, M6, M8, F3, F5 were of the opinion that Environmental Mobile Apps would be best suitable specially for educational and research purposes representing 69.23%.

However, a different group of participants comprising M7, F4, F1 and F2 representing

30.77% were also of the view that Environmental Mobile Apps developed solely for educational purposes may be boring since users will become stressed and suggested that learning becomes fun when combined with entertainment: Education and Entertainment (E&E).

Figure 8: Impacts of Environmental Mobile Apps



Discussion

Findings from the study showed that many are unaware of Mobile Apps that promote good environmental behaviours. They are only familiar with entertainment Apps like WhatsApp, Tik-Tok, Instagram etc. One respondent admitted that he does not know of any Mobile App that promotes environmental good behaviour. This is in agreement with Andrade-Arenas et al., 2024 who also found out that people place more premium only on economic activities and little priority on environmental protection and conservation.

Gamified Mobile Apps are developed not only for the sole purpose of entertainment, but also for providing environmental education. These Mobile Apps have rules, rewards, goals and with critical thinking skills that promote learning which is appropriate for young adults (Morganti et al., 2017; Ro et al., 2017). The findings of Morganti et al., 2017 and Ro et al., 2017 are consistent with the findings of this survey which indicated that Apps should not only entertain, but also educate people on pertinent environmental issues. Additionally, Mobile Apps designed for formal and informal environmental education increase awareness of pro-environmental behaviours. Majority of these specialised apps have engaging features that entice the interest of its users (Torres-Toukoudidis et al., 2022; Boncu et al., 2022).

76.92% of the participants suggested that these Environmental Mobile Apps are not known by many because they are only located “quietly” at Google Play Store and Apple Store. They further posited that many people are mostly on the internet and using social media as a platform for environmental education will promote sustainability. Social media provides a “smart and easy-to-do tasks” to many and used by many to pass on pieces of information from corporate organisations, businesses and individuals (Ellison and Boyd, 2013). Many young people are on social media and the number of subscribers to these different social media handles increase exponentially. Many people spend a lot of hours on social media and get immersed in different activities (Andersson and Öhman, 2017). On this note, social media will provide a suitable medium for the dissemination of environmental knowledge and promoting good environmental practices (Ho et al., 2019).

On the impacts of what existing mobile Apps (in general) offer to society and precisely what Environmental Mobile Apps also offer (after a brief education as to what Environmental Mobile Apps are), some asserted strongly that they are useful tools in education and research. One participant alluded to the fact that these Apps offer great value to her as an Architecture



student in her designs-example Google Earth. Others were also of the view that they help locate new places which before were unknown, help society know what is happening elsewhere in the world among others. The findings of Aydoğan et al., 2022 indicated that adopting the use of mobile Apps to study the negative impacts of global warming provides a positive feedback for awareness creation of environmental issues and for educational/research purposes. This is in agreement with the findings of this study. Some of the respondents also prefer an Environmental Mobile App that educates people in the form of entertainment. They believe that learning in the form of entertainment with human cartoons makes learning fun and more enjoyable. They indicated that few Apps that are solely for educational purposes are sometimes boring and they easily become stressed.

Conclusion

Although, most respondents have no knowledge about the existence of the few Environmental Mobile Apps, very few indicated their awareness but acknowledged that they got to know about them (Environmental Mobile Apps) through their lecturer and/or by virtue of the courses they study. However, they both expressed their willingness to know more about Environmental Mobile Apps.

Many young people suggested that the few Environmental Mobile Apps in existence are shrouded from the public since they can only be accessed in Google Play Store and Apple Store. Most respondents suggested that they should be made visible to many through social media just like other entertainment Apps are being advertised and made visible to many.

Some participants indicated that the existing Environmental Mobile Apps (after educating participants) offer educational value. However, some also indicated that future Environmental Mobile Apps should educate people through entertainment. They believe this will make learning fun and easy.

This study suggests strongly that future Environmental Mobile Apps should be made more visible to the public through social media handles. Additionally, future Environmental Mobile Apps should serve dual purposes of education and entertainment. They should educate people through entertainment since this will make learning less stressful and boring.

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