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Usability and Acceptability of a SWASH Mobile Intervention for Behaviour Change in WASH Practices

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Adequate access to Water, Sanitation, and Hygiene (WASH) is the principal determinant of human health and well-being. However, many African countries are facing challenges in implementing proper WASH practices. The School WASH (SWASH) Mobile App was developed using the Human Centred Design (HCD) approach, which leverages behavioural theories to track school students' sanitation and hygiene behaviours and encourage positive behaviour change. This study examined the usability and acceptability of the SWASH Mobile App. A qualitative research methodology was employed to assess in depth (i) whether the App achieves its intended objective of influencing WASH behaviour change in schools and (ii) challenges that affect its success. A total of 62 people from 20 schools' students, teachers, and community members in Tanzania participated in the study. The results demonstrated that the SWASH Mobile App was widely accepted and highly usable. The study further revealed that the main challenges were costly and unstable internet, difficulties in fetching pictures, and voting and lack of SWASH Mobile App awareness. The study recommends collaboration between schools and telecommunication companies for cost-effective internet access, the use of image compression techniques for faster access to pictures, and a marketing strategy to increase app awareness.

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INTRODUCTION

Adequate access to Water, Sanitation and Hygiene (WASH) is one of the principal determinants of human health and well-being. Ample WASH resources reduce child stunting, prevent hygiene-related diseases such as diarrhoea, and improve school attendance and enrolment. However, many countries, especially in Sub-Saharan Africa and Asia, still lack access to adequate WASH. For instance, in 2020, out of the total world population, 26% (2 billion people) lacked safe drinking water, 46% (3.6 billion people) lacked secure sanitation services, and 29% (2.3 billion people) lacked basic hygiene services (WHO/UNICEF, 2021). Tanzania is the fourth most populous country in Sub-Saharan Africa, home to more than 55.6 million people, 40 percent of its population; some 21 million people lack access to improved drinking water, and more than double that figure, almost 43 million people lack access to improved sanitation (World Bank, 2018). According to the World Bank's Water and Sanitation Programme (WSP) (2012), about 26,500 Tanzanians and 18,500 children under five die each year from diarrhoea, which is caused by poor water, sanitation, and hygiene (WASH).

In an effort to address WASH challenges and eventually achieve the Sustainable Development Goal (SDG) 6, which aspires for clean water and sanitation provisions across the globe (United Nations Children's Fund, 2021), governments, development partners, and the research community have proposed and implemented a wide range of WASH interventions including water supply improvement, water quality improvement, improved and low-cost toilet designs, and promotion of hand washing with soap or other agents to improve hygiene (Mbakaya et al., 2017; Taylor, 2013; Christense et al., 2015). Despite the commendable efforts, many large-scale WASH interventions have been plagued by low uptake, and WASH challenges continue to exist, especially WASH challenges in

schools in low-income countries (McMichael, 2019). For these interventions to realize positive outcomes and high uptake, behaviour, and technologies must be adopted and maintained over time (Dreibelbis et al., 2013).

In recent years, there has been an increasing interest in applying behaviour change theories, and the potential to know people's behaviour (Free et al., 2013). Research evidence demonstrates that using behavioural theories or frameworks to design and implement WASH-related behaviour change interventions can result in improved outcomes (Fiebelkorn et al., 2012; Dreibelbis et al., 2013). People's behaviour is influenced by what they perceive others to be doing or what they think others approve or disapprove of. Existing literature indicates that people are driven by a desire to learn from others and gain affiliation or social approval (Van Bavel et al., 2020; Cialdini et al., 2004).

The school WASH (SWASH) App, developed through the Human Centred Design (HCD) approach, leverages behavioural theories and technology to track school students' sanitation and hygiene behaviours and encourage positive behaviour change while collecting useful and actionable data. SWASH platform challenges students to change bad behaviour on WASH practice using online sanitation competitions in schools with the presence of motivation in a consistent manner. Apart from sanitation competitions, schools are allowed to share pictures based on their best practices, like hand washing, cleaning their WASH facilities, etc. The study's primary aim was to assess whether the SWASH Mobile App achieves its intended objective of influencing WASH behaviour change in schools. The study's second aim was to identify challenges (or implementation factors) that affect the success or failure of technology and behaviour-based WASH interventions.

Human Centred Design and Development of the SWASH Mobile App

Challenge Understanding and Breakdown

Human Centred Design (HCD) is a user-centric approach that involves a human perspective at every stage of software development (Harte et al., 2017). HCD is associated with guiding principles that put the intended users at the core of software development intending to understand their characteristics, needs, challenges, and life situations. The SWASH Mobile App is a solution that was innovated to address a challenge, "how

might we develop low-cost and sustainable WASH facilities without compromising standards outlined in National guidelines for WASH in schools?". In the empathy phase, the team of innovators broke down the challenge into sub-challenges and brainstormed on initial ideas of how each sub-challenge could be addressed (Table 1). This study focuses on addressing sub-challenges 3 and 4, which lack WASH ambassadors to get youth interested in WASH matters to improve the poor conditions of school WASH facilities, and the need for students' behavioural change in school WASH practices.

Table 1: WASH Challenge Breakdown and Understanding

Main Challenge	Sub Challenges	Initial Ideas to Address the Sub-Challenges
Low-cost and sustainable options for WASH facilities	(1) Low-cost and sustainable toilets	• Design and construct large mobile plastic toilets. • Microcontroller voice design to guide PwD/Sick. • Planning and cost analysis tool for construction of WASH facilities. • Integrated sanitation value chain by building bio-digesting toilets for sustainability.
	(2) Poor link between WASH and suppliers	• Linkage platform between suppliers and stakeholders (government, donors, schools, suppliers, etc.) • Drone technology for mapping schools and suppliers.
	(3) Lack of WASH ambassadors among youth	• Communication platform to be used by different WASH clubs in schools and at the community level. • SMS-based system to collect data on school wash data. • Nudging hand-washing behaviours
	(4) Behavioural Change	
	(5) Government awareness and involvement	• Application for reporting on school WASH issues • Monitoring system for WASH projects using SMS and IVR School WASH online monitoring system

Design Research in Behavioural Change Challenges in WASH

To understand the root causes of students' negative behaviour towards WASH practices, the team identified key stakeholders and conducted qualitative-based design research through interviews, observations, engagements, and immersions to understand behaviours, views, needs, fears and hopes of the stakeholders, especially primary school students and their teachers. Interviews were conducted in six primary schools: Mkwawa, Mchangani, Kigogo,

Mwananyamala Kisiwani, Kawe A, and Kawe B, and the following information was gathered and learned.

Observing Negative WASH Behaviours

It was observed that students lacked interest and poorly participated in giving out their views during interviews. There was low interest in voluntary participation in WASH matters (cleaning toilets, washing hands with soap, etc.), improper handling of WASH facilities (destroying facilities such as doors, taps, and toilet

plates, dropping stones in toilets, writing on toilet walls, etc.), not reporting any vandalism done to WASH facilities, and not attending WASH clubs. Such negative WASH behaviours promote poor sanitation, exposing students to infectious diseases such as diarrhoea, resulting in poor school attendance and performance. Furthermore, poorly maintained WASH facilities are less sustainable even though such facilities have been constructed with strong materials and up-to-date technology. Vandalizing WASH facilities raises maintenance costs; on the other hand, a lack of students' WASH education raises handover costs.

Interviewing Students and Teachers in Primary Schools

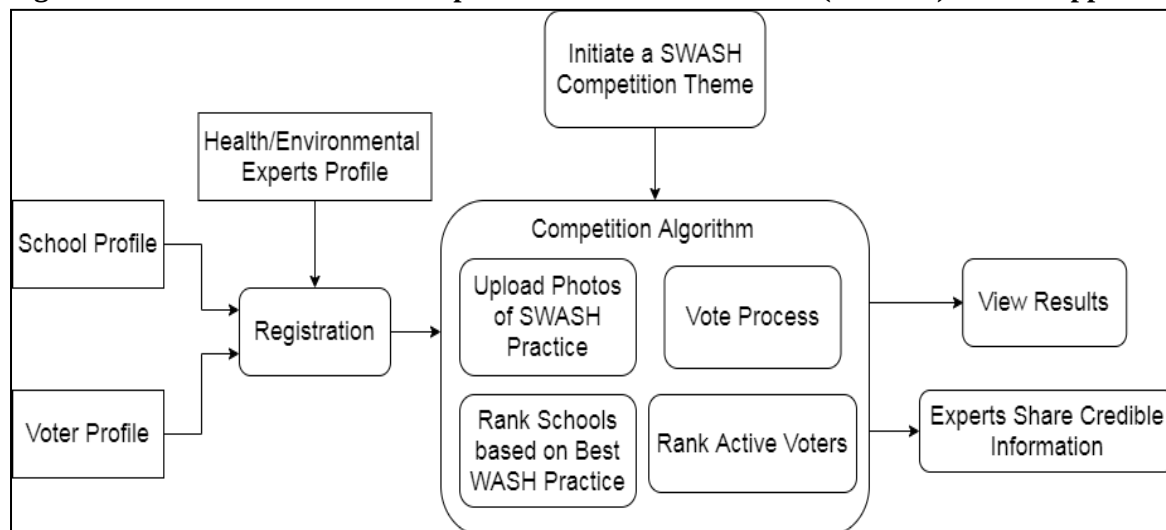
The objective of the interviews was to gather information on a general understanding of WASH and evidence of participation in WASH matters as illustrated. Interestingly, schools that promoted behaviour change in WASH practices reported increased interest and engagement of students in WASH practice. For instance, Mwananyamala Primary School, in collaboration with the WaterAid foundation, designed WASH songs and greetings for morning parades. Swahili songs included lyrics such as, "*Choo Kinaleta Heshima Tutunze na Tuvitumie Vizuri Osha Mikono kwa Sabuni Epuka Kuhara*" which translates to "Toilets bring dignity, therefore maintain, and properly use them. Wash hands with soap to prevent diarrhea".

Interview findings indicate that while most students can define WASH, they lack an in-depth understanding of WASH issues. Most schools do not have WASH clubs, which are platforms that can promote youth participation in WASH matters. A WASH club was started in one school, but due to the low attendance of students and teachers in charge, the club eventually collapsed, signifying a lack of interest. Students were

responsible for cleaning and maintaining school WASH facilities for most of the schools. There are no official WASH capacity-building initiatives; therefore, students are mainly capacitated in WASH matters through morning parades and are sometimes taught in class as part of the curriculum. Teachers reported a generally poor response and lack of interest in WASH matters from the students. The teachers suggested leveraging initiatives such as spectacles, competitions, and the use of television and other media for training students to create demand and increase youth participation in WASH.

Mobile App to Promote Positive Behaviour in School WASH Practice

SWASH Mobile App leverages behavioural theories and technology to track school students' sanitation and hygiene behaviours and encourage positive behaviour change, while collecting useful and actionable data. SWASH platform challenges students to change bad behaviour on WASH practice using online sanitation competitions in schools. *Figure 1* depicts key functionalities of the proposed system of interest. Teachers in participating schools capture photos of the best WASH practices and share them on the mobile app for anyone to comment and vote based on the criteria and theme of the competition. Schools in the competition are ranked on the platform based on the votes they receive. The App uses an algorithm to validate the true location of the school whose photo has been shared. Details such as the school's name and photo location are removed so voters rate anonymous photos to prevent biases and promote fair competition. The App allows verified health and environmental experts to share credible information with the public. The App also maintains a table of active voters and recognizes them as WASH ambassadors.

Figure 1: Functionalities of the competition-based school WASH (SWASH) Mobile App

This platform uses different themes, challenges, and indicators to conduct WASH competitions (Table 2). The criteria and indicators under each theme are derived from the Tanzania National guideline toolkit for WASH in schools.

Table 2: SWASH App Competition Themes and Voting Criteria**Theme 1: Toilet Cleanliness Competition**

Challenge: To what percentage is this school toilet clean?

Sample criteria for voting:

- The toilet should be safe and clean
- Latrines should have a washable floor, and latrine pits should allow emptying
- Access to soap and water near the latrines for easy reach
- Availability of cleaning materials for latrines/urinals like brooms and disinfectants

Theme 2: Hand Washing Challenge

Challenge: To what percentage do the students practice hand hygiene?

Sample criteria for voting:

- Observation of proper hand-washing activities
- Presence of at least one functional hand-washing point
- Availability of adequate clean water
- The use of soap during hand washing

Theme 3: Caring for SWASH Infrastructure

Challenge: To what percentage do students care about water SWASH infrastructure?

Sample criteria for voting:

- Status of facilities: broken or functional?
- Observation of activities to clean and maintain sanitary facilities factoring in gender balance

Theme 4: Environmental Cleanliness Competition

Challenge: To what percentage does this school care about environmental cleanliness?

Sample criteria for voting:

- Availability of bins or other facilities easily accessible for solid waste collection and disposal
- No littering of waste such as papers, bottles, etc.
- Functional drainage/soak pit from the water point
- Well-maintained water infrastructure and hand-washing tools.

Preliminary Testing of the SWASH Mobile App

The primary objective of preliminary testing was to capture feedback learnings from early users and integrate the feedback into the SWASH Mobile App. The testing was conducted in the TEMEKE district. The Mobile App was introduced to the TEMEKE Municipal Council administration and the district WASH coordinator, who selected five schools to be involved in testing. The schools selected were Mbagala, Keko, Mgulani, Bokorani, and Wailes primary schools. The testing phase included the following activities: introducing the App to students and teachers of each school (WASH coordinators of each school), training responsible teachers to download the App and complete school registration, upload competition the theme, and finally, launching the competition. The competition was open for a period of 1 month, and during this period, periodic visits were made to the schools for follow-up purposes.

The school that emerged top and demonstrated the best WASH practice was rewarded with a trophy, a certificate, exercise books, and a WASH package containing cleaning items such as buckets, soap, mops, brooms, detergents, etc. The least performing school was also given a WASH package as a motivation to improve their WASH practice. Top active voters were rewarded with things such as simple phones, T-shirts, etc., and were recognized as WASH ambassadors. The schoolteachers and students shared feedback, which was used to improve the Mobile App. The users recommended that a Swahili version be implemented.

METHODOLOGY**Study Setting and Participants**

To evaluate the SWASH Mobile App, a qualitative research methodology was employed to assess in depth (i) whether the App achieves its intended objective of influencing WASH behaviour change in schools, (ii) challenges (or implementation factors) that affect the success or failure of technology and behaviour-based WASH

interventions. A descriptive design with semi-structured interviews was conducted to solicit the participants' perceptions about the App concerning the influence of the intervention on WASH behaviour change in schools and challenges that affect the App's success.

This study took place in Tanzania, specifically in the Ilala district in the Dar es Salaam region. Due to the current government free education call policy, students' enrolment rates have increased yearly since 2015, which has overwhelmed existing WASH facilities like toilets. Dar es Salaam has 5 districts, Ilala, Temeke, Kinondoni, Ubungu, and Kigamboni, with 127,83,76,64 students and 35 primary schools. Based on the 2019 enrolment rate in Ilala, Temeke, Ubungu, Kinondoni, and Kigamboni, 230243, 183359, 115211, 109897 and 35526 students were recorded respectively. Ilala district has the highest enrolment rate in the Dar es Salaam region and, therefore, was selected as a study area.

The study sample consisted of 20 schools from wards in the Ilala district in the Dar es Salaam region. Inclusion criteria were based on the schools with the (a) Availability of water services (Dar es Salaam, water and sewerage corporation - DAWASCO, Borehole, distant water sources, Rivers, swamps, lake, or no water services). (b) Availability of sanitation and hygiene services (type of toilets like ventilated improved pit latrines, flush pit latrines, pit latrines with washable slabs, buckets, and soap). (c) Location (equal distribution of urban Ilala VS rural Ilala), (d) equal distribution of schools with WASH resources VS schools with no WASH resources. A total of 62 people (students and teachers) agreed to participate in the study.

Data Collection

Data collection took place from January to March 2022 and involved semi-structured interviews which were conducted through online, self-reported, and in-person questionnaires. The study questionnaires were developed after a series of meetings between the SWASH Mobile App project team members from the Y4C Hub. The

questionnaires were formulated based on the Tanzanian National Guideline for WASH toolkit of July 2016 and the National Bureau of Statistics (NBS) statistical method, standard, and Guidelines of 2017. The questionnaires were designed for teachers, students, and community members. The questionnaire had two parts. Part I (items 1 - 6) focussed on collecting demographic information about the participants, i.e., gender, age, role of the participants, etc.

Part II focussed on examining the usability and acceptability of the SWASH Mobile App by measuring the App's usefulness, user satisfaction, influence of the App on WASH behaviour changes in schools and challenges that affect the App's success. Thus, part II contained 14 questions, which were itemized into 4 sub-parts: (i) Usefulness of the App (items 7 to 11), (ii) Influence of the App on WASH Behaviour Change in Schools (item 12 - 16), (iii) User satisfaction of the App (item 17 and 18), and (iv) Barriers or challenges that hinder the success or effective use of the App (item 19 and 20). Some questions were evaluated using a 5-point Likert Scale from "Strongly Agree", "Agree", "Neutral", "Disagree," to "Strongly Disagree". Other questions were open.

Data Analysis

We used a thematic approach to analyze the collected data and interpret the meaning of selected aspects of the interviews to identify the

insights related to whether the App achieves its intended objective of influencing WASH behaviour change in schools and challenges (or implementation factors) that affect the success or failure of technology and behaviour-based WASH interventions. According to Nowell et al. (2017), the thematic analysis provides a flexible approach to getting an overview of the collected data and interpretations of the interviewees' responses by identifying themes. To reduce researchers' biases, data analysis was first carried out independently by researchers. Then we discussed resolving discrepancies while critically analyzing and examining the collected data to capture the manifest meanings. Eventually, the main themes were developed, thus yielding an account of whether the App achieves its intended objective and the challenges (or implementation factors) that affect the success or failure of technology and behaviour-based WASH interventions.

RESULTS

Demographics

A total of 62 individual interviews were conducted, representing 41 community members, 10 teachers (WASH coordinators), and 11 students from schools who participated in the competition (Table 3). Most of the participants were female (69.4%), within ages more than 30 years (59.7%), and had used the SWASH Mobile App in less than a year (91.9%).

Table 3: Summary of respondents' demographic data (n=62)

Participant characteristics		No. (%)
Role	Student	11 (17.7)
	Teacher (WASH Coordinator)	10 (16.1)
	Community Member	41 (66.1)
Age	Under 14	9 (14.5)
	15 – 30	16 (25.8)
	Above 30	37 (59.7)
Gender	Male	19 (30.6)
	Female	43 (69.4)
Years of experience in the use of the SWASH app	0 – 1	57 (91.9)
	1 – 2	01 (1.6)
	2 - 3	2 (3.2)
	> 3	2 (3.2)

The Usefulness of the SWASH Mobile App

The SWASH Mobile App is useful if it provides valuable features that meet users' expectations that are easy to use and navigate (Mackey et al., 2022). Five criteria were used to evaluate the usefulness

of the App: (i) easy to interact, (ii) easy to upload school competition photos, (iii) easy to learn/understand, (iv) easy to vote, and (v) functions as intended. The results indicate that 90.9% of the participants found the App highly useful (Table 4).

Table 4: Usefulness of the App

Criteria	Age Groups	SA	A	N	D	SD
Easy to interact	Under 14	44.4	22.3	22.2	11.1	0
	15 - 30	68.8	12.5	12.5	6.2	0
	Above 30	27	51.4	16.2	5.4	0
	Average	46.7	28.7	17	7.6	0
Easy to upload school competition photos	Under 14	11.1	88.9	0	0	0
	15 - 30	25	75	0	0	0
	Above 30	24.3	70.3	2.7	2.7	0
	Average	20.1	78.1	0.9	0.9	0
Easy to learn/understand	Under 14	44.4	55.6	0	0	0
	15 - 30	68.8	31.2	0	0	0
	Above 30	43.2	51.4	2.7	2.7	0
	Average	52.1	46.1	0.9	0.9	0
Easy to vote	Under 14	44.4	55.6	0	0	0
	15 - 30	55.6	44.4	0	0	0
	Above 30	35.1	56.8	2.7	2.7	2.7
	Average	45	52.3	0.9	0.9	0.9
Function as intended	Under 14	44.4	33.4	22.2	0	0
	15 - 30	75	18.7	6.3	0	0
	Above 30	24.3	59.5	8.1	5.4	2.7
	Average	47.9	37.2	12.2	1.8	0.9
Average Usefulness of the App		42.4	48.5	6.4	2.4	0.3

Key: SA = Strongly Agree, A = Agree, N = Neutral, D = Disagree, SD = Strongly Disagree

Influence of SWASH Mobile App on WASH Behaviour Change in Schools

The influence of the SWASH Mobile App on WASH behaviour change in schools were evaluated based on (i) the positive impact of the App on children's behaviour, (ii) the contribution of the App to positive WASH behaviour practices, (iii) the increase of the participation of SWASH Club students, (iv) a positive impact of the App on school facilities. An average of 97.5% of the participants found the App highly influences WASH behaviour change in schools (Table 5).

User Satisfaction

User satisfaction refers to users' perceived level of comfort and positive attitudes using the application (Garcia-Suarez et al., 2018). The user

satisfaction was evaluated to examine whether the SWASH Mobile App meets the users' expectations. In this study, two questions were used to measure the user satisfaction of the App. A total of 93.3% of participants were comfortable using this App, and 100% of participants were willing to recommend the App to others. Overall, a total of 98.7% of participants are highly satisfied with this application (Table 6).

Table 5: Influence of SWASH Mobile App on WASH behaviour change in schools

Criteria	Age Groups	SA	A	N	D	SD
Impact positively on children's behaviour	Under 14	77.8	22.2	0	0	0
	15 – 30	87.5	12.5	0	0	0
	Above 30	62.2	35.1	2.7	0	0
	Average	75.8	23.3	0.9	0	0
Contribute to positive WASH behaviour practices	Under 14	88.9	11.1	0	0	0
	15 – 30	87.5	12.5	0	0	0
	Above 30	64.9	32.4	2.7	0	0
	Average	80.4	18.7	0.9	0	0
Increase the participation of SWASH Club students	Under 14	77.8	22.2	0	0	0
	15 – 30	81.2	18.8	0	0	0
	Above 30	64.9	27	5.4	2.7	0
	Average	74.6	22.7	1.8	0.9	0
Bring a positive impact on school facilities	Under 14	68.7	25	6.3	0	0
	15 – 30	55.6	44.4	0	0	0
	Above 30	48.6	40.6	10.8	0	0
	Average	57.6	36.7	5.7	0	0
Influence of SWASH Mobile App		72.1	25.4	2.3	0.2	0

Key: SA = Strongly Agree, A = Agree, N = Neutral, D = Disagree, SD = Strongly Disagree

Table 6: User Satisfaction

Criteria	Age Groups	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)
Comfort of Use	Under 14	44.4	55.6	0	0	0
	15 - 30	75	25	0	0	0
	Above 30	40.5	51.4	5.4	2.7	0
	Average	53.3	44	1.8	0.9	0
Recommend to others	Under 14	66.7	33.3	0	0	0
	15 - 30	81.3	18.7	0	0	0
	Above 30	43.2	56.8	0	0	0
	Average	63.7	36.3	0	0	0
Average Satisfaction		58.5	40.2	0	0	0

Challenges and Recommendations

Participants were also asked about their challenges while downloading and using the SWASH Mobile App. Slow and unstable internet, costs of internet bundles, difficulties in fetching pictures and voting, and lack of SWASH Mobile App awareness were mainly highlighted by most of the respondents. To address the challenges, the study recommends collaboration between schools and telecommunication companies to get cost-effective internet access and improved internet infrastructure in schools, using image compression techniques to facilitate faster access to pictures and establishing an effective mobile app marketing strategy to increase awareness and user engagement.

DISCUSSION

This study aimed at critically appraising the usability and acceptability of the SWASH mobile app, which was developed using the Human Centred Design (HCD) approach for leveraging behavioural theories and technology to track school students' sanitation and hygiene behaviours and encourage positive behaviour change while collecting useful and actionable data. The usability and acceptability of the SWASH Mobile App were examined through the App's usefulness, user satisfaction, influence of the App on WASH behaviour change in schools and challenges that affect the App's success.

Participants found the SWASH Mobile App highly usable and acceptable as they expressed positive feelings about participating in the intervention despite associated burdens. Most participants reacted positively to using the intervention as demonstrated in terms of the usefulness of the App (90.9% of the participants found the App highly useful), the influence of the App (an average of 97.5% of the participants found the App has a high influence on WASH behaviour change in schools) and user satisfaction (a total 98.7% participants were highly satisfied with this application). Most participants were happy to recommend using the SWASH Mobile App to others. These findings align with other studies that examined the usability and acceptability of mobile intervention for behaviour change (Kazi et al., 2021; Matera & Smyth, 2021; Bennett et al., 2020).

The results suggest that there are no major issues or bugs with the SWASH Mobile App. However, the findings shed light on the various challenges faced by participants in downloading and using the App. The findings indicate that users face challenges influenced by various factors, with a significant concern being the prevalence of slow and unstable internet. This issue persists not only in the studied context but also aligns with broader challenges faced in other African countries, attributed to inadequate network and traffic infrastructure (Nsoh, 2021). Additionally, participants highlighted concerns related to the costs of internet bundles, difficulties in fetching pictures, and voting, along a general lack of awareness about the App. These issues are not only frustrating users but also hinder the overall functionality of the application. Addressing these challenges requires a collaborative effort between educational institutions and telecommunication companies to ensure cost-effective internet access and improved internet infrastructure within schools.

The difficulties faced in fetching pictures and casting votes indicate potential usability issues within the SWASH Mobile App. Implementing image compression techniques is suggested as a

viable solution to facilitate faster access to pictures. This can enhance the overall user experience and encourage more active participation in the app's features. A noteworthy finding is the lack of awareness about the App among most respondents. To address this, the study recommends the implementation of a robust mobile app marketing strategy to enhance brand awareness and product visibility, in line with the insights provided by Ntui (2021). Increased awareness can be achieved through targeted promotional campaigns, collaboration with educational institutions, and leveraging various channels to reach the target audience.

CONCLUSION

The study explored the usability and acceptability of the SWASH Mobile App, developed using the Human-Centred Design (HCD) approach to promote positive sanitation and hygiene behaviours among school students. It further highlights its influence on WASH behaviour changes in schools and the challenges faced by participants.

The study demonstrated high levels of SWASH Mobile App's usability, satisfaction, and perceived influence on WASH behaviour change, underscoring its potential as an effective tool in the targeted context. Participants expressed their willingness to recommend the App to others, aligning with similar findings in other studies focusing on mobile interventions for behaviour changes. While the study identified no major issues or bugs related to the SWASH Mobile App, it brought to light significant challenges faced by users. The persistent issue of slow and unstable internet, along with concerns about the costs of internet bundles, difficulties in fetching pictures, and voting, and a general lack of awareness, necessitates a strategic and collaborative approach to addressing these barriers.

The study's findings emphasize the importance of a robust mobile app marketing strategy to address the lack of awareness about the SWASH Mobile App among participants. Targeted promotional campaigns, collaborations with educational

institutions, and leveraging various channels are suggested to increase awareness and visibility. Collaboration between educational institutions and telecommunication companies emerges as a crucial step in ensuring cost-effective internet access and improved infrastructure within schools. Furthermore, the study recommends the implementation of image compression techniques to alleviate challenges in fetching pictures and casting votes, thereby enhancing the overall user experience and engagement.

This study not only contributes valuable insights into the usability and acceptability of the SWASH Mobile App but also provides practical recommendations for addressing challenges and improving the app's design for future implementations. The collaborative efforts suggested can pave the way for a more effective and widely adopted mobile intervention, ultimately contributing to positive behaviour change in school sanitation and hygiene practices.

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