

Examining the Role of "Green Apps" in Fostering Community Engagement for Sustainable HCI

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Research in the "Sustainable HCI" community is shifting from individual to broader perspectives to enable more significant impacts from their insights for sustainable futures. A critical aspect of this shift is strengthening community engagement, where individuals come together to exchange ideas and practices around sustainability. In this study, we examine the extent to which "green apps" available in app stores support community engagement. Our findings reveal that while many green apps address individual sustainability concerns, they do not fully embrace the opportunity for higher levels of interaction among users, such as interpersonal, community and organisational interactions. This paper outlines a pathway for enhancing community engagement in green apps and highlights the need for greater integration of interactions beyond the individual level.

CCS Concepts: • **Social and professional topics** → **Sustainability**; • **Human-centered computing** → **Human computer interaction (HCI)**; *Collaborative and social computing systems and tools*; Ubiquitous and mobile computing.

Additional Key Words and Phrases: Sustainable HCI, Mobile Apps, Community Engagement, Sustainability, Climate Change

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1 INTRODUCTION & MOTIVATION

The increasing need for sustainable practices in response to environmental challenges has led to a surge in research within the Human-Computer Interaction (HCI) domain. In the past decade, various efforts have been made to encourage sustainable behaviour through digital nudges [11], persuasive technologies [9], and gamification [8]. However, these studies have primarily focused on individual-level resource consumption [3], leading to questions about the impact and feasibility of such measures for lasting behavioural change. To address these limitations, the field of Sustainable HCI (SHCI) research is shifting towards a broader exploration that includes the potential for sustainable engagement between individuals and within communities [3, 6].

In light of this shift, it is essential to examine the current state of green mobile apps and their contribution to community engagement [1]. Brauer et al. conducted a study in 2016 that analyzed the domains and features of green mobile apps [2]. However, this study did not address the recent calls for overcoming individual perspectives in SHCI research. In this paper, we build upon Brauer et al.'s work by adjusting the methodological approach and focusing on higher levels of interaction between individuals. Our study aims to contribute to the growing body of literature in the field of SHCI and highlight the need for greater integration of community engagement in green mobile applications.

2 APPROACH

To identify, evaluate and categorize sustainable practices-oriented mobile apps (green apps) in the app stores, we first defined twelve relevant keywords in English and German (e.g. environmental sustainability, second hand, ...) related to sustainable practices and domains. With these keywords we have searched for green apps in the Google Play Store.

In the second step, we only included apps with more than 100,000 downloads, ensuring that the green apps had a relevant user engagement rate. Based on the app descriptions and thumbnails, we then included apps that focus on sustainable practices or offer suitable options for such practices. In accordance with Bauer et al., we classified the identified apps into the domains Food, Lifestyle, Recycle/Reuse, Mobility and Energy as well as into the features Informate, Transformate, Educate and Gamify [2]. While an app was only classified into one domain, several features can be assigned to one app, as it may offer various of them.

After that, we investigated the possible user interactions within these apps. To categorize the different degrees of interactions, we defined four levels of interactions: (1) Individual Level, (2) Interpersonal Level, (3) Community Level, and (4) Organisational Level. The Individual Level enables use cases for individuals without any possibilities of interaction with others. The Interpersonal Level covers cases where mobile apps enable individuals to connect with other individuals. Talking about Community Level we specified the case where mobile apps enable individuals to connect and exchange with a larger group of people. Lastly, mobile apps classified with Organisational Level enable individuals to connect and exchange with organisations. A mobile app can belong to multiple levels, as it may offer various levels of interaction for users.

3 FIRST INSIGHTS

In total, we identified 101 mobile apps which focus on sustainable practices or offer suitable options for such practices. These were categorised as follows: 38 in Food, 14 in Lifestyle, 21 in Recycling/Reuse, 17 in Mobility, 10 in Energy and one other. As can be seen in Figure 1a) it becomes apparent that across all domains, almost all apps address use cases on an individual level. However, with each increase in investigated levels of interaction, the number of apps capable of addressing these needs decreases. In the Food domain, 35 apps cover individual, 12 interpersonal, 7 community, and 5 organizational interactions. In relation to the Lifestyle domain, 14 apps could be assigned to individual, 5 to interpersonal, 3 to community, and 5 to organizational interactions.

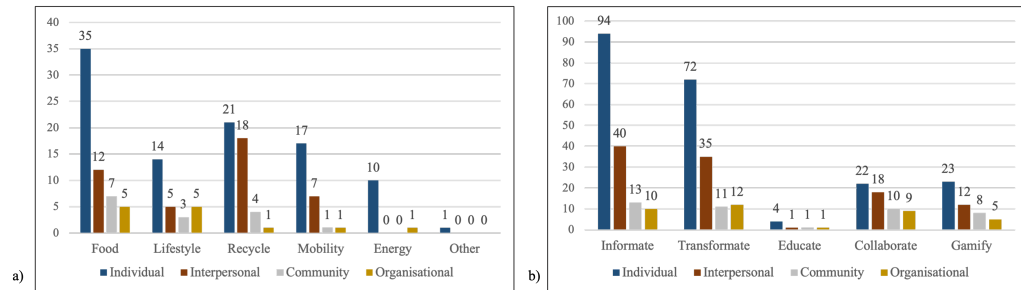


Fig. 1. Results of investigation. While chart a) displays the distribution across the domains, chart b) displays the distribution across the features. Across the domains and features it becomes apparent that green mobile apps are currently targeting individual and partially interpersonal needs, however, neglecting interactions on a community and organisational level.

interpersonal, 3 to community and 5 to organisational interactions. The Recycling/Reuse domain is the only one where nearly all apps cover both individual (N=21), and interpersonal (N=18) needs equally. However, there is still room for enhancement regarding interaction with communities (N=4) and organisations (N=1). Looking at the Mobility domain, 17 apps cover individual, 7 interpersonal, 1 community and 1 organisational interactions. In the domain of Energy, we could only identify apps that serve an individual (N=10) or organisational level (N=1). Lastly, one other identified app could not be assigned to any of the domains, which covers the individual level.

Looking at the distributions across the features at Figure 1b) 94 offer informational features (IF), enabling individual users to get information about sustainability topics. 72 apps even offer transformative features (TF) on an individual basis, leading to sustainability-oriented practices e.g. in consumption. However, the number of apps enabling these features halves by questioning it on an interpersonal level (IF= 40; TF= 35), and a small quantity enables community (IF=13; TF=11) and organisational interactions (IF=10; TF= 12). In relation to collaborative features (CF), of the apps identified, 18 could be assigned to an interpersonal, 10 to a community and 9 to an organisational interaction. Looking at Gamify features (GF), 23 offer individual, 12 interpersonal, 8 community and 5 organisational interactions. Lastly, with 4 individuals, and only one app each on interpersonal, community and organisational interactions level, the Educational Feature (EF) remains to be the least represented feature.

4 DISCUSSION & CONCLUSION

The results indicate that the majority of the identified green mobile apps are targeting individual needs, but do not address recent calls from SHCI research to broaden the perspective to include greater engagement between individuals. This may be due to the natural manner in which mobile apps focus on a user, and raises fundamental questions. Most of the apps identified are owned and operated by a profit-oriented company and are, if at all, generated from a human centered approach, which is desirable from an individual user experience driven vision. However, in accordance with the current state of literature, a shift from human-centred towards a more-than-human vision [10] is needed to fully embrace the potential of mobile apps. Consequently, HCI researchers need to think about new design frameworks that decouple the human focus from sustainable objectives, by widening towards a holistic perspective, where individuals are actors within communities and organisations in the system earth [4].

On the other hand with social networks e.g. Instagram or Telegram-Groups, we have virtual spaces that enable encounters and higher levels of interaction, condensed as a mobile app, without labelling themselves as "green", although these are also partially used as networking tools for sustainable related practices [5, 7]. Instead of questioning which features the identified green apps should adopt from social networks to embrace a higher interaction level, we argue to investigate cross paths with existing infrastructures. Similar to Bremer et al. mentioned, green apps and social networks cannot handle the responsibility of policymakers for sustainable transformation by themselves [3]. However, exploring possible interconnections could contribute to a more sustainable and efficient use of digital resources and foster community engagement.

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