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A way forward for Sustainable Human-Computer Interaction

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Sustainability has become a buzzword in the modern world. In fact, the United Nations (UN) has proposed seventeen Sustainable Development Goals (SDG) to achieve by 2030. SDG can be achieved through different approaches. As modern society is moving forward with a digital world through novel technologies, one promising way of achieving SDG is Sustainable Human-Computer Interaction (SHCI). SHCI is a relatively new research area that is trying to address sustainability issues mainly through sustainable social transformation. Thus, we conducted this research with two main objectives. 1) To analyse how Human-Computer Interaction (HCI) researchers have contributed to this evolving research area 2) To find further opportunities to address sustainability issues using HCI designs. Then finally, we suggested novel approaches to address sustainable energy goals through technological device usage. At the initial stage, research articles were collected through mainly five (05) databases: Google Scholar, IEEE Xplore, Scopus, ACM Digital Library, and ResearchGate. There, keywords such as "Sustainable HCI", "Sustainable Human-Computer-Interaction", "Sustainable interaction design" and "SHCI" were used for collecting research papers through keyword-based filtering. In addition, other research papers were collected through the references of the selected most cited papers. We considered research papers published in top-ranked HCI research conferences and journals for this review. The total collected number of 56 research articles was filtered through the inclusion and exclusion criteria of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) method. Out of 30 papers, most of the articles were published in 2014 and 2015. The bibliographic results show a decrease in SHCI research publications after 2015. According to the findings, SHCI can be achieved mainly through Sustainable Interaction Design (SID). There are two main categorizations of SID. 1) Sustainability in design 2) Sustainability through design. "Sustainability in design" aims to find solutions to social, economic, and environmental issues in our own design, implementation, and evaluation practices. For example, "Affordable and Clean Energy" can be achieved by reducing the energy consumption of the computerized machines used in our daily routines. For instance, introducing lightweight mobile apps can be a successful move for reducing data usage and energy consumption in daily-using mobile apps as a suggestion aligned with the identified opportunities for future development. "Sustainability Through Design" means designing interactive products that promote the sustainable behaviour of its users. For instance, we can consider designing mobile applications as a tool for awareness and encouraging behavioural changes favouring sustainability. One of the key findings of this study is that “sustainable energy” is the specific area that most researchers have addressed through SHCI. The results of this study are beneficial for researchers in different disciplines, such as HCI, sustainability, digital technology, and interaction designs, to contribute to sustainability by reducing energy consumption.

Keywords: Interaction Design, Sustainability, Sustainable Development Goals, Sustainable Human-Computer-Interaction