The 2nd International Workshop on Digital Nudging and Digital Persuasion (DNDP 2023)

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1. Introduction

Nudge Theory is a groundbreaking concept which proposes that subtle changes in the way choices are presented can intuitively guide individuals towards desired behaviors [1]. Fourteen years after Peter Thaler brought this theory, there has been substantial research into its application in research and practice. For example, Maiden and his colleagues [2] were able to significantly encourage employees to take the stairs over the elevator by incorporating footprints and posters that reveal the "desired path". Lee and his colleagues [3] redesigned a snack-ordering website to encourage healthy choices by locating healthy snacks on the first two pages of the website and unhealthy ones on the last two. Another example was provided by Haque and his colleagues [3] who designed a simple zero-cost nudged intervention with a personal normative message installed in users' smartphones as a screensaver to dissuade physical inactivity. This simple modification of the environment, where individuals make decisions, was able to nudge 53% of the participants to opt for a healthy snack [4]. One limitation of present technology-based nudges is the limited understanding of their long-term effects and whether nudging effects sustain once the nudges are removed [5].

Persuasive and gamification techniques also hold great potential for motivating desired behaviors, for instance promoting physical activity [6]. Design principles such as selftracking, tailoring and personalization are well-known and deeply studied in the HCI (Human-Computer Interaction) field. For instance, self-tracking is one of the most prominent theoretically informed techniques used in personal informatics tools to support an individual's regulation of their own behaviors (e.g., achieving walking goals) [6]. One should notice that both nudging, and persuasion have the same end goals but rely on different principles to encourage change. Nudges focus on guiding behaviors and decisions (i.e., decision-based) while persuasive design focuses on changing an individual's attitudes and behaviors (i.e., attitude-based).

In the 21st century, technology has become a primary tool to change citizens' behaviors and attitudes. Also, technology is the new key to guiding behaviors and decisions in systems such as the metaverse, which consists of persistent, shared, 3D virtual spaces linked into a shared interactive virtual universe. Technology can affect sustainability through persuasive systems design [7], and information systems in organizations can influence behavior to reach sustainability goals [8]. It further allows interventions to reach users who might otherwise not seek assistance (e.g., due to fear of being stigmatized). As a result, the use of digital persuasive technology in research and industry domains has attracted a lot of attention. In our present study, we focus on applying digital nudging strategies and persuasive techniques in engaging people to

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increase their level of competency and self-efficacy i.e., achieving their goals. Thus, the expected outcome of using digital nudging and persuasion is to achieve a more sustainable behavioral change for individuals.

2. Workshop Objectives

The workshop is intended to support individuals participating in the workgroup session on the utilization of digital nudging and persuasion techniques to increase goalachievement (e.g., pre-defined or self-chosen goals). This may include, but is not limited to, interventions that support students increase their academic performance, aid software engineers and researchers improve their day-to-day tasks' performance (e.g., setting goals for daily writing output, reducing social media usage), boost patients' intrinsic motivation to adhere to doctors recommendations (e.g., medication adherence), help individuals increase their physical activity levels to achieve daily walking goals, boosting healthy eating and dietary activities, motivate green transportation habits to reduce environmental impact and lessen climate change or improve people's consumption choices (thus aiding in climate change mitigation efforts such as carbon emission awareness). The application area for nudging is thus potentially unlimited. We would also like to receive contributions on the use of nudging, persuasive and gamification technologies for addressing an individual's competency and self-efficacy-based tasks. All papers will be reviewed by at least two reviewers. Accepted papers will be published in CEUR Workshop Proceedings. In addition to the paper presentation session, there will be a dedicated simulation-based session in which the participants will be asked for some real-life scenarios as a way of recreating their ideas and gathering feedback from prospective participants towards building a more persuasive atmosphere, to nudge the participant towards the desired behavior. We will use theoretical concepts such as nudge deck and normative message etc., alongside other behavioral models such as the PSD model [9], so that participants of the tutorial can find the session logically designed and enjoyable to participate in. This workshop is an excellent link-up to Persuasive Technology (PT) 2023 as this will promote technology such as nudging, gamification and persuasion to influence citizens' behavior towards reaching their goals and milestones. This workshop will allow researchers who are registered in the PT 2023 conference to do real simulation tasks which will assist them to do teamwork and improve their nudging skills.

3. Proposed Approach of the Workshop

The structure of the workshop is twofold. In the first session, we will present the work submitted by the participants in response to the workshop call. In the second session, we will have simulation-based activities. We have already run two International Workshops. These include

- an International Workshop on Wellbeing-aware Digital Design 2021 organized by the University of Oulu and LUT University, Finland and
- the first International Workshop on Digital Nudging and Digital Persuasion (DNDP 2022), organized by LUT University, Finland, which was held in Doha, Qatar, hosted by HBKU, Qatar.

The workshop proposed here will be built on top of that. Our goal is to provide an opportunity for scholars and researchers to submit their original contributions on the design, implementation and evaluation of new nudging and persuasive technologies aiding key areas including

- Digital nudging and persuasion, gamification, game-design elements, and game-based solutions
- Sustainable behavioral change towards education outcomes/health outcomes
- Choice architecture for sustainable future
- Novel visualizations of behavioral data
- Citizen and stakeholder empowerment and engagement, competency, and selfefficacy
- Theory and model-based design/co-designs for solutions
- Design thinking and stakeholder-centric design for nudging
- Empirical analysis of nudge-based interventions
- Metaverse and Metacity concept and its applications and services to connect citizens
- Other areas that are linked to nudging and persuasion

We are interested in theoretically, empirically, and/or methodologically focused contributions focused on supporting social sustainability through education, green health and environmental awareness activities, novel designs/co-designs and evaluations of mobile applications and services, AR/VR/MR, games, and social media applications and services. Systematic review articles are considered for review as well. The authors of accepted papers will be asked to give a presentation in person and in exceptional cases via Zoom. The online and physical registration links will be provided well before the workshop. The key dates of the workshop are as follows:

- Submission: 7th March 2023
- Notification: 25th March 2023
- Camera-Ready Version: 8 April 2023
- Submission: LNCS format, 5+ pages

For the simulation-based session, we will run each stage with and without nudging and measure self-efficacy/competence at different points (e.g., just after getting feedback).

- Stage 1: simulation (building scenarios)
- Stage 2: short exercise e.g., abstract
- Stage 3: bigger deliverable of any tasks

4. Format

The half-day workshop is to last for up to four hours, divided as follows:

- 05 min: Opening keywords and description of the workshop
- 40 min: Paper presentations ● 05 min: Break
- 40 min: Paper presentations
- 30 min: Break
- 30 min: Simulative group tasks (case 1: Engagement in education to increase competency)
- 05 min: Break
- 30 min: Simulative group tasks (case 2: TBD)
- 05 min: Break
- 30 min: Simulative group tasks (case 3: Engaging people in Smart services) ● 05 min: Best paper award, Q&A and closing remarks

5. Expected Outcomes

Registered participants and authors/co-authors will be expected to present their research work as a part of the workshop proceedings. They will discuss their ideas and how they are implemented into their research. The workshops include activities running case scenarios, a combination of applying theoretical concepts, engaging, and empathizing with participants' ideas and drawing conclusions to culminate sustainable solutions, showcasing project work outputs, and joining with participants' feedback. Finally, a CEUR proceedings open-access publication will be available which can be used in future as a toolkit for academic and industry stakeholders in future education and research innovation on digital nudging and persuasion.

6. Audiences

Since PT 2023 is going to be physical, therefore it can be expected that more participants will be willing to take part. There will be some participants from Finland, Portugal, India, and Bangladesh as the organizers are associated with these countries. In addition, participants will also be joining from the Netherlands (Eindhoven University of Technology) as PT 23 will be hosted here.

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