

# Preface to the First International Workshop on Digital Nudging and Digital Persuasion (DNDP 2022)

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## 1 Introduction

Thirteen years after Peter Thaler brought Nudge Theory [1] into prominence, a concept which proposes that subtle changes in the way choices are presented can intuitively guide individuals towards desired behaviors. Since 2008 there has been substantial research into its application in research and practice. For instance, Maiden and his colleagues [2] were able to significantly encourage employees taking the stairs over the elevator by incorporating footprints and posters that reveal the “desired path”. Another example is provided by Lee and his colleagues [3] who redesigned a snack ordering website to encourage healthy choices by locating healthy snacks in the first two pages of the website and unhealthy ones in the last two. This simple modification of the environment, where individual’s make decisions, was able to nudge 53% of the participants to opt for a healthy snack [3]. One limitation of current technology-mediated nudges is the limited understanding of their long-term effects and whether nudging effects sustain after the removal of the nudge [4].

Persuasive techniques also hold great potential for motivating desired behaviours, for instance, promoting physical activity [5]. Design principles such as self-monitoring, tailoring and personalization are well-known and deeply studied in the human-computer interaction (HCI) field. For instance, self-monitoring is one of the most prominent theoretically informed techniques used in personal informatics tools to support an individual’s regulating own behaviours (e.g., walking goals). 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 behaviours and decisions (i.e., decision-oriented) while persuasive design focuses on changing individual’s attitudes and behaviours (i.e., attitude oriented).

Technology holds great potential offering new interventions and reaching a wide range of individuals in a faster and cheap way. It further allows interventions to reach users who might otherwise not seek assistance before (e.g., due to fear of being stigmatised). As a result, the use of persuasive digital technology in the research and industry

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domains has attracted a lot of attention. In DNDP workshop, we focused on applying digital nudging strategies and persuasive techniques in engaging people to increase their level of competency and self-efficacy i.e., achieving their goals. Thus, the expected outcome in using digital nudging and persuasion is to achieve a more sustainable behavioural change for individuals.

## **2 The First International Workshop on DNDP**

The DNDP workshop was intended to support individuals participating in the workgroup session on the utilization of digital nudging and persuasion techniques to increase goal achievement (e.g., self-chosen or predefined goals). This may include, but is not limited to, interventions that help 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), boosting patients' intrinsic motivation to adhere to doctors recommendations (e.g., medication adherence), help individuals increase their physical activity levels to achieve daily walking goals, 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). 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 related tasks.

On March 29, 2022, we had the pleasure to organize the 1<sup>st</sup> edition of the Digital Nudging, and Digital Persuasion (DNDP) Workshop in Doha, Qatar (virtually). The workshop offered researchers, practitioners, and other relevant stakeholders from multidisciplinary backgrounds a platform to present their research work and discuss their ideas on the opportunities and challenges facing the digital nudging and persuasive technologies research community.

The structure of the workshop was two folded. In the first session, we presented the paper submitted by the participants in response to the workshop call. In the second session, we had simulation-based live study activities. The workshop also witnessed a keynote presentation from Dr Mary Barreto, an invited Professor from Madeira University, Portugal. A total of 4 papers were accepted and will be presented at the workshop. Each paper submission went through a thorough peer-review process and was assessed by at least two reviewers using the single-blind peer-review method. The research paper submissions were evaluated based on their scientific quality and significance to the DNDPs workshop. All research papers had been reviewed by at least two reviewers. Accepted research papers was published on CEUR Workshop Proceedings open access publication which can be used as a guidebook for both industry and academic stakeholders in future research on digital nudging and persuasion. Authors and co-authors were expected to present their research work as a part of the workshop.

In addition to the paper presentation session, there was a dedicated simulation-based live study session in which the participants were asked for some real-life scenarios as a way of recreating their ideas and gathering feedback from prospective participants towards building a more persuasive environment, to nudge the participant towards the

desired behaviour. As an example, Dr Reem Saleh Al Mansoori from Hamad Bin Khalifa University (HBKU), Qatar, conducted a live experiment on inclusivity and digital wellbeing, which is part of a research study called “*Changing Designers First: A Nudge-based Design Framework for Inclusiveness and Wellbeing*”. This live study was designed with the purpose of broadening the concept of inclusivity to consider users’ diversity beyond the commonly recognized abilities, whether permanent or contextual, to include socio-emotional characteristics such as susceptibility to online pressure (technical and social), self-awareness, resilience, personality, self-esteem, and self-efficacy, and to reduce potential harm experienced by users when they interact with technology-mediated solutions.

### 3 Workshop Organisers

The organisation for the online DNDP 2022 Workshop included Sanaul Haque (LUT University, Finland) and Ana Caraban (Instituto Superior Técnico + Interactive Technology Institute, Portugal) as program co-chairs, Jari Porras (LUT University, Finland) and Joseph Kehoe (Institute of Technology Carlow, Ireland) as general co-chairs, Daire O’Broin (Institute of Technology Carlow, Ireland) and Ashok Tripathi (LUT University, Finland) as organising co-chairs. We wish to thank the Programme Committee for their immense work and support:

- Fanny Vainionpää (University of Oulu, Finland)
- Larry Abdullahi (LUT University, Finland)
- Laura Nauha (University of Oulu, Finland)
- Micael Sousa (University of Coimbra, Portugal)
- Rohit Mishra (TU Delft, The Netherlands)

### 4 Presented Work

The accepted paper contributions covered broad areas of Digital Nudging and Digital Persuasion. In this areas, current research issues of interest include how to engage individuals, increase self-competency and efficacy level theory-driven game/gamified design for solutions, and novel visualizations of behavioral data, Sustainable behavioural change towards education outcomes and health outcomes:

Sousa et al. [6], in their paper “*Transforming Google Drawings into a game-based nudging tool for collaboration*”, proposed a game-based methods where participants in a meeting and a lecture played a simple collaborative game to engage in a nudging activity. This process can be easy replicated and added to online meetings and classes.

Mayumi et al. [7], in their paper “*Aroma Nudges: Exploring the Effects on Shopping Behavior in a Supermarket*”, investigated how the disposal of unsold vegetables could be solved. This study focuses on the “aroma” generated during product sampling and explores the effect of aroma nudges on purchasing behavior towards sustainability. The results suggest that the inclusion of aroma nudges has a positive potential to attract consumer interest and positively influence their purchasing decisions.

Alam et al. [8], in their work titled “*Prototyping a gamified system to persuade school-age children in developing countries: using Kahoot in online environments*”,

explored how the socio-economically disadvantaged school-age children in developing countries, used a Kahoot based online gamified platform (reward-based tasks) for solving primary level math quizzes and puzzles. This study also highlighted on using CSLT theory to design and develop the system.

Haque et al. [9], in their paper “*Do nudges work? Using personal normative message in mHealth intervention to dissuade from physical inactivity*”, designed and developed a zero-cost nudging mHealth intervention to stimulate physical activity. The result of the pilot study has shown that participants highlighted personal normative message installed as screensaver in a smartphone to dissuade their physical inactivity.

The DNDP workshop was an excellent match to Persuasive Technology (PT) 2022 as this promoted technology such as nudging, gamification and persuasion to influence citizen’s behaviour towards reaching their goals and milestones. This workshop allowed researchers as well as relevant stakeholders who are registered and engaged in the PT 22 conference to present their work and to do real simulation tasks which assisted them to do teamwork and improve their nudging skills.

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