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Self-Determination Theory in HCI: Shaping a Research Agenda

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ABSTRACT

Self-determination theory (SDT) has become one of the most frequently used and well-validated theories used in HCI research, modelling the relation of basic psychological needs, intrinsic motivation, positive experience and wellbeing. This makes it a prime candidate for a 'motor theme' driving more integrated, systematic, theory-guided research. However, its use in HCI has remained superficial and disjointed across various application domains like games, health and wellbeing, or learning. This workshop therefore convenes researchers across HCI to co-create a research agenda on how SDT-informed HCI research can maximise its progress in the coming years.

CCS CONCEPTS

• **Human-centered computing** → *HCI theory, concepts and models.*

KEYWORDS

self-determination theory, research agenda, motivation, wellbeing, user experience

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1 BACKGROUND

Self-determination theory [SDT, 19] has become one the most frequently used and well-validated theories employed in HCI research, addressing questions of motivation and wellbeing across domains like games [22], health and wellbeing [1, 17], gamification and behaviour change [5, 24], learning [11], crowdsourcing [13], human-robot interaction [10, 23], virtual agents and human-AI interaction [3, 25]. Positing three basic psychological needs whose satisfaction fuels intrinsic motivation, vitality, and wellbeing, SDT has directly informed basic HCI work in user experience and experience design [6], positive, hedonic or eudaimonic experiences [7, 15], motivational design [26], player experience [22], and positive or wellbeing-driven design/computing [1, 4].

As such, SDT holds potential to become an integrating theory or "motor theme" [14] for HCI research, especially since motivation and wellbeing are centrally involved in many grand challenges in HCI [20, 21]. However, uses of SDT in HCI often remain superficial and partial, as shown in a recent review of SDT in games HCI [22]. In addition, there has been little communication between different HCI communities using SDT, notably games and health and wellbeing [1]. Meanwhile, HCI researchers actively debate how best to translate theory into HCI research and practice [2, 9], and whether HCI would benefit from more theory-driven work [14]. To realise the full potential of SDT in HCI, we need to move from disjointed applications in separate domains to more systematic collective research: identifying and contributing to a joint body of knowledge, articulating and contributing to shared "middle-range" [16] concepts and models at the intersection of SDT and human-computer interaction, and identifying underlying and shared theoretical, methodological, and meta-scientific questions and issues in using (self-determination) theory in HCI.

To this end, we propose a hybrid workshop to generate a research agenda for the use of SDT in HCI — "not [...] as a forecast of the future, but as a proposal—a stimulus for further research." [8, p. 91]. By engaging a diverse community of researchers who use (or are interested in using) SDT, we hope to do precisely this: identify shared, and maybe underlying and latent issues and opportunities associated with the use of SDT in HCI, and derive a structured

outline of what lines of research would benefit the field most in the coming years.

1.1 Workshop Goals

This workshop invites contributions from HCI researchers and practitioners across various domains who are interested in the role of SDT and psychological theory in HCI more broadly. The workshop aims to:

- Identify new and existing issues and opportunities around SDT's use in HCI
- Organise and build consensus around identified issues and opportunities to articulate a research agenda for the community that can guide important future work, in the shape of a concrete document
- Provide a forum for researchers using SDT in specific application domains, disciplines, and methodological traditions to connect with others and learn from their experiences
- Advance broader debate about the possible role and form of theory-driven research in HCI, using SDT as a concrete case in point

At a broader level, we hope that the workshop will connect and inspire researchers to form collaborations for concrete next studies that address the issues, open questions, and opportunities surfaced in the workshop, and thereby play a small role in encouraging theory-driven research in HCI.

2 ORGANISERS

To actively develop the early career researchers working on SDT in HCI today, our organising committee intentionally champions and is led by junior researchers, supported by senior researchers with rich networks and experience in running CHI workshops and similar events. Our committee also brings together expertise across the key HCI application areas of SDT (games, education, behaviour change, health and wellbeing), and ensures geographic coverage of different time zones (US, EU, AU) needed to deliver the online part of our workshop.

Nick Ballou is a PhD candidate at Queen Mary University of London. His research explores experiences of need frustration in games and their relationship with wellbeing, with a focus on objectively measured gaming behaviour. He seeks to promote open research practices and serves as Queen Mary's Local Network Lead for the UK Reproducibility Network.

Sebastian Deterding is Professor in Digital Creativity at the University of York. His work on motivational design and gamification heavily draws on SDT, and he has presented empirical SDT-informed work on contextual autonomy support at CHI. He has led 5 previous CHI workshops on gamification, social games, and embarrassing interactions.

April Tyack is a Postdoctoral Researcher at Aalto University, studying videogames, meta-science, and the use of theory for understanding player experience. She is also the vice-president of DiGRA Australia, and a contributing editor at Metro Magazine.

Elisa Mekler is an Assistant Professor in Computer Science at Aalto University. Drawing from her background in psychology, Elisa has applied SDT to empirically study motivational phenomena underlying video games, gamification and user experience, as well as investigated the applications of psychology-based paradigms in HCI. She is papers chair for CHI PLAY 2021 and chairing the CHI 2022 Games and Play subcommittee.

Dorian Peters is a designer and researcher at Imperial College London and the University of Cambridge. She co-created the METUX model which applies SDT to design for wellbeing and runs workshops on the topic, including four previous courses at CHI, and co-authored the influential SDT-based book *Positive Computing* with Rafael Calvo [1].

Rafael A. Calvo is Professor at the Dyson School of Design Engineering, Imperial College London. He is also co-lead at the Leverhulme Centre for the Future of Intelligence, and co-editor of the *IEEE Transactions on Technology and Society*. He directs the Wellbeing Technology Lab that focuses on the SDT-informed design of systems that support wellbeing in mental health, medicine and education.

Gabriela Villalobos-Zúñiga is a User Experience Advisor at Cargill. She recently completed her PhD, where she focused on creating effective behavior change apps. She conducted empirical research contributing to bridging the gap between the SDT psychological constructs and mobile app design.

Selen Turkay is lecturer in Human Computer Interaction at Queensland University of Technology. Selen has applied SDT to design gamified systems to maximize user motivation in various contexts, including education and to examine player experiences in videogames. She is the co-director of Cognitive and Learning Environments in Virtual and Augmented Reality (CLEVAR) group.

3 PRE-WORKSHOP PLANS

By December 2021, we will create a Wordpress site with call for participation, details of the workshop structure, organisation committee, and instructions for submitting. Participants will submit their position pieces on EasyChair. Accepted pieces will be posted to the website at least 4 weeks before the first online workshop part, and will remain there for viewing after it has concluded, together with the keynote videos (see below).

We will launch a call for participation by December 16 (see below). The call will invite the submission of short position papers (max. 1,500 words, excluding references) outlining one challenge or opportunity potential attendees have identified around SDT in HCI.

We will send the call to SIGCHI and other email lists (including relevant adjacent communities in psychology, informatics, and computer-mediated communication), promote it on social media, and distribute by reaching out directly to organisers' colleagues with a known interest in the topic; in each case, we will encourage potential attendees to share further to reach communities we may not be able to easily access. As SDT is notably used in UX, Games User Research, Digital Health, and Behavioral Design practitioner communities, we will also post the CFP on relevant LinkedIn pages and share it with our networks in these communities to attract potential industry practitioners.

The organisers will review submitted position papers to select up to a maximum of 35 participants for the workshop. Submissions will be accepted based on quality, diversity of topics and perspectives, and expected ability to inform the workshop. All accepted

participants will be instructed to finalise position pieces for posting on the workshop site, signing up to the online or onsite workshop component, and familiarising themselves with all position pieces and videos ahead of their workshop slot.

4 HYBRID FORMAT

The workshop will adopt a hybrid format with one separate onsite session and a varying number of virtual sessions to balance demand over preferred time zones. On submission, participants are asked to sign up for preferred onsite or virtual participation, and a preferred time zone for the latter. At each session, at least one member of the organisation committee will be present to act as facilitator. Participants who join any session (virtual or onsite) will have access to all advance materials (position papers and keynote videos) before their session starts and will be able to access all material outputs and captioned recordings (provided participant consent) resulting from all other sessions for asynchronous use.

During the online period (April 14/15, 2022), we will run up to six separate 4-hour virtual sessions staggered in different time zones: North America (0-2), Europe (0-2), and Asia-Pacific (0-2). To run a session in a given time zone, we set a minimum of 5 and maximum of 10 participants registered for that time zone. If a time zone session doesn't reach critical mass, we will ask participants to switch to the most convenient alternative session. If a time zone is over-subscribed, we will split it into two back-to-back sessions. The virtual sessions are followed by an 8-hour (5.75 working hours) in-person session taking place in New Orleans, which we cap at 25 participants to allow productive work.

Participants in virtual and onsite sessions will go through a similar process (see Section 5), informed by reading all position papers in advance. The major difference between virtual and onsite sessions is that the virtual sessions will be shorter to minimise Zoom fatigue and fit more flexibly into people's schedules. This shorter length is enabled by the fact that virtual sessions will have fewer participants, which will shorten planned activities (less presentations, fewer world cafe rotations), and pre-recorded keynotes can be watched before the workshop. Where the onsite session uses tables and physical materials for recording, we will run virtual sessions on Zoom with Miro for virtual recording.

We conclude our activities with an opt-in post-workshop online phase where participants can review, comment, and vote on draft research agenda items the organising committee collates across all sessions.

This workshop format emulates a 'wisdom of the crowd' structure: Individual sessions work more or less independently on a selected subset of themes, where not all themes are covered in all sessions, and some themes may be covered in multiple sessions, but all themes are covered in some session. The integration of session results is offloaded into out-of-workshop work by the organising committee. This allows for a wider diversity of perspectives to inform the research agenda, allows individual themes to receive more time and attention in each session, and maintains productive energy in sessions, compared to an alternative where participants would be expected to first work through and integrate an increasing amount of prior work by participants in earlier sessions.

5 WORKSHOP STRUCTURE

The proposed workshop structure is outlined in Table 1. Both onsite and virtual sessions center around the production of a research agenda document. We therefore structure the workshop into blocks that correspond to stages in generating such a research agenda, namely *understanding the landscape* (lightning round), *provoking new ideas* (world cafe), and *codifying the knowledge* (fleshing out) [12]. Blocks will be interspersed with breaks and keynote presentations (see Table 1). Even within blocks, groups and activities will be rotated approximately every 20 minutes to maintain energy levels throughout the workshop.

Keynotes are 3 pre-recorded, 10-minute 'impulse' talks watched before (virtual) or interspersed throughout the workshop (onsite). They help both attract participants to the workshop and offer broader perspectives on SDT, its place in HCI, and the role of theory in HCI — see table 2 for confirmed speakers and topics. Our primary keynote, Professor Richard Ryan, will additionally be present for a live (remote) Q&A session with the audience during the in-person session. We will collate questions for the Q&A from the virtual sessions and share its recording with virtual participants afterwards.

The **lightning round** gives a low-burden way for participants to introduce themselves and (re)familiarise themselves with the breadth of SDT-related issues that others have raised. Participants have two minutes each to present the idea of their position paper in any way they choose: talking without visual aids, using slides, or another option. We expect that attendees will already start to identify patterns and related issues while listening to the lightning round.

The **world cafe** is a proven method we have used with great success in prior workshops to let a large group of participants generate, capture, and build on each others ideas. The organisers will identify and prepare ahead of time present organising themes across all accepted position papers, and present these to the participants as virtual breakout rooms and whiteboards/physical tables with whiteboard paper pre-filled with the theme label and a list of matching position paper issues. Participants can then propose additional themes they saw emerging (if any), set up as additional boards. Participants then rotate in 15-minute rounds between theme boards, choosing the ones they are interested in most. During each round, they are encouraged to discuss the theme and capture and organize their ideas on the board. On rotation, one person is asked to stay on their current board to recap the previous discussion to board newcomers. This format regularly mixes up groups, allowing participants to work together with a variety of other people. We Expect more themes than rounds of rotation, allowing participants to self-select the themes to which they feel they can offer the most, while multiple sessions increase the chance each theme will receive some coverage.

In the **fleshing out** block, participants will organise into small (2-4) groups each focusing one theme that is most compelling to them, tasked with integrating the information of the world cafe and position papers into Google Docs templates prepared by the organisers; this template will correspond to the structure of a section in the research agenda, entailing items like title, short description, rationale (why this matters), open key and sub-research questions,

Table 1: Proposed Workshop Structure

Activity	Time (Onsite Session)	Time (Virtual Session)	Description
Introduction	15	15	Organisers welcome and walk through workshop setup
Lightning round	50	20	Each participant gives a 2-minute presentation introducing themselves and summarising their position piece
Keynote 1	15	-	Pre-recorded impulse lecture by Richard Ryan
Keynote 1 Q&A	30	-	Participants can pose questions about the keynote and their position pieces to Richard Ryan
Coffee	20	-	Break time
World Cafe I	45	30	Participants rotate between tables that each correspond to a theme, identifying and categorise issues related to that theme
Keynote 2	15	-	Pre-recorded impulse lecture by Marc Hassenzahl
World Cafe II	45	30	Participants rotate between tables that each correspond to a theme, identifying and categorise issues related to that theme
Lunch	90	45	Break time
Keynote 3	15	-	Pre-recorded impulse lecture by Yvonne Rogers
Fleshing out	75	45	Small groups work out a chosen theme into a templated, clear overview and potential next steps
Coffee	20	20	Break time
Wrap-up	45	30	Groups present their fleshed out themes, organisers collect feedback and guide next steps

and proposed research designs. Participants can collaboratively write and live-edit their section in Google Docs.

At the **wrapup**, each group will briefly present their structured document to the full workshop, and provide feedback on the workshop itself. The organizers will talk through the post-workshop plans and let participants opt into or out of these.

6 POST-WORKSHOP PLANS

After the workshop, all materials and recorded sessions for which we gathered consent will be shared with all participants through a password-protected drive. The organizers will integrate the results of all sessions into a single draft research agenda. Participants who opted into this can then leave comments on the draft agenda and participate in a force ranking of its items. The organising committee will integrate this information into a coherent journal article draft. Participants can provide feedback on the draft and become co-authors on it should they wish. The submission-ready document will be shared with all attendees and posted as a preprint.

We plan for this agenda and the position pieces accepted to the workshop to form the basis of a journal special issue on the same topic with *Interacting with Computers* and have already secured in-principle agreement with the journal's editor-in-chief, Prof Helen Petrie. Workshop participants will be invited to submit their position pieces as extended abstracts to an open, two-stage Special Issue CFP, allowing them to expand position pieces accepted to the special issue into full papers that incorporate workshop feedback.

7 CALL FOR PARTICIPATION

CFP: A Research Agenda for Self-Determination Theory in HCI (Workshop at CHI 2022)

Self-determination theory (SDT)—a multifaceted theory stating that people are motivated by innate and universal psychological needs for autonomy, competence, and relatedness—has become one of the most frequently used and well-validated theories used in HCI research, but its use often remains superficial and disjointed. This workshop therefore convenes researchers across application domains (games, health and wellbeing, learning, etc.) to co-create a research agenda on how SDT-informed HCI research can maximise its progress in the coming years.

Interested participants should submit a short position piece (up to 1500 words, excluding references, in the ACM single column format) outlining one challenge or opportunity they've identified around SDT in HCI. We invite submissions on questions including but not limited to:

- **Forming theories**: Articulating 'mid-range' and domain-specific theories and models of SDT for HCI issues
- **Testing predictions**: Identifying key untested predictions of SDT in HCI areas

Table 2: Keynote Speakers and Topics

Speaker	Relevance to workshop	Keynote Topic	Status
Richard Ryan	Co-creator of self-determination theory [19]	The next 10 years of SDT research	Confirmed
Marc Hassenzahl	Leading researcher on user experience and wellbeing design [6, 8]	Contextualizing SDT in wider user experience and wellbeing-driven design	Confirmed
Yvonne Rogers	Leading researcher on HCI theories and interaction design [18]	The role and value of theory-related work in HCI	Confirmed

- **Advancing methods**: Issues and advances for robust HCI study designs and measurements on SDT constructs
- **Widening application areas**: Identifying new HCI areas of application for SDT
- **Exploring mini-theories**: Unpacking possible HCI applications of under-used SDT mini-theories
- **Computational interaction**: Computational methods for measuring, modelling, predicting SDT constructs and adapting interfaces
- **Translational research**: Methods, patterns, and other translational resources making SDT applicable in interaction design

Attendees can join either a remote 4-hour session during the CHI 2022 web exclusive (April 14–15, 2022) or a fully in-person full-day session at CHI 2022 in New Orleans. Please note that at least one author of each accepted position paper must attend one of the workshop sessions, and that all participants must register for both the workshop and for at least one day of the CHI 2022 conference.

Important information:

- **Website**: http://www.positivecomputing.org/p/chi2022.html
- **Submission site**: https://easychair.org/my/conference?conf=sdthci21#
- **Position paper submissions due**: end of 24 February 2022, anywhere on earth.
- **Participants notified of acceptance decision**: 1 March 2022.

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