Turtles and Ethics: Experiential Learning through Game-making

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Abstract

Teaching and exploring the ethical issues brought about by digitalization is an important challenge in current higher education programs. Experiential learning through games is becoming increasingly relevant as games exert an enormous influence on the imaginarium of newer generations. This paper details how a class of international graduate students engaged in a year-long exploration of ethics, gender, and sustainability issues by playing, remixing, and designing games using an original Design Games Framework. Using a qualitative approach based on participatory observations that followed the student's entire game-making process and a series of final semi-structured interviews, the paper illustrates how game-making can enable higher education students to better understand the complex interplay of ethical issues and digitalization processes, as well as confirming that the Design Games Framework is a valid instrument for the exploration of ethics through the design of tabletop games in a higher education setting.

Keywords: Experiential learning, Game-based learning, Privacy, Digitalization.

1. Introduction

Teaching and exploring ethical issues in higher education settings is an important yet challenging activity (Piper, 1993). Literature addresses challenges in engaging higher education students in ethics-oriented teaching activities in academic areas such as engineering (Zandvoort et al., 2000), science (Johnson & Selgelid, 2010) and information systems (Cohen & Cornwell, 1989).

In the 2020s, games and gaming occupy an important economic, cultural, and social position (Manovich, 2000). Worldwide, 2.8 billion people play video games, with the 3 billion thresholds forecasted to be crossed in 2023 (Clement, 2022). The generational shift (Cushman & Wakefield, 2021) and convergence phenomena (Jenkins, 2006) are extending the influence of games through the dissemination of game content, game logic, and game culture in a variety of media. Games are maturing and diversifying, achieving increasing *"artistic sophistication"* (Tavino, 2009) and

unprecedented market success in a remarkably short period of time. The video game industry is currently the most lucrative entertainment industry, for an estimated 2019 worth of 147 billion USD (Richter, 2020), and the global board games market has grown steadily and is projected to keep growing towards a 2026 worth of 30 billion USD (Arizton, 2020).

With these numbers as a backdrop, and consolidated research describing how games and playful approaches have been successfully used as learning tools (Tobias et al, 2013; Gee, 2003; McGonigal, 2011), the paper discusses a case of experiential learning based on an original design game framework (DGF) (Resmini, 2014; Resmini & Lindenfalk, 2020; Resmini, 2022) for the creation of design games as a form of serious games, games with purposes other than simple entertainment (Abt, 1970; Susi et al., 2007), centering on the wicked problems introduced by ethics, gender, and sustainability issues in the context of digital service innovation in higher education settings.

As digitalization is changing how we work and connect, the values we believe in, and our view of reality, a multitude of ethical issues connected to digitalization and digital transformation has emerged, with recent examples found in the use and abuse of social media (Trottier, 2012; boyd, 2014; Zuboff, 2015) or in the automation of processes via machine learning and artificial intelligence (Browne, 2015; Broussard, 2018; Crawford, 2021). Furthermore, the ongoing process of servitization (Baines et al., 2009), where products and purchases are replaced by services and subscription models, brings about additional ethical challenges in its shift from pay-to-own to pay-to-use models.

The study intends to answer the following research question: *how can designing games be used to enable students with diverse knowledge backgrounds to explore ethical issues in the context of digital service innovation?*

The paper first provides a brief overview of ethics and its relevance in the digital era. It then summarizes experiential-based and game-based learning in relation to digitalization, and introduces the DGF as the specific game-based methodology used to facilitate the students' exploration of ethics, gender, and sustainability issues in the context of

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digital service innovation. The methodology used in the study follows, and then empirical insights focusing on one of the games designed by the students, *"Exposed Turtles"*. The paper concludes with a discussion of results, current limitations and future work, and a summary of contributions.

2. Related literature

2.1 Ethics and digitalization

Several examples exist of digital solutions producing unethical consequences, either intentionally (Isaak & Hanna, 2018) or unintentionally (Eubanks, 2018). One such recent example is the impact of big data analytics, enabled by pervasive digitalization and a lack of relevant legislation, fueled by the collection of massive amounts of data. Zuboff (2015; 2019) discusses the vast and initially underestimated ethical implications of this form of digitalization, including the potential damage to democratic processes and the loss of free will.

Defining guidelines for a reformed approach to digitalization processes remains a challenging task because of their scale, complexity, and systemic implications that often lead to unforeseen and long-term consequences. Attempts to provide ethical guidelines have emerged in the field of AI (Jobin et al., 2019, p. 389; Barmer et al., 2021; Shneiderman, 2022), information philosophy (Floridi, 2013; 2019; Floridi et al., 2018), and design (Lovejoy, 2018; Amershi et al., 2019; European Commission, 2021).

Research focusing on the impact of digitalization on ethics includes discussions of gender inequality (Wachter-Boettcher, 2018; Criado Perez, 2019), the personhood of AI agents (Yampolskiy, 2021), and human rights (Klang & Murray, 2005).

2.2. Experiential learning, games, and ethics

Experiential learning describes a modality of learning in which "experience, experiment, purposeful learning (and) freedom" on the part of the learner are emphasized (Dewey, 1938). Learning from experience means that learners must be willing to be involved, be able to reflect and conceptualize the experience, and possess skills that allow them to use what they gained from the process (Kolb, 1984). Experiential learning has been successfully adopted for teamwork (Kayes et al., 2005), entrepreneurship (Mason & Arshed, 2013; Resmini & Lindenfalk, 2014), and in engineering education (Gadola & Chindamo, 2019).

Similarly, games have been used in educational contexts (Squire & Jenkins, 2003) to *"enliven teaching topics"*, *"appeal to different learning styles"*, and to *"encourage collaborative problem solving"* (Boyle, 2011). Game-based approaches bring an added layer of immersion and participation to well-proven case- or experience-based ways of learning (Trybus, 2015).

Game-based learning distances itself from gamification, which refers to the integration of basic game elements such as point systems, leaderboards, or badges into conventional learning activities in which the learning tasks remain largely unchanged (Plass et al., 2019). Game-based learning refers instead to the use of learning tasks redesigned *"from the ground up, taking advantage of the unique affordances of games"* (Plass et al., 2019). This redesign, based on insights from education, pedagogy, and discipline-specific theory, should be *"a good learning task but also a good game"* (Plass et al., 2019) that is applied to real-life problems in an effort to create a more engaging learning experience. Game-based learning has been successfully documented in application domains such as engineering (Lloyd & van de Poel, 2008), economics (Beato, 2015), sustainability (Boller & Kapp, 2017), and human rights (Amnesty, 2022).

Effective game-based learning environments let learners work towards a goal, *"choosing actions and experiencing the consequences of those actions along the way"* (Trybus, 2015). Progression through a game means learning what it does and why by directly immersing oneself into its simulated reality.

Games allow making mistakes in risk-free settings (Crawford, 1984, Trybus, 2015), making it possible to experiment and explore the consequences of specific series of actions while remaining *"highly engaged in practicing behaviors and thought processes"* that one can then *"easily transfer from the simulated environment to real life"* (Trybus, 2015). This naturally includes actions and choices which carry ethical weight.

Several design frameworks have been proposed for the creation of games in the specific settings of education and pedagogy. To better understand the approach adopted in the CT, it is useful to distinguish them in accordance with Fullerton's play, puzzle, and game ladder (2008). Designerly frameworks such as "design with intent" (Lockton et al., 2009) occupy the play step of the ladder, as they are primarily concerned with engagement and creativity. Methods relying on tools such as the PLEX cards (Lucero et al., 2014) or the "Information Architecture Lenses" (Brown, 2017) occupy the puzzle step, since they are not concerned with the logic of winning or losing, but offer game-adjacent structures to support the learning or exploratory experience. More theoretical frameworks such as Rooney (2012) or Smith et al. (2017) are primarily concerned with sound theoretical foundations that balance pedagogy and play. For example, Rooney proposes a "triadic theoretical framework for serious game design comprising play, pedagogy and fidelity", while Smith

et al. bring together game design, instructional design, and player considerations in an effort to facilitate the continued improvement of "smarter serious games". Both Rooney and Smith et al. mainly consider the design of digital games.

The DGF differs from these methodologies in a number of ways: it centers on design games, defined as a subset of serious games and concerned with the game step and the winning v losing conditions of Fullerton's ladder; it emphasizes learning through the process as much as through the outcome (i.e. the game); it primarily draws from from game design theory; it favors tabletop games and the embodied, situated approach to exploration via prototyping they allow participants.

2.3. The Design Games Framework

Design games are a type of serious game (Abt, 1970) specifically aimed at design problems and placing greater emphasis on the design of the games themselves as a primary part of the learning process (Flanagan, 2009). In this sense, design games are not meant to be simply finished products meant to generically experientially educate players on a given issue, but their design itself is intended to contribute to the understanding of the systemic entanglement represented and simulated by the game itself (Resmini, 2022).

The DGF draws on work by Abt (1970), Norberg-Schulz (1971), Crawford (1984), and Fullerton (2008) to provide a conceptual framing for understanding, formalizing, and prototyping complex digital/physical experiences using concepts and methodologies adapted from game design theory (Resmini, 2014; Resmini & Lindenfalk, 2020; Resmini, 2022).

The DGF has two distinct purposes; 1) provide a structured way to analyze, describe, explain, and explore experiences by breaking them down into their formal, dramatic, and spatial elements; and 2) provide a structured approach to the creation of design games meant to act as highly-interactive prototypes (Ferrara, 2012; Kapp et al., 2014), for simulating and directly engaging with complex experiences.

By introducing a way to break down a problem space into a playable system structured around a finite number of formal, spatial, and dramatic elements, the DGF introduces a manageable way to express the structure of a complex experience by means of a design game. These sets of elements work as a system, and their reciprocal relationships are an important part of what constitutes the play experience: they respectively address the various logical and procedural constraints the game places on the play experience, the narratives it weaves, and the environment it creates for players to inhabit.

The emphasis on the generative aspect of designing and prototyping a game is an important distinctive element of the DGF that merges experiential learning with game-based learning approaches and their emphasis on the creation of prototypes and artifacts (Boller & Kapp, 2017; Kapp et al., 2014). Contrary to most game-based approaches, which center on digital games and video games (Ferrara, 2012; Prensky, 2003; Tobias et al., 2013; Gee, 2003), the DGF privileges tabletop games as they are easier and quicker to collaboratively prototype and because of the material anchors they provide for the exploration of abstract problems (Hutchins, 2005).

The DGF is applied in three consecutive phases that are meant to transition from purely reflective activities to primarily generative activities:

Play, in which selected games are played and then systematically deconstructed in their formal, dramatic, and spatial elements, their relationships analyzed, and the play experience discussed. The choice of games to be played relates to the problem space being investigated, and this phase favors reflection over generation;

Remix, in which games are designed that purposefully modify existing games by recasting one or more selected formal, dramatic, or spatial elements. This phase balances reflection and generation;

Design, in which entirely new games are designed that introduce novel formal, dramatic, or spatial elements in response to the problem space being investigated. This phase favors generation over reflection (Resmini & Lindenfalk, 2020; Resmini, 2022).

The play, remix, and design phases lead learners along a reflection-to-generation process that follows the experiential learning progression from reflective learning to the making of judgments as a guide to choice and action (Moon, 2004), helping boundary-setting (Meadows, 2008) and facilitating the capture and representation of the interplay between the different parts of the problem space as visible and actionable game elements.

3. Method

3.1 Research settings

Halmstad University in Halmstad, Sweden, runs a master's program in Digital Service Innovation (DSI). DSI implements a series of seminars, lectures, and workshops, called the "Core Theme" (CT), which runs parallel to the formal curriculum throughout the entire two years of the program. The CT centers on ethics, gender issues and sustainability and its goal is to make these, and their importance in the context of digital service innovation, present and

visible to DSI students. Its implementation was decided based on feedback from the university's industry partners, who evidenced a lack of employable workforce with knowledge and experience in the area.

CT meetings with students and teachers started in the fall of 2021: they lasted two hours as a rule, were scheduled regularly every other week, and were run for a total 14 times. Because of ongoing restrictions, the first meetings were held remotely on Zoom and consisted of three introductory lectures that provided the basis of the DGF and its application in the context of the CT, and of three live play sessions in which the teachers acted as facilitators. Attendance was low but the students who were present were active and engaged. The teaching team made sure that all necessary CT- and DGF-related information was provided in the course of these meetings and that concerns were timely addressed, paying specific attention to observing and listening in to the emerging group dynamics and to the problems groups encountered along the process. Teachers-only debriefing sessions were run after every CT meeting with the specific goal of discussing how students engaged with the DGF and with the CT topics. These debriefing sessions resulted in a series of notes for the iterative improvement of future CT runs.

Emphasis was placed from the beginning on collaborative work, since the process of formalizing and solving a problem together is not only a way to gain new knowledge, but also training for important soft skills such as the capacity to listen, critical thinking, empathy, and rhetoric (Hmelo-Silver, 2004). The students were asked to self-organize in groups of 3-7 members and were then invited to design, prototype, and playstest games that explored a specific problem space of their choosing in one of the CT areas.

One student group focused on the UN Agenda 2030 and its Sustainable Development Goals, while another group decided to work with gender issues connected to recruitment and yet another group on how to raise awareness of day-to-day water use. The authors collected data on the use of the DGF for exploring CT issues through participatory observations of the student group work, and through interviewing one of the student groups to deepen our understanding of the students' work with the DGF.

3.2 Participatory observations

The largest student group (seven members) decided to focus on privacy in social media as their CT topic and design game space. This group had constant lively discussions and a high level of interaction among group members at meetings. As it also had the most members, and hence the most students

working on applying the DGF to the same topic, interviews were conducted with all of them to better understand their design process and what *they* thought of the DGF and of its use in exploring CT issues.

3.3 Semi-structured Interviews

Each member of the group focusing on privacy and social media was asked if they were willing to be interviewed, and they all agreed. The interviews were performed by the first author, who was also responsible for the logistics of the CT. All interviews were recorded following each student's individual consent. The interviews were semi-structured (Bryman, 2016) and focused primarily on the student's experience with the CT, and their experience with working with the DGF.

Seven interviews were recorded, completed, and individually transcribed. The transcripts were uploaded to Atlas.ti and coded using thematic analysis (Bryman, 2016). In the analysis we identified problems with the DGF, possible venues of improvement, and confirmation of positive results obtained through the use of the framework.

4. Empirical insights

4.1 Backdrop and use of the Design Games Framework

The self-organized student groups comprised individuals hailing from different countries. Since DSI is an international program, the students brought in a diversity of educational backgrounds, ethnicities, cultures, work experience and religions which made for interesting foundations for discussions within each group. Research shows that learning situations that involve multicultural groups are especially beneficial (Sweeney et al., 2008). English was the lingua franca for all activities in CT.

Play phase. The process started with play sessions in which the students played existing tabletop games chosen by the teachers. After having been given a brief presentation, the students had to explore the games on their own: the sessions were held regularly and interspersed with seminars illustrating the games being played from the perspective of the DGF and in the context of the CT. This play phase lasted approximately two months and included games that covered different formal, spatial, and dramatic elements so that students could be exposed to a variety of these to stimulate reflections, but that also offered an opportunity to immediately inject ethical issues into the conversation. For example, *"Werewolf"* was chosen to have the students consider problems of information asymmetry and personal bias.

"Werewolf" is a social deduction game derived from an earlier game called *"Mafia"*, created in 1987 (Robertson, 2010). Players are assigned a secret identity as part of two opposing factions: a minority group, the werewolves, who know each other, and a majority group, the villagers, who possess no information on other players. Game play alternates a night phase and a day phase: during the former, the werewolves agree on one villager who will be *"killed"* and eliminated; during the latter, all surviving players, including the werewolves, have to openly debate which player they suspect to be a werewolf. When an agreement is reached, that player is *"sentenced to death"* and eliminated. The game ends when one of the two factions achieves its goal, usually the elimination of all werewolves for villagers and numeric parity for the werewolves.

"Werewolf" is a game based on information asymmetry between the two factions. It is particularly suited to expose bias and prejudice since villagers have to take decisions that have no factual substance to them. It presents relatively simple formal and spatial sets and is mostly driven by conflict emerging from formal and dramatic elements: its objective (eliminate or reduce the numbers of the opposing faction), its procedures (debate and vote to eliminate players), and its characters (villagers vs. werewolves). Students were especially invited to consider how the dramatic elements of the game (premise, story, characters) shape the play experience and vastly influence its ethical interpretation. This specific point was reinforced by bringing to class an existing prototype based on the game in which the simple replacement of *"werewolves"* with *"immigrants"* made it contentious, polarizing, and ultimately unplayable; and by showing them a relatively recent commercial *"Werewolf"* variant called *"Women are Werewolves"*, in which players are assigned nonbinary characters at the beginning of the game and have to decide their gender, knowing that only women will become werewolves.

Remix phase. During the remix phase, which also lasted approximately two months, the students were asked to use the DGF to modify either one of the games they played or any other game the group felt confident approaching by altering one or some of its formal, dramatic or spatial elements. The remixed game should have offered a way to investigate aspects of a CT-related issue the group wanted to focus on.

Examples were brought to class that resulted in an initial series of seminal ideas, including how *"Werewolf"*-type games could be used to highlight the often invisible network of power-relations within a given group. Initial ideas were circulated for a game that would center on boardroom decision-making and swap shapeshifting villagers with corporate executives. Migration and immigration were prominent ethics-related topics in early conversations for all groups, and they also resulted in the conceptualization of possible prototypes, one of them a battleship variant that pitched the national coast guard against migrants in boats, an unfortunate all too common evenience in the Mediterranean sea.

These sketches and ideas were discussed in follow-up workshops to allow the students to better understand how small tweaks or changes to even one single DGF element could create vast ripples not only in terms of gameplay, but also in terms of the meaning and purpose of the game. Changing the modality of interaction between players, a formal element, from multilateral competition to collaboration could turn *"Monopoly"* into a political experiment. Changing a battling navy, a character and thus a dramatic element, into a convoy of migrant boats in the battleship reimagination substitutes a sanitized, aseptic view of armed conflict on the seas with the terrible reality of fleeing masses facing drowning, sinking, and deportation.

These remixes created the conditions for understanding how a non-game goal, such as the exploration of a specific ethical, gender- or sustainability-related problem could and should become the central concern of the entire process.

The process also showed the students how a careful balancing of the relationships between the elements of the three different DGF sets was necessary to create a successful CT-centered design game, defined, following Fullerton (2008), as a closed formal system that engages players in a structured conflict centered on an ethical dilemma and that resolves its uncertainties in unequal outcomes that expose the dilemma's consequences.

Design phase. In the design phase, lasting roughly three months, groups were asked to start designing and prototyping a new game specifically centered on an ethical, gender-, or sustainability-related problem of their choice, based on three primary factors: the group's own interests and intent; the design service innovation perspective explored in the curriculum; the insights, learnings, and observations obtained during the play and remix phases. The groups were also informed that their finished games would constitute part of the introduction to next year's CT cycle, to be played by the incoming cohort of students as an introduction to the CT itself, and by industry partners as part of the final playtesting moments.

The groups worked on several different games in the course of the design phase: these included a game focusing on gender inequality in the workplace, one focusing on reducing day-to-day water consumption,

one focusing on global sustainability, and one focusing on privacy and data sharing.

This latter game, called *"Exposed Turtles"*, is used here to reflect on the process, the application of the DGF to the CT, and to discuss results.

4.2 Exposed Turtles

"Exposed Turtles" was initially conceived as a calque of a commercial game, *"Exploding Kittens"*, that the group intended to thoroughly transform into an entirely new game focusing on privacy. *"Exploding Kittens"* was chosen as the initial template as that was a game the group loved to play, and which did not, in the group's opinion, present the player with a large amount of formal elements. Still, the plan was not carried through to completion since playtesting sessions and teachers' feedback made the students realize that the supposed initial formal simplicity of the game meant they would not have the time to properly introduce all necessary formal elements changes they wanted or needed.

In *"Exposed Turtles"*, players compete against each other taking the role of cartoon turtles who are immersed in today's world of social media, smartphones, and data tracking. Playing cards that describe common privacy pitfalls such as lost passwords, oversharing friends, or hacker attacks, players try to make other players share personal or sensitive data while avoiding to reveal too much about themselves. *For example, one of the "Protect"* cards, a defensive card, reads *"You read the terms of service and decide to not use that service"*. When played, it allows the player to return their *"last drawn card back into the deck"*, a positive outcome.

A *"Hack Attack"* card, an offensive card, reads *"Keylogger: keystrokes of your device are recorded to get your login info"*. If played, it allows the player to *"force (another) player to take two turns"*, a negative outcome for the other player. The game ends when only one turtle, the winner, remains unexposed.

The group felt that they were learning plenty about privacy, data sharing, and social media dynamics as they progressed through the design phase: "*Since our game is focusing on privacy, you begin to see how many things actually relate to privacy and it kind of makes you conscious (of issues). And even though we talk about these things in seminars, we do learn about ethics and then how this can be applied in the game*".

It is worth of note that designing the game became the natural, applied continuation of what the students learned and discussed in lectures and seminars that were part of the standard curriculum, and that the groups took responsibility for their own learning process as they chose what their game would focus on. As the design phase progressed,

knowledge sharing and cross-pollination among group members became also more substantial: "*I have really limited knowledge about technology, while others have a lot of knowledge, and then they can explain what (something) is. For example, someone explained how to hack a computer, which is interesting to know for sure*".

The international, multicultural composition of the groups proved to be fertile soil for a more nuanced understanding of the inherent, and often invisible, inequality that socio-technical artifacts bring into the world, and of its ethical corollaries: "*In the beginning I know we discussed (how) in Sweden we all listen to Spotify and everyone has a smartphone. And then Sarah said, oh no, in my country only men have Spotify and if you want your female friend to listen to some music you have to hand over a CD. And then I thought, oh my, I am so isolated in my bubble I live in!*"

One of the members explicitly acknowledged that "*Diversity has helped. Because for example, I may look at it from an engineering perspective that is way too technical and then someone interferes with the simplicity perspective and reduces it and breaks it down and then someone else adds the fun to it. So all of them together, we have come down to something that we are really happy with*".

These different working experiences and educational backgrounds of group members were also an important element of the learning process in relation to their specific ethical problem space dealing with privacy issues, since knowledgeable individuals could teach the others, for example, "*How important it is to use apps that use encrypted data and why that is important. So absolutely, I have learned a lot. I am "blue-eyed", you know, I use Facebook because it is so convenient*".

These peer dynamics typical of experiential learning instantiated important knowledge generation virtuous cycles: "*At some point people started to read about the topic, and then we could start discussing. I think the group is in a very different place right now (compared from the beginning). Not like we are cyberactivists, but we raised the bar*".

From a CT perspective, this meant that group members not only did learn about different ethical problems in the context of privacy and data sharing by engaging in the play-remix-design process offered by the DGF, but that the conversations sparked by this engagement made them reflect about their own personal ways of dealing with privacy in social media. This is in line with expectations set on the reflective part of the DGF process: by providing a structured approach to the creation of highly interactive prototypes in the form of games, the DGF enables the production of knowledge about the problem space both in-process, since designing a

game is in itself a knowledge-intensive process, and at end-of-process, through the finished design game, which can then be simply experienced through play by any other interested party. This preoccupation with the end-of-process use of the game was clearly visible throughout the design phase and confidently stated in the interviews: *"How can we make people be aware of the problems with for example social media and that they are so many different parts of privacy. We want to make a game that makes people think about privacy. It has been fun to think about that and at the same time make a game that brings this up"*.

Overall, students were engaged and *"belonged"* (Beard, 2010) in the CT learning process: they deepened their understanding of the ethical dilemmas they decided to focus on: *"I love this topic (privacy) and I can now say that everyone has a very different perception of privacy"* and expressed appreciation for the way the DGF was used to support the learning process: *"It is the only course (where) I have enjoyed the learning process itself"*.

4.3. Discussion

The DGF has been adopted as a prototyping approach to foster engagement and co-creation in a number of previous learning initiatives, including executive education, industry workshops, and graduate courses: integrating it with the CT effort presented nonetheless a number of new challenges.

The nature of the CT as an infrequently occurring yet lengthy activity that ran in parallel to the curricular DSI courses caused friction. This was most visible in the transition and progression between phases.

Even though the play, remix and design phases were introduced, explained, and temporally delimited in the very early meetings, all groups found moving out of one phase and into the next one difficult. This became visibly obvious in the transition between the remix and design phases, when groups struggled to recenter their ethical issue as the focus of an entirely new design game. In DGF terms, reflective activities that are meant to understand and capture the structure of a specific experience were not followed by a mature move into the generative design phase. A few groups encountered problems formalizing the relationship between their ethical problem space and the space of the game. A major point raised was related to the utility of the remix phase, whose value was not apparent to some of the students. As a consequence, some groups entered the design phase with very little consolidated knowledge brought over from the remix phase. This led them to interpret the DGF-based criticism of current efforts offered by the teachers as negative feedback, leading to a vicious cycle of multiple consecutive restarts in which

concepts were presented, discussed, and immediately abandoned.

The authors believe that an increase in the time devoted to structured supervision between the remix phase and the generative design phase could be beneficial to the learning process. These sessions should specifically center on illustrating how the knowledge produced by observing the consequences of altering specific elements from the DGF sets can be carried over into the design phase and turned into the foundations for an entirely new game.

"Exposed Turtles" did not suffer from CT-related issues, but the finished game still shows signs of this process-wide friction: the current version of the game remains by and large a remix of its *"Exploding Kittens"* source material in which only the dramatic elements of the DGF (premise, story, characters, settings) have changed.

The impact of the COVID-19 pandemic on the initial two phases, during which sessions were mostly held remotely, was also substantial and should not be underestimated. Even after face-to-face meeting restrictions were finally dropped, a number of students still preferred to engage online to avoid traveling or because of personal reluctance to return to campus. This led to tensions, especially in connection to in-group communication (*"when we are online only one person can speak at a time"*) and access to shared resources, including physical prototypes (*"people have been traveling (abroad) and it is difficult to get access to everything"*).

These factors might have contributed to the problems encountered with iteration and progression. General attendance and group size were also mentioned as minor problems: students remarked that compulsory attendance and enforced on-campus presence would better suit the CT process. The *"Exposed Turtles"* group commented that they were *"quite a lot of people, so ideas come in and then (another day) other ideas come in, and synchronizing these different ideas from different days and different people becomes a back and forth situation"*.

The CT process saw students purposefully receive limited instructions besides the framing offered by the DGF: they learned about the element sets and the play, remix, and design phases; they played existing games; they discussed the games through the paired lenses provided by the CT and the DGF; they remixed existing games to start exploring ethical issues; and they then applied what they learned to the design of new games centered on a specific ethics, gender, or sustainability problem. Finally, they prototyped and playstested their games. Most practical arrangements, and the choice of what ethical problem their game was to center on, were left entirely to the groups' own judgment, in accordance with experiential learning practices

(Kolb, 1984; Dewey, 1938; Moon, 2004). Teaching staff offered constant critique of ongoing efforts, but only provided counsel and direction when the groups explicitly asked for it.

Such a setup satisfied the pedagogical goals initially attached to the CT process: to allow students to identify and formalize their own learning goals through an experience-based learning approach (Beard, 2010; Kolb, 1984); to let them directly engage with and discuss ethics, gender issues, and sustainability by having to inscribe them in the context of a design game via the DGF; and to produce playable games that could be further used for reflective and generative purposes in both educational and industry settings.

5. Limitations and Future Work

By engaging students in the creation of new tabletop games, the DGF provided them with a more immersive and immediate experience than that offered by game-based learning methods focused on digital games. However, a few friction points were identified:

Transitions between phases proved to be difficult. Students easily got stuck in the initial play phase and needed help conceptualizing how the element sets could be used to acquire a structural understanding of the game. As a consequence, they found game playing satisfying but found repurposing the game to address ethical issues complicated. The transition between the remix and design phases was also problematic. In general, knowledge transfer between phases remained a messy and ad hoc process for most groups.

Empirical evidence from the CT suggests that initiatives spanning long periods of time may benefit from a different setup than the tighter day- or week-long settings in which the DGF has been employed so far, and require more formal milestones and checkpoints for transitioning between phases. Formal checkpoints for formal knowledge transfer in-between phases could be a possible solution to the transition problem observed. It is also possible that in long-lasting processes the individual length of the three phases may require adjustments, for example to provide the remix phase more space.

Balancing the extrinsic problem provided by the CT with gameplay flow and logic was a struggle. Most groups felt they were either devoting too much or too little attention to either of these sides. This is a well-known problem in game-based learning (Frank, 2007; Caserman, 2020; Chen et al., 2021), but one that did not manifest in previous DGF runs, possibly because of the differences in duration or focus, and had therefore not been previously addressed.

Future studies could also address the fit of the DGF with hybrid and remote education models.

Literature shows that physical co-location is preferable (Yang et al., 2022): however, successfully implementing the CT learning experience as a partially or fully online process would allow for wider use of the DGF in higher education settings, thus increasing the possibility to improve the framework and explore a variety of wicked problems beyond those explored by the CT. It is conceivable for example that online multi-user platforms such as Tabletop Simulator, that allow to prototype and play tabletop games in a shared 3D environment, **or** the use of VR or XR technology, could alleviate some of the collaboration problems encountered by the groups when working remotely.

6. Conclusions

The paper illustrates the adoption of an experiential learning process based on the design of games for the exploration of ethics, gender issues, and sustainability in the context of digital service innovation in graduate education. The process adopted an original design games framework (DGF) to drive the learning process.

Observation and interview results indicate that the students found the experiential learning process rewarding and conducive to exploring ethical issues, even though the pandemic restrictions in the early stages shaped the way the DGF was taught and the ways that student groups collaborated, placing an emphasis on discussion rather than direct exploration and making the online-only start of group work uniquely challenging compared to co-located work.

The negotiated nature of experiential learning made group size, group composition, and group dynamics an important element of the learning process. The multicultural composition of the groups also proved to be a positive defining factor in shaping the discussion of ongoing efforts and, as a consequence, of how effective the groups were at explicitly relating ethical issues to the design of the games.

The DGF effectively engaged students in the game-based activities meant to support in-depth exploration of the CT problem space: approaching ethical problems under the guise of games by means of formalized formal, dramatic, and spatial element sets provided a structured way to investigate the complex mesh of relationships and ethical consequences; concretely applying those same element sets to design new games specifically focusing on an ethical core theme illuminated behavior and systemic feedback loops that would otherwise escape exploration, ultimately resulting in a more successful and complete learning process.

These results indicate that experiential learning through DGF game-making can be an engaging and effective way to explore and teach ethical issues to

diverse groups of students in a higher education setting.

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