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**Article:**

# Close but not too close: Distance and relevance in designing games for reflection

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Persuasive games promote attitude and behavior change, of which reflection is an important precursor, but existing advice on designing for reflection is mixed and requires further empirical investigation. To address these concerns, we report on the design and evaluation (n=32) of a game to prompt student reflection on work-life balance. Participants either played as themselves or a third person character (Alex). An inductive qualitative analysis of post-play interviews, and a follow-up one week later, resulted in four themes that consider how gameplay facilitated reflection: making (sensible) consequences visible; it's like MY life; the space between Alex and I; and triggers in everyday life. In addition, a deductive qualitative analysis indicated that while both games resulted in different forms of reflection for the majority of players, those who role-played as Alex appeared more likely to experience higher levels of reflection. Through exploring the different ways that the two versions of the game succeeded, and failed, to support reflection, we highlight the importance of providing a relevant context to players (so the game feels close to their experience), and allowing them to role-play as someone other than themselves (but not too close).

CCS Concepts: • **Human-centered computing~Interaction design~Empirical studies in interaction design**

Additional Key Words and Phrases: Reflection, game design, evaluation, role-play, work-life balance

## 1 INTRODUCTION

Alongside the increasing ubiquity of digital gaming as a leisure activity, there has been much interest in how games can be utilized for a range of persuasive purposes, from supporting

learning to facilitating behavior change. Reflection has been highlighted as a key component of transformational change, with respect to both changes in understanding and behavior, e.g., [1, 21]. Emerging research indicates that games can successfully support reflection [30, 42] and often do [39, 52]. However, despite the interest in how to design games for this purpose [35], there is still much to be understood about the mechanisms that support reflective processes and outcomes.

In the area of persuasive or serious game design (i.e. where games are used for applied purposes), Kaufman and Flanagan [32] note that overly didactic approaches can lead to reactance (where individuals feel threatened and then try to resist the persuasive attempt [10]). In contrast, Khaled [35] argues that games which prioritize interventions by stealth (where the persuasive goal or aim is hidden from players) will reduce the likelihood of reflections that will transfer to the real-world. While the former approach advocates for increasing the distance between the player and the game to create a non-threatening environment, the latter appears to suggest that this distance should be decreased to ensure a relevant experience that players can identify with and connect to their day-to-day lives. Thus, the roles of distance and identification in the context of games and reflection are not entirely clear and further empirical work is required.

To further explore these issues, we report on the design and evaluation of a game that was developed to prompt students to reflect on their own work-life balance. While we know that different professional groups experience different work-life balance challenges [12], little attention has been given to the student population [46]. Given the added risk for students experiencing poorer wellbeing due to a combination of academic, financial and social pressure [49] there have been calls for positive initiatives to support better 'student-life balance' [19]. Thus, a need for supporting self-reflection and strategies for improving work-life balance has been recognized [13].

In our study, we investigate the question of how game design can influence reflection in the context of work-life balance through the evaluation of two different versions of a game. Thirty-two participants played a version of the *Student-Life Balance* game. In the first version, the player was invited to play as themselves; in the second, they were asked to take on the role of a character called Alex. The evaluation included an inductive and deductive qualitative analysis of post-play interviews, and a follow-up interview one week later. Our main contribution is to provide empirically supported insights into how game design can facilitate reflection. Through exploring the different ways that the two versions of the game succeeded and failed to support reflection, we discuss the implications for reflective game design.

## 2  RELATED WORK

### 2.1 Reflection and Gameplay

Boud and colleagues [6] describe reflection as "a generic term for those intellectual and affective activities in which individuals engage to explore their experiences in order to lead to new understandings and appreciations" (p19). While there are several differing definitions of reflection, for the purpose of this research we refer to Fleck and Fitzpatrick's levels of reflection framework [20, 21], which offers a broad understanding of different kinds of reflection. Based on a synthesis of literature, the framework describes five levels.

R0 is the lowest level, and does not involve any reflection, as it purely involves a description of events, without any elaboration or explanation. R1 is next, and refers to reflective description, where the description is accompanied by a reason or justification of some kind. R2 is dialogic reflection, whereby alternative explanations are considered, and an attempt is made to connect different pieces of knowledge and experience. R3 refers to transformative reflection, where a change in practice or understanding occurs after an intentional revisiting of an event or piece of knowledge. Finally, R4 is critical reflection (the highest and least common form of reflection) that occurs when wider socio-historical and politico-cultural issues are considered.

The framework has been used widely within HCI, e.g., [22, 31], and also to explore reflection in games. In a survey study exploring experiences of commercial games, Mekler et al. [39] note that lower levels of reflection (i.e. R1 and R2) are a relatively common part of gameplay, from players evaluating their own performance, to comparing aspects of a game to their own lives. Similar to other domains (e.g., [20-22]), the authors also note that examples of higher levels of reflection were rarely reported. Additional work by Whitby et al. [52] adds a further distinction between exo- and endo-transformation in games. The former refers to an experience that involves a change in belief or behavior outside of, or exogeneous, to gameplay (e.g., judging your own life decisions less harshly after playing *Life is Strange*), whilst the latter concerns a transformation that manifests within, or is endogenous to, gameplay itself (e.g., the player changing their opinion about a game character, or adapting their playstyle). Their findings indicate that, while still not as common as other examples of reflection, 'mundane' moments of endo-transformative reflection are more frequent than exo-transformative ones.

A related line of research has focused on exploring eudaimonic experience in games (see [16] for a review). In relation to entertainment media, Oliver and Bartsch [41] distinguish between hedonic enjoyment (which is associated with being fun and/or entertaining) and eudaimonic appreciation (which is associated with being meaningful, moving and/or thought-provoking). There is some suggestion that emotionally challenging games (e.g. [5, 14]) or uncomfortable experiences (e.g. [24, 52]), could facilitate thought-provoking experiences. Similar ideas are expressed in literature on serious or persuasive games, where negative emotions are described as having the potential to create a lingering effect that resonates with players afterwards [38]. However, Mekler et al's [39] study indicated that emotional experiences were more closely linked to reminiscing (i.e., R0 – non-reflective description – as opposed to any of the other levels), so it is unclear how effective discomfort is at prompting higher levels of reflection.

These examples indicate that reflection can play a key part of the player experience, supporting Khaled's [35] description of games as 'highly appropriate vehicles for triggering and supporting reflection' (p. 3). However, with respect to commercial games, this reflection is often endogenous to the game (e.g. [52]), and not necessarily the main goal of designers (who may be more focused instead on creating an emotionally impactful experience [17]).

## 2.2 Designing for Reflection

With respect to literature on how to intentionally prompt reflection in games, Khaled [35] argues that serious games (that have non-entertainment purposes such as education), often embody design values that can act in opposition to those that support reflection. Instead of a

focus on creating safe environments, providing problems with clear solutions, and trying to create an engaging experience where players learn through stealth, she proposes an agenda for *Reflective Game Design*. This agenda focuses on supporting critical reflection, defined as an intentional and conscious "interrogative process in which we critically assess the validity of presuppositions on which our beliefs have been based or how problems are posed or defined in the first place" (p. 4; [35]). To support this kind of critical thinking, Khaled argues it is necessary to prioritize *clarity over stealth*, to ensure the players can make real world connections to the game. Doing so will increase the likelihood that players can relate their in-game experiences to their day-to-day lives. A focus on *questions over answers*, indicates ambiguity should be increased to allow players to explore multiple possibilities – this helps to create a space in which players consider alternatives and form their own interpretations. Through having to question initial beliefs or assumptions, critical forms of reflection can also involve an element of discomfort [40]. Thus, an emphasis on *disruption over comfort* would involve moments of surprise, awkwardness or uncertainty that challenge players. These moments may be more likely to 'stick' in the player's memories afterwards. Finally, Khaled argues that immersion serves as almost the antithesis of reflection, since when we are highly involved in a game, we lack analytical perspective and critical distance. Thus, to *privilege reflection over immersion*, players need opportunities to step back and revisit their experiences from a more critical perspective.

The reflective design agenda suggests a number of promising design principles to consider when designing games that aim to support reflection. However, while two examples of games on the boundaries of mainstream design are discussed (Pippin Barr's *Art Game* & Die Gute Fabrik's *Johann Sebastian Joust*), it is not always clear how these principles could be implemented in practice (particularly in relation to how to support reflection over immersion). There is also a general need for further empirical work to examine the ways in which different design decisions influence different types of reflection.

In an example of a study that aimed to evaluate a game that was purposefully design to support reflection, Ortiz and Harrell [42] report on *Chimera:Grayscale*, a role-playing game they developed to support players in self-reflection on sexism in the workplace. Similar to Khaled [35], the authors build on Dewey [18] and Mezirow [40] to define critical self-reflection as "a type of reflection characterized by an individual's reexamination of the presuppositions that inform their own beliefs, thoughts, and actions" (p. 354). By taking on the role of a HR manager in a toxic workplace, the player engages in a number of different email exchanges over the course of a week, where their choice of response leads to different resolutions at the end of the game.

While also informed by work on role-play induction principles [53], the design of *Chimera:Grayscale* drew upon the *Embedded Design Model* developed by Kaufman and colleagues [32, 33]. The model describes three design strategies that attempt to avoid psychological reactance (i.e., reduce the chances that a persuasive game makes the player feel threatened or defensive by being overly didactic in its approach). The first strategy, *intermixing*, involves embedding persuasive content through a balance of on and off-message content. The second, *obfuscating*, relies on obscuring the true intent of the game and delivering the game's messages in a more covert way. The final strategy, *distancing*, incorporates the use of devices such as fiction, fantasy or metaphor, to create a safe space between the individuals and the serious themes or topics covered in the game. Trope and

Liberman [50] describe psychological distance as "egocentric: Its reference point is the self in the here and now, and the different ways in which an object might be removed from that point—in time, in space, in social distance, and in hypotheticality" (p. 440). Ortiz and Harrell [42] note that due to ethical restrictions they did not utilize the obfuscating strategy, but they did incorporate intermixing (by mixing emails related to sexism with those that did not), and distancing (where players role-played as someone other than themselves).

With respect to the evaluation of *Chimera:Grayscale*, the assessment of reflection involved portions of Learning Activities Survey (LAS; [36]) which were used "as an indirect measure of the amount of critical self-reflection experienced by study participants" (p.359, [42]). Since none of the participants answered no to any of the items on the LAS, the authors conclude that they all engaged in critical self-reflection to some extent. It is somewhat unclear however, what items from this scale were included (as only a few examples are included in the paper), nor how exactly the LAS was used to measure the 'amount' of self-reflection that occurred. In educational contexts the survey is not intended to be used on its own and is usually supplemented with interviews [36] suggesting that, even though this is described as an exploratory study, the approach adopted was limited in examining how the game influenced player experiences of reflection.

Empirical work does suggest that the strategies outlined by the *Embedded Design Model* can be effective in relation to reducing implicit biases e.g., around sexism [32, 33]. However, questions remain about their potential impact on real-world behavior, and how they influence more conscious forms of reflection that the *Reflective Game Design* agenda [35] aims to facilitate. In addition, both approaches differ in terms of their conceptualization of distance, which we discuss further in the following section.

## 2.3   Distance and Identification

From *an Embedded Design Model* [32, 33] perspective, a key design consideration is to increase the psychological distance [50] between the player and the game so that players can explore sensitive topics in a non-threatening way. Based on prior work indicating that higher levels of psychological transportation lead to higher levels of enjoyment [26] and persuasion [25, 26, 34], the goal is to create "an absorbing, immersive game [that] should trigger a high level of psychological transportation thereby distancing players from their real-life surroundings and true identities" (p. 186, [33]). For example, the Kaufman and colleagues [33] describe a comparison between *POX* and *ZombiePOX* – two versions of a public health game for promoting positive attitudes towards vaccinations. The former presented a straightforward, realistic narrative about disease spread, while the latter involved a fictional narrative about a 'zombie plague'. However, while the findings indicated the more fictionalized version led to higher levels of self-reported empathy and transportation (as defined by [25]), both versions of the game were similarly effective at influencing vaccination attitudes when compared to the control condition.

Ortiz and Harrell [42] implemented an additional distancing strategy within *Chimera: Grayscale* by asking players to take on the role of another character. Role-play has long been associated with learning, with role-playing games providing opportunities for perspective-taking, experience-taking and vicarious experience [28]. Gee [23] describes how role-playing games allow players to "relate, reflect on, their multiple real-world identities, a virtual identity, and a projective identity" (p. 67). The projective identity is the space in-

between the player's real-world and virtual identities, where a player can project an identity on to the character they are playing, based on their own values and the game itself. Based on this perspective, the juxtaposition between the real-world and virtual identities is key to players reflecting on their experience, suggesting that it would be beneficial to have some distance between the two. However, very few empirical studies have addressed this particular question, and without a comparison to a different version of the game in [42], it is unclear how reflection is influenced by the player relationship to their character.

Khaled's agenda for *Reflective Game Design* [35] also refers to the concept of distance, though in different ways. Firstly, when referring to Boal's *Theatre of the Oppressed* [4], she argues that when players are immersed or transported to another world, they lose the ability to reflect on their experience due to a lack of critical distance. Here, distance is not about creating an a psychologically safe space where players do not feel threatened. Instead, it is about attempting to foster a more analytical perspective, where players can step back and actively interrogate their own beliefs. Secondly, Khaled suggests that fictional contexts may be detrimental to reflection as they make it less clear how relevant the game is in terms of people's day-to-day lives. In work on serious games, others have noted the significance of relevance, e.g., [15, 29], where Súilleabháin and Sime [47] argue that transfer is more likely to occur when the game has a high degree of experiential fidelity. Experiential fidelity is similar to the concept of 'authentic simulation' [28], where the focus is less on graphical fidelity and more on ensuring the game reflects real world situations and processes so players can relate the game to their own personal contexts. From this perspective, it can be argued that the distance between the player and the game should be minimized, otherwise there is a risk that the game will not be seen as relevant enough for players to identify with.

Although, prior literature indicates the concepts of distance and identification are closely linked, it is not always clear how to implement distancing within a game (e.g., through fiction, as in *ZombiePox* [33], or role-play, as in *Chimeria:Grayscale* [42]), and what effect these manipulations may have on reflection. On one hand, distancing could create a space for players to reflect on their different identities [23], in a non-threatening way [33]. However, there is also a risk that, if this distance is too great, the player won't be able connect the gameplay to their own lives and opportunities for reflection will be lost [35].

## 2.4 Research Aim

Despite emerging ideas on how to design to support reflection in the context of applied games, questions remain about how best to do so. In particular, there are competing ideas about distance and identification, particularly when attempting to stimulate a more explicit consideration of personal beliefs and behaviors. To explore these issues, we investigate the following research question: How can game design support reflection in the context of work-life balance?

We address this question through the evaluation of two different versions of the *Student-Life Balance* game. Following Ortiz & Harrel [42], who implemented the distancing strategy of the *Embedded Design Model* [32, 33] by asking players to role-play as someone else, the two versions were identical, apart from the fact that in one, the player was asked to play as themselves, and in the second, they were asked to take on the role of Alex. The comparison of the two versions was intended to facilitate a deeper exploration of how game design can influence both the process and outcomes of reflection.

## 3 STUDENT LIFE BALANCE GAME

### 3.1 Project Background

Work-life balance has become a common discourse topic in media and academic work, but this is generally circumscribed to the work environment in juxtaposition to other facets of life, and thus students in higher education are often left out. In addition, people do not generally think of their work-life balance until it is too late and some sort of issue has aroused – often in relation to one's health and wellbeing, with levels of stress and other mental health issues rising [37]. As a result, most interventions are aimed at organizational or policy level to propose policies and guidelines [27]. While such work is important, it offers blanket solutions to challenges that are instead highly dependent on personal context and preferences. Prior work has identified the need to support boundary control to help individuals better manage the constant demands from various life domains [37] yet there is a lack of instrumental support for reflecting on challenges around work-life balance [13].

While we know that different professional groups experience different work-life balance challenges [12]. students have their own set of struggles, which call for positive initiatives to support better 'student-life balance' [19]. In fact, students in higher education often experience a number of lifestyle changes and challenges, where the transition to university life might be the first time that many have moved away from home and they may need to rebuild their social support network. The new-found freedom and independence that comes with living on one's own can put additional pressures on students' finances and time management skills, where students need to learn, perhaps for the first time, to balance socializing with the pressures of studying [19].

The oversimplification of the expression 'work-life balance' can also become a conceptual trap. There is an assumption that time and resources spent for 'work' and 'life' need to be equally distributed, but we know from existing work that this a much more complex issue and several tradeoffs need to be made, especially in our hyperconnected world [12]. The game developed for this study plays around this concept of 'balance', where students need to keep track of how various behaviors might affect four main aspects of a student's life and reflect on the implications: health, finance, social life and academic attainment.

### 3.2 Designing the Game

The *Student-Life Balance* game was custom developed using the Unity game engine and ran on a desktop PC controlled by a mouse. The game is presented as a "visual novel" style of game [11] without any audio. The aim is for the player to progress through a "term" or "semester" at a fictional UK university. The overall game was particularly influenced by two aspects of the Khaled's agenda for *Reflective Game Design* [35]. The first was *clarity over stealth* where we decided to set the game in a fictionalized yet experientially realistic university environment and to be explicit about its focus on work-life balance. The second was *questions over answers*. Though the goal of the game was clear, to try and balance different aspects of their lives, we wanted to ensure that the scenarios presented to the player did not have a clear cut 'best' answer, where the outcomes of the game depended on the cumulative effects of choices without an obvious correct path through the game.

We chose to explore the distancing strategy of the *Embedded Design model* [32, 33], following Ortiz & Harrell [42], by developing two versions of the game. In the first version the player is addressed directly: "You are about to start your second year…" (Figure 1; see supplementary materials for gameplay recording). In the second, they take on the role of a student named "Alex" (Figure 2). "Alex" was intentionally left as a blank slate to allow people to fill in the gaps themselves (rather than impose a particular character that players may or may not identify with). To this end "Alex" was chosen as a gender-neutral name and there are no images of "Alex" anywhere in the game. In the "You" version, the student's academic subject is not mentioned (as presumably, they are aware of what they are studying), whereas in the "Alex" version, Alex is studying "Academiology" (an obscure subject that all participants were unlikely to be familiar with). Finally, in both versions, the university is also fictional, though the name is similar to the university that the participants attended.
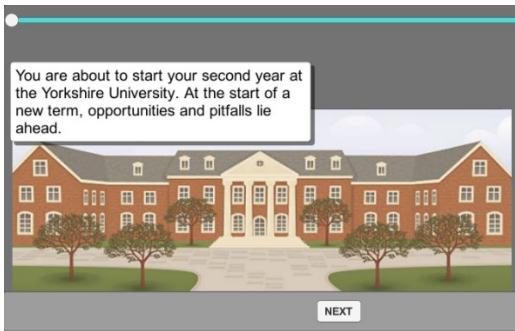


Figure 1: In one version of the game, participants are told that they are about to start their second year at university.
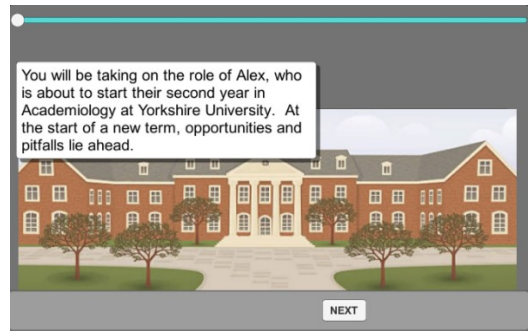


Figure 2: In the other version of the game, participants are told that they are taking the role of Alex, a student at the university.
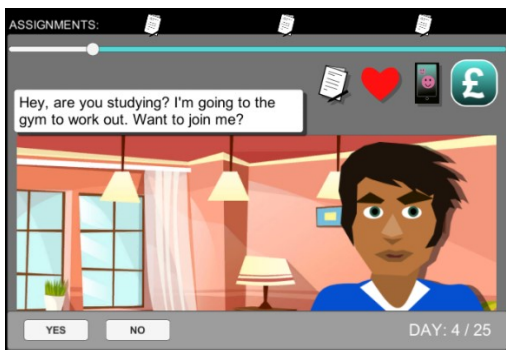


Figure 3: As the game progresses the player makes decisions about how to spend their time.
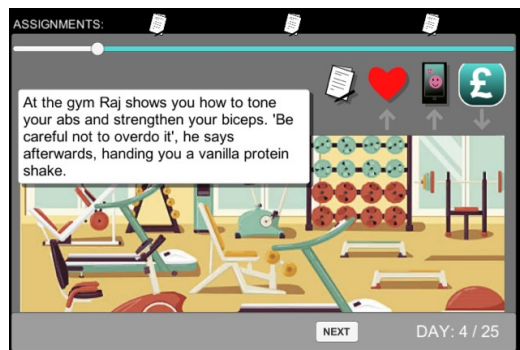


Figure 4: After the choice they are given feedback on how the choice impacted their studies, health, social life and money

The interface of the game consisted of visual or graphic novel-style images, a progress bar indicating how far through the term the player is, and icons that represented specific dimensions of work-life balance: academic study, health, social interaction and finances.

Throughout the game, players have to make decisions about how they spend their time and money, where the player responds to a prompt or question posed by the game with "yes" or "no" (see Figure 3). After each decision, arrows briefly appear under the dimensions that have been affected in each case to give the player feedback about their decisions (see Figure 4, where the decision to go to the gym has positively impacted health and social interaction, but decreased their finances). To add variety, a small number of scenarios also allowed players to select from a list of three options (e.g., Figure 5).

At set points in the game, players' academic study is "assessed" and they receive a grade which is dependent on how much effort they have allocated to studying. At the end of the in-game term, and thus the end of the game, the player is presented with an end-of-term assessment, based on how they performed in relation to each dimension of work life balance (see Figure 6). For each dimension, there were four possible outcomes to reflect player choices (1) 'low': if they spent too little effort; (2) 'high': if they spent too much; (3) 'OK': where they put in some effort but perhaps could have tried a little harder, and (4) 'good': where they put in a good amount of effort but didn't go overboard. There were also two additional outcomes regarding the Study and Finance dimensions. The first was triggered if the player chose to 'cram' two out of three times that they were offered this choice before an assignment was due. The second occurred if the students took out a loan and did not pay it back before the end of term (see supplementary materials for the different possible game outcomes).
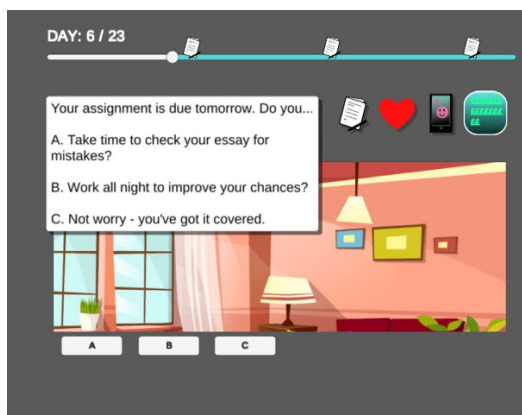


Figure 5: Some decisions have 3 options.
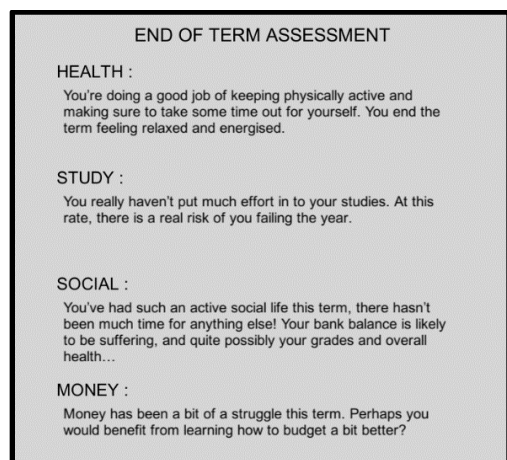


Figure 6: At the end of the game players are given an assessment for each of the four factors

## 3.3 Game Development

The game went through an iterative development cycle, with two rounds of playtesting, as well as workshops with, and feedback from, the wider research team. The playtesting was carried out by the third author. The game developer was not involved in these sessions, and it was explained to participants that we were interested in eliciting feedback to improve the design of the game. In the first round of playtesting, the game was piloted with five

participants, and in the second round, three participants checked that changes to the game had the desired effect. The participants were all university students (3 female, 4 male; mean age: 21.17, SD: 2.30). The playtesting yielded helpful comments and suggestions, such as aspects of scenarios that seemed unrealistic and that the assignments were given too frequently. The prototype that was tested also included a "maybe" option as well as "yes" and "no". Selecting "maybe" would randomly select either a "yes" or "no", but testers found this confusing and had different interpretations of what the response signified e.g., thinking it meant they were not interested at the current time, or that it would lead to more information.

In addition, earlier versions of the game included persistent bars underneath each dimension to reflect the cumulative effects of player choices. For example, players who chose to study rather than socialize with friends would see the social bar decrease and the study bar increase. The play testing feedback suggested players were too focused on maximizing the bars under each dimension on work life balance and not paying that much attention to the fact they needed to score somewhere in the middle to achieve a good balance. In later versions, this was changed to the briefly appearing arrows (as shown in Figure 4).

Early versions of the endings provided the player with a percentage score for each of their stats (health, social, study, money) and a description of how they did in managing each factor. The final version of the game presented only the descriptions and not the percentages as testers again indicated that they felt the aim of the game was to maximize each stat. The playtesting also helped to improve the balancing of game outcomes and the overall challenge of the game. For instance, it should not be possible to maximize all the dimensions during a single game, to reflect the fact that if you do too much of something, you are likely to have less time for other aspects of your life.

## 4   METHOD

### 4.1   Overview of the Study

Ethical approval for the main study was obtained from the faculty ethics committee at the University of York. Students were recruited using posters and email lists distributed across the departments to ensure that participants were from a range of subject disciplines. A £10 Amazon voucher was offered for participation in the two-part study. Data collection was carried out by the third author, who also transcribed the interviews for analysis.

*4.1.1   Part 1: Gameplay and interview*
In the first part of the study, participants were asked to provide demographic information and about their game-playing habits and preferences. They then played through one of two versions of the game ("Alex" or "You") once before they were interviewed. The session took up to 30 minutes (with roughly half spent playing the game, and the other half spent on the interview). The screen was recorded to capture the game play in case the research team needed to cross reference any decisions made in game during the analysis. Participants were not asked to think aloud or discuss the game whilst playing it. After they finished the game, the following prompts were used to ask participants about their experiences but without directly ask them to "reflect" (the questions were informed by [43]).

1.  What they were they trying to achieve in the game and how they were going about making choices.
2.  How they felt about scenarios and outcomes in the game and whether anything surprised them.
3.  Whether they related to the game or identified with any of the characters.
4.  How they felt about the game ending and the descriptions they were given.
5.  Whether they would choose to play again if given the opportunity.
6.  Whether they had any further comments.

*4.1.2 Part 2: Follow-up interview*

Similar to Iacovides & Cox [30], the second part of the study took place a week later via telephone or online equivalent in which the participant took part in a short follow-up interview (up to 10 minutes). The follow-up interview first asked if the participant had thought about the game since playing or talked to anyone about it. If they had not, they were asked for any comments they had about the game, and then thanked for their participation. If they had, they were also prompted to explain what their thoughts were, what they have said to or discussed with others, whether anything had changed in their life after playing, what they think caused/triggered those changes, and how they felt about them.

## 4.2 Participants

A total of 32 student participants were recruited across a range of disciplines, where Table 1 provides a breakdown of demographics, academic area of study, and what games they reported playing and how often. There were 19 participants who identified as female and 13 as male (mean age: 20.88, SD: 2.34).

Table 1: Participant demographic, academic and game play information

| No. | Age | Gender | Area of study | Year of study | Types of games | Frequency of play | Version played |
|---|---|---|---|---|---|---|---|
| P1 | 20 | Male | Electronic Engineering | 2nd | Story/adventure/shooter | Few times per week | Alex |
| P2 | 19 | Male | Electronic Engineering | 1st | RPG, FPS | Every day | You |
| P3 | 19 | Male | English | 1st | Fifa | Used to play more regularly | You |
| P4 | 19 | Male | Electronic Engineering | 1st | Counter Strike | Couple of times per week | Alex |
| P5 | 19 | Male | English | 1st | Visual novels, sports, strategy | 3 hrs per week | You |
| P6 | 20 | Female | Environment, Economics & Ecology | 1st | Previously shooters on Xbox, currently, Sim City | Every now and then | Alex |
| P7 | 21 | Female | Chemistry | 3rd | N/A | N/A | You |
| P8 | 22 | Male | Electronic Engineering | 1st | Shooters, sports, action/adventure | 2 hours a day | Alex |

| No. | Age | Gender | Area of study | Year of study | Types of games | Frequency of play | Version played |
|-----|-----|--------|---------------|---------------|----------------|-------------------|----------------|
| P9 | 20 | Male | Electronic Engineering | 2nd | All | Varies by how busy they are | You |
| P10 | 19 | Female | Computer Science | 2nd | Mobile puzzle games like Nonograms | At least once a week | Alex |
| P11 | 20 | Female | Social Policy & Social Work | 1st | Mobile, cooking, Temple Run | Everyday | You |
| P12 | 19 | Female | Environmental Science | 1st | DS Lite years ago. Puzzle games on mobile now | Once a week | Alex |
| P13 | 20 | Female | Psychology | 2nd | Sims, adventure | Once or twice a week | You |
| P14 | 21 | Female | Biology | 3rd | Mobile card games | Once a week | Alex |
| P15 | 20 | Female | Psychology | 2nd | N/A | N/A | You |
| P16 | 20 | Male | Psychology | 2nd | Mobile, PC, a variety | 2-3 hours a day | Alex |
| P17 | 22 | Female | Biomedical Sciences | 4th | Relaxing puzzle-based, e.g. Legend of Zelda | In patches, weekly | You |
| P18 | 20 | Female | Criminology & Sociology | 2nd | Adventure - Red Dead Redemption, Fifa | 3 times a week | Alex |
| P19 | 19 | Female | Mathematics | 1st | Suko, card games, Minecraft, wargaming, rugby | Very rarely now (about 2 times a year) | You |
| P20 | 19 | Female | History | 1st | Puzzle solving, simulation | Once a week | Alex |
| P21 | 22 | Female | Psychology | 3rd | FPS- Overwatch. Minecraft etc. Nintendo games | Daily | You |
| P22 | 22 | Male | Electronic Engineering | 2nd | FPS, RTS, RPG, Puzzle | Previously every week | Alex |
| P23 | 18 | Female | Psychology | 1st | Sims, survival, FPS | 4-5 hours a week | You |
| P24 | 30 | Female | Politics | PG | Basic games | Not too often | Alex |
| P25 | 23 | Male | Physics | PG | Everything but sport or racing | Every day | You |
| P26 | 23 | Male | Physics | 3rd | RPG, strategy, indie | Once a week | Alex |
| P27 | 26 | Male | Chemistry | PG | FPS, RPG, puzzle | Monthly | You |
| P28 | 22 | Female | Social policy | 1st | N/A | N/A | Alex |
| P29 | 20 | Female | Electronic Engineering | 1st | RPG | Every other day | You |
| P30 | 22 | Female | Psychology | 3rd | Fortnite, Apex | A couple of hours a week | Alex |
| P31 | 21 | Female | Psychology | 3rd | Sports & sims | Once in a while | You |
| P32 | 21 | Male | Psychology | 3rd | Mobile games and multiplayer | Once a week and once a month respectively | Alex |

Recruitment took place mid-way through the summer term in which students are normally preparing for exams, undertaking exams, or doing project work. Though recruitment targeted undergraduates, three of the participants were postgraduates (listed as PG in table 1). Of the undergraduates, many were first years (N=13), with others in their

second (N=8), third (N=7) and fourth years (N=1). The majority of participants indicated that they have had experience of playing digital games, where 21 reported playing games at least once a week, and only three that stated they did not play games at all. The participants were split evenly between game versions (16 playing the "Alex" version, and 16 playing the "You" version). All participants completed both parts of the study as described above.

## 5 RESULTS

The analysis was conducted in two stages, which had different goals and accordingly used different qualitative analysis techniques. Firstly, to explore how the different versions of the game supported the process of reflection, an inductive thematic analysis [7, 8] was carried out on both the immediate post-play and follow-up interview transcripts. An inductive approach allowed us to explore player experiences of the games and how the games either supported, and failed to support, reflection. Secondly, to evaluate the reflective outcomes of the study, a deductive content analysis was conducted using Fleck and Fitzpatrick's framework [21] to analyze the follow-up interviews for evidence of the different levels of reflection that players experienced after the gameplay session. The findings are presented below with illustrative quotes that are labelled by participant number and game version e.g., P11 (You) refers to participant 11, who played the version of the *Student-Life Balance* game where participants were addressed as "You".

### 5.1 Inductive Thematic Analysis: The Process of Reflection

To explore how the two different versions of the game supported the process of reflection, an inductive thematic analysis was carried out on the immediate post-play and follow-up transcripts. The approach outlined by Braun & Clarke [7, 8] highlights the active role that the researcher has in interpreting and constructing themes, recognizing that these are informed by the researchers experience and prior knowledge. The first author conducted the thematic analysis, discussing the coding and the development of the inductive themes with the rest of the research team. Due to the interpretative nature of the analysis, inter-rater coding was not carried out since it is not considered appropriate for this form of analysis [3, 9].

Using Nvivo 12, an iterative coding process was conducted with multiple cycles, with the analysis gradually moving from lower-level codes, such as "it's like being at university" and "challenging decisions", to a more complex set of five provisional themes e.g., "making consequences visible". These provisional themes were re-applied to the data set, before being refined and re-applied to determine overall fit.

The analysis resulted in four themes that consider how gameplay facilitated reflection: *making (sensible) consequences visible; it's like MY life; the space between Alex and I;* and *triggers in everyday life.* In addition, as not everyone experience reflection to the same degree, eight potential barriers to reflection were identified during the coding process. These are presented as lower-level codes associated with each theme that represent an obstacle to reflection e.g., *unclear feedback* was found to be a barrier where it made it harder for the player to understand how the game worked, i.e., it got in the way of *making (sensible) consequences* visible.

### 5.1.2 *Making (sensible) consequences visible*

The first inductive theme focuses on how the game was able to support reflection through allowing players to make choices and making it clear what the consequences of those choices were. The game was described as a "university life simulator" (P17, You) that "definitely made you think about a lot of the choices you make" (P2, You). Though the decisions were sometimes challenging, this was usually seen as a positive e.g., "it was stressful, but enjoyable stressful" (P18, Alex). Participants often responded to the feedback the game provided in an attempt to manage the different dimensions of work-life balance e.g., "If you've just had one stat go down a few times you want to make sure to get it up. Try and keep everything balanced" (P16, Alex).

Players also noted how the game made them reflect more on certain factors that they didn't normally consider. For example, regarding health, P20 (Alex) explains "I know it's kind of important but it's one of those things that you don't necessarily think about, maybe that doesn't necessarily feel as much of a priority as sort of like keeping your social life and keeping your study up". The game was generally described as helping players "to realize the influence of your decisions" (P21, You), where they also appreciated how the outcomes were presented at the end: "it was a nice thinking to see all like the little briefs written out rather than just like a score" (P23, You).

By offering these players a range of scenarios and providing feedback on the consequences of their choices, the game was able to make players think more explicitly about decisions they perhaps do not always pay attention to within their daily lives. However, there were three barriers associated with this theme that were likely to prevent players from reflecting more deeply on their own work-life balance.

**Barriers:** The first, *unclear feedback*, made it difficult to connect the effects of in-game choices to longer-term consequences. While participants were generally aware of their grades and their finances, some failed to notice the arrows that briefly appeared below each indicator. Even for those who did, it could still be difficult to assess how they were doing "because [the arrow] flashes up quite quickly and I didn't really pay much attention to it" (P5, You). P8 (Alex) noted that the lack of numerical feedback did make the game more like "real life", but it also made it harder to keep track of overall progress during play.

The second barrier, *consequences that don't make sense*, related to occasions where players started to question the design decisions behind the game and whether the consequences of certain choices were realistic or not. For example, P15 (You) was critical of how much of an impact buying a bicycle had on their finances: "I would say the bike actually saves money … I think that's where real-life bias comes into place as well because I have a bike and I cycle, and I know it [also] saves me time".

The final barrier, *once may not be enough*, was raised by a number of players who suggested that the brevity of the game and the fact that they only had a single play-through meant they did not have a chance to explore and consider the consequences of different choices. Players suggested that multiple sessions might be more beneficial: "you play it once and it kinda itches at you, so if you play it a few times…" (P1, Alex). Players were also curious about the other endings e.g., P17 (You) explains how they would play it again "to see how it plays out". Though they only played it once in the session, multiple playthroughs would have afforded further opportunities for reflection in the longer term.

### 5.1.2 It's like MY life

The second theme emphasizes how gameplay was able to support reflection on personal experience through providing a relevant context that players could personally identify with. The game was generally described depicting "typical student life" (P7, You) and as being a "good and fair representation of what is happening at uni overall" (P29, You). While sometimes players made decisions "just to see what happens" (P5, You), the majority often reacted to the scenarios by thinking about "what I would do in the situation" (P6, Alex). The game was "extremely relatable" (P32, Alex), where players appreciated details that made the game relevant to their own life including "standard boring household things" such as "electricity failing, toilets getting clogged" (P4, Alex), or activities they personally enjoyed, such as going to a yoga class "because I'm really into yoga … I wouldn't miss that" (P15, You).

Players often compared what they saw in the game back to their own experience of work-life struggles e.g., P22 (Alex) who discussed how "getting a bad grade and then having the option to like stay up all night to work on your essay at the detriment to your health … is very much a theme in my present university studies". Though the majority of participants were first- or second-year undergraduates, even those that were later on in their university studies were able to relate to the game e.g., P26 (Alex) "I can relate, but even though I lived university life for 3 years … this still gives a new insight on how I can balance out my life".

Reflection often required players to identify with the scenarios in the game, where the effect was particularly pronounced when the outcomes of the game resonated with aspects of their own personal identity. For example, as P13 (You) describes:

> "So at [the] end, the social life was like you like to go out but you also like your own company, it's like that's definitely me because sometimes I said I'd go out and sometimes I didn't want to. So I think it was quite an accurate description for how I played because it described me as a person".

In this case, both versions of the game were able to support reflection through creating a set of choices and outcomes that players could identify with and then reflect on in relation to their daily life. Again however, not all players were able to strongly connect the game back to their own lives, and there were two main barriers to this.

**Barriers:** The first, *a general lack of relatability*, was encountered by players who did not see the game as being particularly representative of their day-to-day experience. For instance, P9 (You) thought it was "very generic" while P5 (You) describes "you're just kind of put into it at the beginning and you could be anyone". Others found some of the options in the game to be too restrictive e.g., P3 (You) notes that the game "focused a lot on social aspects" but did not allow for players to complete an assignment "beforehand so you could just chill or something" (which is something they would do in their own life). In addition, participants did not always relate to the other characters in the game e.g., P22 (Alex) describes how they did not "remember the names of any of the people" as "there was no characterisation".

The second barrier, *game outcomes contradict personal identity*, was evident when players disagreed with the game's assessment of them in relation to one or more of the

work-life balance dimensions. For instance, P16 (Alex) states: "I didn't really find it helped me question anything in my life. Like, in the game, it said I wasn't good at balancing my money but in real life I am very good at budgeting so I guess it didn't really help me in any way relevant to my life so". Thus, there were occasions where the player may have initially found the game to be relevant to their university life, but where opportunities for further reflection were lost by a dissociation between their personal identity and the game's assessment of their choices.

### 5.1.3  The space between Alex and I

The third theme applies only to the 'Alex' version of the game, focusing on the reflection that occurred when players used first- and third-person pronouns to compare and contrast themselves to Alex, allowing for a shifting between identities that the 'You' version did not. As stated earlier, Alex was intentionally created as a blank slate, where the character was given a gender-neutral name, and as few details as possible about who they were (apart from being a second year, studying a made-up course at a made-up university). As a result, some players projected an identity on to the character e.g., while most assumed Alex was male, at least one female participant referred to Alex as female (P12). In addition to this projection, it was striking how participants would jump between these different identities in their interviews. For example, P14 describes how:

> "I really put myself in Alex's shoes during that and I found it quite stressful and I was very torn and I could really relate to the issues that he was having, to try and spread yourself across everything but also be present in everything as well at the same time."

Similarly, P32 describes Alex as an "idealistic version" of themselves, where they got involved in environmental activities as "I've always been planning to get involved, so I was like now's my time to do it". While P18 spends a fair amount of time discussing how Alex's poor grades could mean that he was not that smart, they then go on to state "I'm slow as well. And I'm just judging this person because it's so easy, like you know to try to make him do the best, but I wouldn't have done better in real life". Furthermore, even if players were disappointed with how they performed on the game, it was Alex being assessed, so they did not take it as personally. As P14 indicates when he reflects on the end-of-game outcomes:

> "The finance side of it, I was disappointed because I am quite thrifty, so I do like to manage my money better than what Alex did unfortunately. So, I was disappointed with that and I was disappointed as well with the grades, I would have more liked Bs or As for the best of it, however, I'm pleased overall that I feel like I did devote a lot of time for his health, and I think that showed at the end."

The ability to take on a different character in the 'Alex' version of the game helped to create a space for players to reflect on their own personal aspirations and behaviors and how these compared to Alex, in a way that seemed less threatening than the straight comparisons made in the 'You' version. However, there was one key barrier to this occurring.

**Barrier:** The main barrier that relates to this theme is due to the fact that *not all players took notice of Alex*. While a few referred to Alex explicitly, the majority playing this version did not. Instead, they played the game in much the same way as those in the 'You' condition e.g., P1 (Alex) stated that they approached decision making in the game by thinking "what do I actually do when I normally do those sorts of things". Arguably this sort of approach creates fewer opportunities for a player to compare and contrast their own motives and behaviors with that of the character they were playing. While we intentionally did not provide much detail about Alex (in an effort to avoid the possibility that players would not identify with the character), the manipulation was too subtle for certain players, and they did not really notice they were playing as someone other than themselves.

*5.1.4   Triggers in everyday life*

The final theme focuses on how environmental factors in everyday life can serve as a trigger for reflection. Many participants referred to external events that helped to prompt thinking around work-life balance after having played the game. For instance, P23 (You) suggests that "I've actually been thinking a little bit more about money though, when I've been doing my weekly shops and stuff", while both P14 (Alex) and P30 (Alex) refer to conversations they had with others about what they did in the game and how this related to their real-world behavior. P24 (Alex) also discusses a realization they had after exercising:

> "I was like physically really exhausted so I thought that the game, it's not just about, that you should not just consider the timing of the activities but also the level of energy that exercise [can] take from you because I was sort of exhausted and I had to work today 6 hours."

In another example, that relates to a change in behavior, P13 (You), discusses travelling on a bus with friends at the end of term and discussing whether they should go to the cinema or not:

> "I wasn't sure whether or not to go to, because the prices had increased since we'd had a look at it and I was like - oh you know what, it's online, I'll watch it for free at home ... and I kind of thought back to the game. It was like, well what is that doing to my social life? Let's go. So I went and I had a really good time".

While not all players were explicit about what caused them to reflect on their work-life balance, it is clear that many required a catalyst that allowed them to further relate their gameplay experiences to situations in the real world. In some cases, the delayed interview itself may have acted as a prompt for explicit forms of reflection, as in the case of P32 (Alex):

> "I think it's weird like now because I was saying on the phone and looking back at the game and looking back etc., like I can see how it's influenced it like my thought processes and whatnot. I think a lot of it was quite like subconscious processing rather than like explicit, oh well this is what happens in a game ergo that's what I should change".

**Barrier:** There was one main barrier to this theme, which related to the *timing of gameplay*. Though several participants did encounter situations that allowed them to think back to playing the game, for others, the fact that the study took place at the end of term meant that

by the time of the post-play interview, there had been less opportunity for them to reflect on academic study. For instance, P3 (You) explains that nothing has changed for them since playing the game:

> "I feel that now that I'm home and I've finished for summer, it would definitely more applicable to my second year because I know that things are gonna start counting so I'm gonna have to work on the balance of social aspects and money and jobs and studying all at the same time" (P3, You)

As P7 (You) and P26 (Alex) also noted, the game may have had more impact if players had still been in term time.

## 5.2    Deductive Content Analysis: The Outcomes of Reflection

To explore the reflective *outcomes* of playing each game, we applied Fleck and Fitzpatrick's framework [21] to analyze the follow-up interview transcripts (following Mekler et al. [39]). This helped us to assess the extent to which individuals reflected on work-life balance after playing the game. Outcomes were recorded using the following categories: *no impact*; *description; reflective description*; *dialogic reflection; transformative reflection*; and *critical reflection* (see supplementary materials for the codebook used to guide this process). As the levels of reflection are hierarchical, each outcome was categorized according to the highest level of reflection that was illustrated within the interview transcript, e.g., in cases where the transcript contained instances of reflective description and dialogical reflection, the outcome was recorded as dialogical reflection. The first and second author independently coded each transcript, before meeting to compare codes and resolve any disagreements (as in [39]). A summary of reflective outcomes is displayed in Table 2. Critical reflection is not included in the table as none of the transcripts indicated that players had considered wider societal or cultural issues in relation to their own work-life balance.

Table 2: Overview of reflective outcomes

| Outcome | Count of outcomes | Game Version | No. of participants |
|---|---|---|---|
| No impact | 5/32 | Alex | 2 |
| | | You | 3 |
| Description | 6/32 | Alex | 2 |
| | | You | 4 |
| Reflective description | 8/32 | Alex | 3 |
| | | You | 5 |
| Dialogic reflection | 4/32 | Alex | 3 |
| | | You | 1 |
| Transformative reflection | 9/32 | Alex | 6 |
| | | You | 3 |

Out of 32 participants, five reported *no impact*; where they essentially responded "no" to the majority of the questions about whether they had "thought about the game since playing it", "spoken to anyone else about the game", and if "anything had changed as a result of playing the game". Six outcomes were coded as *description*, where participants merely described taking part in the study to their friends (P15, You) or how they had been

reminded of the game in their daily life e.g., "when I'm buying stuff I'd be like - this is weirdly similar" (P1, Alex).

The majority of participants (n=21) however, did indicate they experienced some form of reflection. Eight outcomes were coded as involving *reflective description*, where participants descriptions of their experience also included an explanation or evaluation of their own work-life balance since playing the game, albeit in a limited or vague way. For instance, P21 (You) described how the game, "gave me different aspects to think about rather than just like, your social life and what happens at, you know, like with your course and stuff like that". Four outcomes were classified as *dialogic reflection*, where participants went further in terms of considering alternative explanations and perspectives, mostly in relation to comparing and contrasting the game with their own life. For example, P10 (Alex) discussed how, when walking to a routine social engagement the day after playing the game, they were thinking about the different ways in which their own social life is much more "planned" and tied to their course work, as opposed to the more "spontaneous" form of socializing that occurred in the game. Finally, nine participants showed evidence of *transformative reflection* as a result of having played the game, whether in relation to their behavior, and/or how they think about different aspects of their own lives. For example, P30 (Alex) reflects on how the gameplay led to a self-realization about their relationship with money and a subsequent change in spending behavior:

> "I think because in the game I was being very conscious about money … and the social aspect, the education aspect of it, I was like oh no that comes second to money, but yes, I was like maybe I've been way too anal about money in my own life, so yeah, I've been spending a bit more."

As indicated in Table 2, the findings indicate that both versions of the game did result in some form of reflection for the majority of players. They also suggest that those who played the 'Alex' version of the game, were more likely to experience higher levels of reflection.

## 6  DISCUSSION

There has been growing interest in using games to support reflection, though there has been less work exploring reflective game design from an empirical perspective. In addition, the literature suggests conflicting ideas regarding distance and identification, where is it not always clear how to implement distancing within a game, or the effects this will have. While distance has been described as necessary to create a non-threatening space for players [32, 33], others argue that distance should be decreased to ensure a relevant experience that players can identify with [35]. To explore these issues, our study compared two versions of a game that aimed to support students reflecting on their work-life balance. Both versions of the game resulted in reflection, though this was supported in different ways.

Building on work carried out in the context of persuasive games and implicit attitude change [32, 33], one of our key contributions is to provide empirical support to show that the *distance between the player and their player-character* can create space for reflection to occur. According to Trope and Liberman's dimensions of distancing [50], we manipulated a form of social distancing, where the "Alex" version of the game facilitated players in adopting a third, as opposed to first, person perspective. Through this manipulation, our findings provide support the idea that the projective identity (i.e., the space in between the

player's real world and virtual identities) allows players to reflect through comparing and contrasting different identities [23]. In addition, there is evidence to suggest that those who role-played as Alex were subsequently more likely to experience higher levels of reflection including a change of some kind after having played the game e.g., in terms of how they thought about their relationship with money or implementing a new routine. While none of our participants engaged in critical reflection, this is generally quite rare [21, 39] and may be in part be due to the nature of the topic and how we designed the game – as we were asking people to reflect on themselves, rather than say, the socio-cultural factors or structures that might influence work-life balance.

In addition, our findings also highlight the importance of ensuring gameplay is interpreted as being relevant. As argued by Khaled [35], and others working in the area of games and learning [28, 29, 47], players need to be able to connect the game to their own contexts. Our analysis suggested that reflection required players to identify with the setting of the game and see parallels with their own lives. Thus, with respect to *the distance between the game environment and the real world*, reflection can be facilitated by a closer relationship between the two. Following Trope and Liberman [50], this could be described as a form of hypotheticality – though the game was set in a fictional environment, we chose to focus on an experientially realistic university (as opposed to, for example, a fantastical version set on an alien world). In contrast to work that suggests high levels of fiction will be more persuasive [26, 33], our study suggests this would be less appropriate when the aim is to support self-reflection.

As indicated by the barriers we identified, it is very challenging to design a highly relevant gameplay experience that can accurately mirror the conditions of players day-to-day lives. Due to the variability of individual experience, there are lots of details to get right, and when this goes wrong, opportunities for reflection are subsequently lost. The effect is magnified when players could not reconcile the outcomes of the game with their personal identities where the resulting reactance [10] created an obstacle to higher levels of reflection. In contrast, while the relevance of the context presumably still mattered in the 'Alex' version, those playing as Alex took the game less personally and did not react as strongly to negative game outcomes.

## 6.1 Reflective Game Design Considerations

The themes and associated barriers developed in our analysis illustrate how reflection can be a fragile process, where it can be hard to get the balance of different game elements right. When designing games for reflection, one of the first considerations should be on helping players understand the link between cause and effect by providing feedback that helps player to interpret the consequences of their actions. In addition, care needs to be taken to ensure that those consequences are viewed as being plausible. Otherwise, players are likely to end up feeling confused, and any opportunity for reflection will be lost. Like Khaled [35], we are not advocating that the 'correct' choices should be obvious to players or that outcomes should always be positive, otherwise the game is unlikely to provide much of a challenge (whether functional or emotional [14]). Iteration and play-testing will be key to ensuring that players understand the feedback they are provided with, and that they do not resort to spending time questioning the design of the game (as opposed to their own behaviors or opinions).

To ensure that players can reflect through comparing the game to their own lives, we suggest that the game needs to focus on a relevant context and provide a relatable narrative. We again refer to Khaled [35], and argue that the distance between players' real-world environments and the game environment should be reduced, otherwise there is a risk that people will disengage due to thinking that the game does not really apply to them. While iteration and playtesting can help to evaluate relevance, participatory methods could also be very useful for developing a deeper understanding of players, their experiences and contexts, to feed into the design process from the start.

There is a still a potential risk however that the game may not be perceived as relevant enough, or that it will conflict with a player's sense of personal identity, for instance if they disagreed with the game's assessment of how they acted within the game. It might be tempting to make the game more customizable to try and incorporate even more aspects of the players' lives e.g., in our case, we could tailor the *Student-Life Balance* game so players can pick their subject of study, who they live with, what they do for fun etc. However, this would be a rather time-consuming approach that would require a more complex game, and there is still scope to get certain details wrong. As an alternative, it would probably be more feasible to allow players to role-play as a different character. Thus, when considering the relationship between the player and the player character, we agree with the approach of Kaufman and colleagues [32, 33] and would recommend that a greater amount of distance between the two would be beneficial. Based on our experience, we suggest that the game should be designed to make the existence of a separate player character more salient than in our game, e.g., by including more detail about the character, otherwise the player may fail to play as anyone other than themselves.

That said, when providing more detailed information (e.g., with respect to demographic information or their appearance), there is an additional risk – some players will not identify with the character, and then be less likely to interpret the game as being relevant to their own lives [45, 51]. Thus, we would suggest exploring a third approach, where players are asked to play as a set character but given an opportunity to customize them (e.g., much like Commander Shephard in the *Mass Effect* series). As research on avatar customization and engagement shows, this would allow them to more strongly relate to the character they are playing [2]. Theoretically, this approach could overcome any barriers relating to salience and identity but provide enough distance between the player and the player character since they are still being asked to play as someone other than themselves.

Finally, as part of the design and dissemination process, it will be useful to consider the potential external triggers that can prompt reflection after playing the game. By providing a relevant game environment that is high in terms of experiential fidelity [47], players are also more likely to encounter similar situations in their daily lives that would act as a trigger for reflection. In addition, consideration should be given to the timing of the release of the game, or in terms of game-related events that could act as further prompts for reflection. For example, in the case of the *Student-Life Balance* game, this could have been released in conjunction with a university campaign and associated social events to act as prompts for reflection and to provide opportunities for them to discuss the game with others. An episodic game format may also be beneficial where the release of short weekly games or updates could each act as a trigger for further gameplay and reflection.

## 6.2 Limitations

One of the main challenges with working in this area relates to defining and evaluating reflection. We chose the Fleck & Ftizpatrick [21] framework to try and capture a more nuanced view of reflection, but this was not always a straightforward process. In particular, when coding for transformative reflection in the post-play interviews, we focused on any evidence of conceptual or behavioral change that resulted from playing the game – but it was not always clear whether this change resulted from "intentional" revisiting of the gameplay experience, or indeed, whether this 'intentionality' is a necessary part of the process. Though the *Transformational Framework* [15] for game development does not explicitly consider reflection, it could be useful in future for identifying different types of transformation that result from playing reflective games (e.g., with respect to knowledge, identity, society). We would also have needed a longer study to ascertain whether any changes are 'transformative' over the longer term.

Another potential issue is that the post-play and follow-up interviews may have acted as a trigger for reflection. We purposefully tried to avoid asking participants directly if the game made them reflect on their work-life balance, but the very act of asking them to discuss their experience is likely to have encouraged them to reflect, either in anticipation of, or during the interviews themselves. Certain individuals could also be more likely to engage in reflection than others [44], or are even just more articulate, so there is a possibility that the findings were influenced by individual differences. These are difficulties associated with the majority of attempts to capture reflection since the evaluation methods used can only provide indirect evidence of reflection and do not always account for people's ability to reflect [1, 20, 48].

In addition, we did not collect participant data relating to socio-economic or cultural factors, which could have influenced how players responded to the game. The game was generally aimed at typical UK university students (living away from home for the first time, without additional caring responsibilities); while the participants did not suggest any particular socio-economic or cultural factors as obstacles to relevance, it is worth noting our sample is relatively young (the majority were aged between 18-22), and likely to be white (given the general breakdown of the undergraduate population when the study was carried out). Thus, the findings may not generalize to other populations.

Finally, with respect to the design of the *Student-Life Balance* game, the findings suggest that the game itself would benefit from some improvements in terms of making the feedback clearer, and ensuring that players are able to understand the consequences of different choices. While role-playing in the 'Alex' version did appear to facilitate higher levels of reflection, this was a relatively small-scale study, and so additional research is required to further investigate this relationship and explore whether it manifests in relation to other topics or contexts.

## 6.3 Future Work

As part of future work, it will be important to consider longer-term evaluations that can help to examine how reflection affects players over time, and to establish how enduring potential transformations are. Due to time and resource constraints, our study only focused on the effects of a single play-through. While it is possible that allowing for multiple

playthroughs would support further opportunities to reflect on how different choices lead to different outcomes, a longer-term study would be necessary for exploring whether this is the case. In addition, further research is needed to investigate whether a combination of customization and role-playing as someone else does result in higher levels of reflection.

Our study was focused on self-reflection in relation to one's own life and behavior, where it is possible that the findings may be different if the purpose of the game is to encourage explicit reflection on more controversial topics, e.g., towards Covid-19 vaccinations. While we did not manipulate the distance between player's real-world context and the environment depicted in the game explicitly, our findings indicated that there is a risk that a highly fictional narrative will not benefit reflection. We also focused on distancing in relation to the player and the player character, other forms of distancing could have different effects.

Finally, there is still much to unpack in terms of the other *Embedded Design Model* strategies [32, 33] and how they might impact reflection, as well as more to explicitly investigate the influence of the different *Reflective Game Design* principles [35] such as *reflection over immersion*, which were not examined in this study. Further work will need to look at both how these strategies and principles can be implemented from a design perspective and also how best to evaluate their effect on reflection and the player experience.

## 7   CONCLUSIONS

To further explore tensions in the literature around distance and relevance in the context of developing games that support reflection, our study compared two versions of a game that aimed to support students reflecting on their work-life balance. The versions were identical, but we manipulated one form of distance by asking players to play as themselves in the first version, and by asking them to play as Alex in the other. The inductive analysis resulted in four themes, with associated barriers, that highlight how different aspects of game design influenced the process of reflection. The deductive analysis also indicated that while both games resulted in different forms of reflection for the majority of players, those who engaged in role-play appeared more likely to result in higher levels of reflection, such as experiencing a conceptual or behavioral change. Taken together, our findings suggest that both distancing and relevance should be key considerations for reflective game design and we discuss how they can manifest in different ways. In addition to ensuring that players can make sense of in-game consequences, and considering the influence of external triggers, we conclude that reflection can be facilitated through gameplay by providing a relevant context to players (so the game feels close to their experience), and by supporting them in role-playing as someone other than themselves (but not too close).

# REFERENCES

[1]     Eric PS Baumer, Vera Khovanskaya, Mark Matthews, Lindsay Reynolds, Victoria Schwanda Sosik, and Geri Gay. 2014. Reviewing reflection: on the use of reflection in interactive system design. In Proceedings of the 2014 conference on Designing Interactive Systems, 93-102. doi: http://dx.doi.org/10.1145/2598510.2598598 .

[2]     Max V Birk, Cheralyn Atkins, Jason T Bowey, and Regan L Mandryk. 2016. Fostering intrinsic motivation through avatar identification in digital games. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems. ACM, 2982-2995. doi: https://dl.acm.org/doi/10.1145/2858036.2858062.

[3]     Ann Blandford. 2013. Semi-structured qualitative studies, in The Encyclopedia of Human-Computer Interaction, M. D. Soegaard, Rikke Friis Ed., 2nd ed.  The Interaction Design Foundation, 2013, ch. 52.

[4]     Augusto Boal. 1985. Theatre of the Oppressed. Theatre Communications Group.

[5]     Julia Ayumi Bopp, Klaus Opwis, and Elisa D Mekler. 2018. "An Odd Kind of Pleasure" Differentiating Emotional Challenge in Digital Games. In Proceedings of the 2018 SIGCHI Conference on Human Factors in Computing Systems. ACM, 1-12. doi: http://dx.doi.org/10.1145/3173574.3173615.

[6]     David Boud, Rosemary Keogh, and David Walker. 1985. Promoting reflection in learning, in Reflection: Turning experience into learning D. Boud, R. Keogh, and D. Walker Eds. London: Kogan Page, 1985, pp. 18-40.

[7]     Virginia Braun and Victoria Clarke. 2006. Using thematic analysis in psychology. Qualitative Research in Psychology,  3, 2, 77-101. doi: http://dx.doi.org/10.1191/1478088706qp063oa.

[8]     Virginia Braun and Victoria Clarke. 2013. Successful Qualitative Research: A Practical Guide for Beginners. SAGE.

[9]     Virginia Braun and Victoria Clarke. 2016. (Mis)conceptualising themes, thematic analysis, and other problems with Fugard and Potts' (2015) sample-size tool for thematic analysis. International Journal of Social Research Methodology 19, 6, 739-743. doi: https://doi.org/10.1080/13645579.2016.1195588.

[10]   Jack W Brehm. 1966. A theory of psychological reactance. Academic Press.

[11]   Dani Cavallaro. 2009. Anime and the visual novel: narrative structure, design and play at the crossroads of animation and computer games. McFarland.

[12]   Marta E Cecchinato, Anna L Cox, and Jon Bird. 2015. Working 9-5? Professional differences in email and boundary management practices. In Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems. ACM, 3989-3998. doi: http://dx.doi.org/10.1145/2702123.2702537.

[13]   Adela Chen and Elena Karahanna. 2014. Boundaryless technology: Understanding the effects of technology-mediated interruptions across the boundaries between work and personal life. AIS Transactions on Human-Computer Interaction,  6, 2, 16-36. [Online]. Available: https://aisel.aisnet.org/thci/vol6/iss2/1.

[14]   Tom Cole, Paul Cairns, and Marco Gillies. 2015. Emotional and functional challenge in core and avant-garde games. In Proceedings of the 2015 Annual Symposium on Computer-Human Interaction in Play. ACM, 121-126. doi: http://dx.doi.org/10.1145/2793107.2793147.

[15]   Sabrina Haskell  Culyba. 2018. The Transformational Framework: A process tool for the development of Transformational games. ETC Press, 2018. [Online]. Available: https://www.transformationalframework.com/product/book-pdf/.

[16]   Rowan Daneels, Nicholas D Bowman, Daniel Possler, and Elisa D Mekler. 2021. The 'eudaimonic experience': A scoping review of the concept in digital games research. Media and Communication,  9, 2, 178-190. doi: https://doi.org/10.17645/mac.v9i2.3824.

[17]   Alena Denisova, Julia Ayumi Bopp, Thuy Duong Nguyen, and Elisa D Mekler. 2021. "Whatever the Emotional Experience, It's Up to Them": Insights from Designers of Emotionally Impactful Games. In Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems. ACM, 1-9. doi: https://doi-org.libproxy.york.ac.uk/10.1145/3411764.3445286.

[18]   John Dewey. 1933. How We Think: A Restatement of the Relation of Reflective Thinking to the Educative Process. Boston, MA, USA: D. C. Heath.

[19]   Niharika Doble and MV Supriya. 2011. Student life balance: myth or reality? International Journal of Educational Management,  25, 3, 237-251. doi: https://doi.org/10.1108/09513541111120088.

[20]   Rowanne Fleck. 2012. Rating reflection on experience: A case study of teachers' and tutors' reflection around images. Interacting with computers,  24, 6, 439-449. doi: http://dx.doi.org/10.1016/j.intcom.2012.07.003.

[21]   Rowanne Fleck and Geraldine Fitzpatrick. 2010. Reflecting on reflection: framing a design landscape. In Proceedings of the 22nd Conference of the Computer-Human Interaction Special Interest Group of Australia on Computer-Human Interaction. ACM, 216-223. doi: http://dx.doi.org/10.1145/1952222.1952269.

[22]   Eva Ganglbauer, Geraldine Fitzpatrick, and Florian Güldenpfennig. 2015. Why and what did we throw out? Probing on reflection through the food waste diary. In Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems. ACM, 1105-1114. doi: http://dx.doi.org/10.1145/2702123.2702284.

[23]   James Paul Gee. 2003. What video games have to teach us about literacy and learning. New York: Palgrave Macmillan.

[24]   Chad Phoenix Rose Gowler and Ioanna Iacovides. 2019. "Horror, guilt and shame" -Uncomfortable Experiences in Digital Games. In Proceedings of the Annual Symposium on Computer-Human Interaction in Play. ACM, 325-337. doi: https://doi.org/10.1145/3311350.3347179.

[25]   Melanie C Green and Timothy C Brock. 2000. The role of transportation in the persuasiveness of public narratives. Journal of personality and social psychology,  79, 5, 701. doi: https://doi.org/10.1037/0022-3514.79.5.701.

[26]   Melanie C Green, Timothy C Brock, and Geoff F Kaufman. 2004. Understanding media enjoyment: The role of transportation into narrative worlds. Communication theory,  14, 4, 311-327. doi: https://doi.org/10.1111/j.1468-2885.2004.tb00317.x.

[27]   Catherine Grevet. 2014. Managing the Work-Home Boundary in a BYOD (Bring Your Own Device) Culture. In MobileHCI'14 Workshop on Socio-Technical Systems and Work-Home Boundaries.

[28]   Jessica Hammer, Alexandra To, Karen Schrier, Sarah Lynne Bowman, and Geoff Kaufman. 2018. Learning and role-playing games, in Role-Playing Game Studies: A Transmedia Approach, J. Zagal and S. Deterding Eds., Routledge, 2018, pp. 283-299.

[29]   Jennefer Hart, Ioanna Iacovides, Anne Adams, Manuel Oliveira, and Maria Margoudi. 2017. Understanding engagement within the context of a safety critical game. In Proceedings of the Annual Symposium on Computer-Human Interaction in Play. ACM, 253-264. doi: https://doi-org.libproxy.york.ac.uk/10.1145/3116595.3116633.

[30]   Ioanna Iacovides and Anna L Cox. 2015. Moving beyond fun: Evaluating serious experience in digital games. In Proceedings of the 33rd Annual SIGCHI Conference on Human Factors in Computing Systems. ACM, 2245-2254. doi: http://dx.doi.org/10.1145/2702123.2702204.

[31]   Maria Karyda, Elisa D Mekler, and Andrés Lucero. 2021. Data Agents: Promoting Reflection through Meaningful Representations of Personal Data in Everyday Life. In Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems, 1-11. doi: https://doi-org.libproxy.york.ac.uk/10.1145/3411764.3445112.

[32]   Geoff F Kaufman and Mary Flanagan. 2015. A psychologically "embedded" approach to designing games for prosocial causes. Cyberpsychology: Journal of Psychosocial Research on Cyberspace,  9, 3, Art no. 5. doi: https://doi.org/10.5817/CP2015-3-5.

[33]   Geoff F Kaufman, Mary Flanagan, and Max Seidman. 2016. Creating Stealth Game Interventions for Attitude and Behavior Change: An"Embedded Design" Model. Transactions of the Digital Games Research Association, 2, 3, 173-193. doi: https://doi.org/10.26503/todigra.v2i3.57.

[34]   Geoff F Kaufman and Lisa K Libby. 2012. Changing beliefs and behavior through experience-taking. Journal of personality and social psychology,  103, 1, 1-19. doi: https://doi.org/10.1037/a0027525.

[35]   Rilla Khaled. 2018. Questions over answers: Reflective game design, in Playful disruption of digital media, Springer, 2018, pp. 3-27.

[36]   Kathleen P King. 2009. The handbook of the evolving research of transformative learning: Based on the Learning Activities Survey. IAP.

[37]   Ellen Ernst Kossek, Marian N Ruderman, Phillip W Braddy, and Kelly M Hannum. 2012. Work–nonwork boundary management profiles: A person-centered approach. Journal of Vocational Behavior,  81, 1, 112-128. doi: https://doi.org/10.1016/j.jvb.2012.04.003.

[38]   Tim Marsh and Brigid Costello. 2013. Lingering serious experience as trigger to raise awareness, encourage reflection and change behavior. In International Conference on Persuasive Technology. Springer, 116-124. doi: https://doi-org.libproxy.york.ac.uk/10.1007/978-3-642-37157-8_15.

[39]   Elisa D Mekler, Ioanna Iacovides, and Julia Ayumi Bopp. 2018. "A Game that Makes You Question..." Exploring the Role of Reflection for the Player Experience. In Proceedings of the 2018 Annual Symposium on Computer-Human Interaction in Play. ACM, 315-327. doi: https://doi.org/10.1145/3242671.3242691.

[40]   Jack Mezirow. 1990. Fostering critical reflection in adulthood. Jossey-Bass Publishers San Francisco.

[41]   Mary Beth Oliver and Anne Bartsch. 2010. Appreciation as audience response: Exploring entertainment gratifications beyond hedonism. Human Communication Research,  36, 1, 53-81. doi: https://doi.org/10.1111/j.1468-2958.2009.01368.x.

[42]   Pablo Ortiz and D Fox Harrell. 2018. Enabling critical self-reflection through roleplay with Chimeria: Grayscale. In Proceedings of the 2018 Annual Symposium on Computer-Human Interaction in Play. ACM, 353-364. doi: https://doi-org.libproxy.york.ac.uk/10.1145/3242671.3242687.

[43]   Barbel Pee, Theresa Woodman, Heather Fry, and Elizabeth S Davenport. 2002. Appraising and assessing reflection in students' writing on a structured worksheet. Medical Education,   36, 6, 575-585. doi: https://doi.org/10.1046/j.1365-2923.2002.01227.x.

[44]   Paul J Silvia and Ann G Phillips. 2011. Evaluating self-reflection and insight as self-conscious traits. Personality and Individual Differences,  50, 2, 234-237. doi: https://doi.org/10.1016/j.paid.2010.09.035.

[45]   Alistair Raymond Bryce Soutter and Michael Hitchens. 2016. The relationship between character identification and flow state within video games. Computers in Human Behavior,  55, B, 1030-1038. doi: https://doi.org/10.1016/j.chb.2015.11.012.

[46]   Racheal L Stimpson and Kimberly L Filer. 2011. Female graduate students' work-life balance and the student affairs professional, in Empowering women in higher education and student affairs: Theory, research, narratives, and practice from feminist perspectives, P. A. Pasque and S. E. Nicholson Eds.,  Sterling, 2011, pp. 69-84.

[47]   Gearóid Ó Súilleabháin and Julie-Ann Sime. 2010. Games for learning and learning transfer, in Critical design and effective tools for e-learning in higher education: Theory into practice,  IGI Global, 2010, pp. 113-126.

[48]   Jennifer Sumsion and Alma Fleet. 1996. Reflection: can we assess it? Should we assess it? Assessment & Evaluation      in      Higher      Education,            21,      2,      121-130.      doi:      https://doi-org.libproxy.york.ac.uk/10.1080/0260293960210202.

[49]   Craig Thorley, "Not By Degrees: Not by degrees: Improving student mental health in the UK's universities," in "IPPR: London, UK," 2017. [Online]. Available: https://www.ippr.org/research/publications/not-by-degrees

[50]   Yaacov Trope and Nira Liberman. 2010. Construal-level theory of psychological distance. Psychological review,  117, 2, 440-463. doi: 10.1037/a0018963.

[51]   Selen Turkay and Charles K Kinzer. 2014. The effects of avatar-based customization on player identification. International Journal of Gaming and Computer-Mediated Simulations,  6, 1, 1-25. doi: https://doi-org.libproxy.york.ac.uk/10.4018/ijgcms.2014010101.

[52]   Matthew Alexander Whitby, Sebastian Deterding, and Ioanna Iacovides. 2019. "One of the baddies all along": Moments that Challenge a Player's Perspective. In Proceedings of the Annual Symposium on Computer-Human        Interaction        in        Play.        ACM,        339-350.        doi:        https://doi-org.libproxy.york.ac.uk/10.1145/3311350.3347192.

[53]   Krysia M Yardley-Matwiejczuk. 1997. Role Play: Theory and Practice. Sage.