

activities as intrinsically motivated. The content gamification approach aims to incorporate game elements into the content so that it can be made more game-like. Filatro and Cavalcanti, [9] report ways of achieving content gamification, such as using storylines with characters, and role-playing between participants.

On the rightmost side of Figure 1 is “Games” including standard board games such as Monopoly and Settlers of Catan, as well as video games like Call of Duty and Super Mario. This also include Serious Games (also called “Game-based Learning” or “Applied games”) which are full-scale games that are created for particular purposes such as to convey important information in training, and not just for entertainment. More specifically, Serious games are defined as “any form of interactive computer-based game software for one or multiple players to be used on any platform and that has been developed with the intention to be more than entertainment” [11] p.6, with a further distinction between “serious games” and “serious gaming” [2]. The former relates mainly to games designed to deliver educational material through playing. The latter refers to the use of the game ecology, such as using the technologies for educational purposes. This categorization is useful, although it is not universally agreed upon, and it is not always easy to discern between a ‘gamified’ element and a ‘game’ as their uses are very much context-dependent and subjective [2].

2. Core Drivers of Gamification

Chou [12] in his Octalysis framework has identified eight fundamental motivations that draw users into games and game-like activities. These can be divided into two categories of intrinsic and extrinsic motivations and can be further split into positive and negative motivations. It is interesting to consider the different types of motivations for engaging in game-related activities as described by this framework. Positive ones such as the desire to derive meaning from one’s actions, develop one’s creativity and acquire a sense of development and accomplishment which are legitimate and worthy motivations. On the other hand, being motivated by the fear of loss, of unpredictability and by the desire to have something because it’s scarce or unavailable raise some ethical concerns. Chou’s core drives are:

1. *Epic Meaning and Calling*: This refers to the players’ motivations in terms of their feeling that they are chosen to do something greater than themselves.
2. *Development and Accomplishment*: This refers to the players’ motivations in terms of making progress and developing new skills.

3. *Empowerment of Creativity and Feedback*: This refers to the players’ motivations in terms of developing their creativity.
4. *Ownership and Possession*: This refers to the players’ motivations in terms of their efforts in creating and customizing their avatars.
5. *Social Influence and Relatedness*: This refers to the players’ motivations in terms of social interaction and peer pressure.
6. *Scarcity and Impatience*: This refers to the players’ motivations in terms of scarcity, such as time restrictions on number of lives.
7. *Unpredictability and Curiosity*: This refers to the players’ motivations in terms of how uncertainty can trigger the players curiosity.
8. *Loss and Avoidance*: This refers to the players’ motivations in terms of avoiding loss or pain.

3. Benefits of Gamification

Gamification has been hailed as an approach to education that can be beneficial to the student experience, for example, Kaufmann [13] looked at how it can be used as a motivational tool for students when undertaking routine tasks, where the researcher used a gamified tool when working on their dissertation and noted their increased enthusiasm for everyday tasks.

Brull and Finlayson [14] explored gamification, first explaining some of the mechanics involved, including points, badges, levels and scoreboards, and then highlighting some of the benefits, including the fact that it is more dynamic than a classroom delivery, the fact that as a simulation it is safer than real-world activities, and finally, the fact that using a points scoring system could be an easy way to demonstrate competence in particular skills and abilities.

Fraçz [15] investigated students who were using a software versioning tool (git) to undertake a large number of small tasks, they created two student groups, one who undertook these tasks as gamified activities (n=31), and one who did not use the gamified elements (n=42). The students in the gamified group had a live scoreboard where they were ranked in order of the number of tasks attempted and the number of tasks completed successfully. Based on a comparison with the non-gamified group, this research indicated that gamification increased motivation and work speed, as well as creating a more enjoyable environment. The research also noted that some of the gamified group tended to prioritise tasks that would increase their standing on the scoreboard (“gaming the

system”), as well as the fact that the non-gamified group were more likely to support each other.

Marín, *et al.* [16] explored the use of a gamified software tool to help students learn how to write computer programs. The tool uses points, badges, a scoreboard, as well as keys to unlock short video lessons. They compared the outcomes of two first year student groups, one that did not use the tool (n=407), and one that did (n=267). They found that the students in the gamified group obtained higher average marks than those in the non-gamified group. Additionally, they found that there is some statistical evidence to show that there is a positive effect on the learning performance for those students who were in the gamified group. They tentatively conclude that gamification could be effective in improving the students’ ability to learn to program, but that more research is needed.

Chapman and Rich [17] produced a gamified course and surveyed students as to their level of motivation doing the course (n=124). Their three key findings were as follows:

- A large portion (67.7%) of the students reported an increased (perceived) motivation in doing this gamified course compared to traditional classroom-based courses.
- The type of gamified elements that the students found most motivating were the ones that allowed them to track their own progress (points) and the progress of others (scoreboards).
- The demographics of the participants (age and gender) did not seem to impact the perceived benefits of the gamified course.

Interestingly, Koivisto and Hamari [18] explored whether or not gamification had a different impact on people in different demographics, using a survey (n=195). They focused specifically on age, gender, and the length of time using the gamified system. They found that in terms of age, there was little evidence of significant differences in the users’ experiences of the gamified system; with some evidence that the perception of the ease-of-use of the system diminishes slightly as age increases. In terms of gender, females reported significantly more positive perceptions of the gamified system, particularly in terms of the recognition received, and the social community developed (and the reciprocity between users), and they also reported the overall experience as being more enjoyable than males. Finally, in terms of the length of time using the gamified system, they found that the perceived usefulness, enjoyment, and playfulness tend to diminish over time for all user groups. These outcomes seen promising, but it is worth noting that

in 1976 social psychologist Donald Campbell observed that once a metric is identified as a primary indicator for success, its ability to accurately measure success tends to be compromised. This is known as “Campbell’s Law”, and when speaking specifically about educational programmes, he observed that: “*when test scores become the goal of the teaching process, they both lose their value as indicators of educational status and distort the educational process in undesirable ways*” [19]. Sidorkin [20] extended this notion when he explained that when people are aware that they are being evaluated, they will tend to change their behaviours in order to affect the measurements, and if they are aware of the exact criteria they are being evaluated on, they will change their behaviour to improve the results with respect to those particular metrics. Thus, in the context of gamification in education, choosing the game elements and what these represent and measure in a pedagogical context can be detrimental in the making of educational decisions and policies.

4. Gamification and Digital Nudges

The term “gamification” may have benign connotations because of its association with concepts such as “game” and “play”, but given that it sometimes uses points and scoreboards, if it were rechristened as “competition-ification” it would be interesting to see if people’s perspective on this teaching approach were to change. In fact, Bogost [21][22] suggests that a more suitable term might be “exploitationware”, since gamification has little to do with play, and is, in fact, more closely aligned with behavioural economics, which is a persuasion technique that attempts to reframe people’s choices but exploiting cognitive biases and by using manipulation strategies. The term “behavioural economics” has largely been superseded by the term “digital nudges”, but the concepts are almost exactly the same [23], whereby people are presented with small interventions that guide their choices, typically using things such as personalized messages, small (digital) rewards, or timely reminders, to reframe choices [24]. Sunstein and Thaler [25] describe digital nudges as aiming to “*alter people’s behaviour in a predictable way without forbidding any option*”.

The two approaches, gamification and digital nudges, both attempt to change a person’s behaviour towards a desired outcome, however, in the case of gamification the students may have no choice but to engage in the process, whereas with digital nudges, they are merely strongly guided in their choices, and they are not mandated. Nonetheless, the two techniques are extremely similar as they both stem from a root of liberal paternalism (or “soft paternalism”), both are attempting to influence behaviour, and both exploit similar cognitive

shortcuts [26][27][28]. Some of those shortcuts include the following:

- Kahneman [13] pointed out that people tend to rely more on their intuition than their rational thinking, particularly for the more routine, day-to-day activities.
- Waldman [29] highlights that there are limitations to the amount of information a person can process, they have therefore developed a series of heuristics (“rules-of-thumb”) to process information, and the five most pervasive ones are: anchoring, framing, hyperbolic discounting, overchoice and metacognitive processes (e.g. cognitive scarcity and cognitive absorption).
- Cialdini [30][31] pointed out that many persuasion techniques are built on the “*six basic tendencies of human behaviour*” and these are: reciprocation, consistency, social validation, liking, authority and scarcity.
- Bösch, *et al.* [32] discuss cognitive dissonance as a persuasion technique, where the uncomfortable state of mind where one’s beliefs and actions are contradictory can lead to bad decision making. The researchers note that “*this process can be exploited by inconspicuously providing justification arguments for sugar-coating user decisions that have negatively affected their privacy*”.

Increasing number of the shortcuts often occur at an unconscious (or intuitive) level, students will engage in these behaviours without being aware of them at the time, but when they reflect on their activities later, they can sometimes feel exploited or manipulated by the gamification process [33], for example, if the students are working hard to get to the top of the scoreboard in a gamified process, it may be only be after the process is finished that they might question why they became so obsessed with topping the scoreboard.

5. The Ethics of Gamification

Ethics was defined by the British philosopher G. E. Moore in his seminal 1903 book, “*Principia Ethica*”, as “*the general enquiry into what is good*” (p.3). Similarly, in the US television series “*The Office*”, one of the characters, Oscar Martinez, says that “*Ethics is a real discussion of the competing conceptions of the good*” (in Season 3, Episode 3, “*Business Ethics*” by Ryan Koh). Thus, ethics is about trying to understand what is “good” and what is the difference between right and wrong. It is

important to recognise that the answers to those questions will vary depending on what one chooses to focus on. If the focus is on people, their actions, and the outcomes of those actions, we call that “normative ethics” [34], for example, if good actions result in bad consequences, should we consider that as “good”? And if the opposite were to occur, that bad actions result in good consequences, is that “good”? The study of normative ethics generally discusses it from three classic perspectives [35]:

- *Virtue Ethics*: This perspective looks at ethics from the perspective of the people performing the action, is that person a virtuous one, who is a fully flourishing human being?
- *Deontology*: This perspective looks at ethics from the perspective of the actions themselves, and whether or not they adhere to a set of principles based on cultural or personal principles.
- *Utilitarianism*: This perspective looks at ethics from the perspective of the consequences of the actions, and to maximise the well-being of as many people as possible involved.

Looking back at the history of the ethics of games, it is worth noting that the ethics embedded in how a game is played do not always fit the real world. What Huizinga [36] termed the “magic circle” of a game that separates the real world from the game world thus having separate sets of rules and morals within each does not always demonstrate a clear-cut distinction between the two. As Kim and Werbach [33] note, gamification can convolute the boundaries between these two worlds. Their research identified four key ethical concerns from an extensive review of the literature:

- i. Exploitation: Gamification can take unfair advantage of people
- ii. Manipulation: Gamification can infringe on people’s autonomy
- iii. Harm: Gamification can intentionally or unintentionally harm people
- iv. Character: Gamification can negatively impact on the moral character of people

They also noted that an ethical analysis of gamification is made complex by the fact that some activities that the student is undertaking is happening both in the “real world” and the “gamified world” at the same time, so for example, a student earning virtual badges for educational achievements is

competing in both worlds at the same time. They also note that there can be a tension between the needs of the game provider and the game player, for example, if a university were to gamify a learning experience so that a student were to be more academically successful in a psychologically healthy way, then the student gains a benefit, and the university gains a benefit, but if the university were to gamify a learning experience so that it could predict which students were likely to fail their courses and which were likely to pass, and then the university decided to expel those students likely to fail, this would be harmful to the individual students, but may be beneficial to the organisation that provides the gamified process. Also, in the context of the ethics of gamification Toda *et al.* [37] noted that there is a lack of instructional design frameworks in the gamification literature, which would aim to develop gamified processes that would positively impact students' development. They undertook a systematic literature review and identified four significant negative effects of gamification:

- i. Performance: Gamification can lead to the loss of educational performance
- ii. Behaviour: Gamification can result in the appearance of undesired behaviours
- iii. Indifference: Gamification can result in indifference to the gamification approach
- iv. Effectiveness: Gamification can result in declining effects

Toda *et al.* [37] noted many studies have demonstrated the failure of gamification to make any statistically significant improvement in learning when compared to traditional teaching. Hyrynsalmi, *et al.* [38] also undertook a systematic literature review and also identified four significant negative effects of gamification:

- i. Cheating: Gamification can lead to cheat, as it could in games.
- ii. Exploitation: Gamification can exploit the game players, therefore the players need to be educated on possible problems with gamification.
- iii. Addiction: Gamification can potentially be addictive, and if the player has a history of addiction, or is a child who is easily manipulable, can a gamified approach be justified? The researchers note a paucity of research on this topic.
- iv. Necessity: Gamification might not be necessary or possible in all cases. There may be cases where

gamifying a process is simply adding unnecessary steps, and that can be harmful or dangerous.

Nyström [39] also used a systematic literature review in the gamification domain to identify seven problematic categories in gamification, as follows:

1. *Motivation*: The use of badges and points in gamified processes are extrinsic motivators, and seem to work well (for a limited duration) for those students who are extrinsically motivated, but may have a detrimental effect on those who are intrinsically motivated.
2. *Addiction*: The gamified elements of a process can be fun and competitive, but for some people it can result in them becoming deeply immersed in the process (which psychologists refer to as "flow"), which in turn could lead to addiction for some of those players.
3. *Competition*: If the gamified elements of a process are competitive, that can lead to less successful learning experiences in exchange for succeeding at the gamified elements of the process. It may also result in less future collaboration between former competitors.
4. *Manipulation*: Some people have reported the feeling of having been manipulated when engaging in a gamified process (because the game cues make them react automatically without thinking), which in turn can lead to distrust between the game provider and game player. The game provider must ensure that no manipulation occurs.
5. *Data Integrity*: All data that the player shares (both explicitly and implicitly) while engaging in the gamified process should be treated with the utmost care and should not be employed in future for any purpose other than for what it was intended (and agreed) to be used for.
6. *Surveillance and Privacy*: Some approaches to gamification can make people feel surveilled, for example those processes that include a public scoreboard allows tracking of everyone's performance, and particularly for the person at the bottom of the scoreboard, they can feel publicly humiliated. Gamified processes should be designed so that the players can decide what data to share and what data to keep private.
7. *Exploitation*: One of the most worrisome aspects of gamification is the potential for exploitation, where students (or employees) end up working far harder than they need to (and this could impact their well-being) because of the gamified

process. Thus, the game provider must carefully ensure that the gamified process does not exploit the game players.

Finally, Almeida, *et al.* [40] undertook a systematic literature review on the negative effects of gamification, and they identified 22 different issues (including the number of papers per issue):

1. Lack of effect (16)
2. Lack of understanding (9)
3. Irrelevance (8)
4. Lack of motivation (8)
5. Demotivation (6)
6. Loss of performance (6)
7. Cheating (5)
8. Gaming the system (5)
9. Reduction of intrinsic motivation (5)
10. Alienation or confusion (3)
11. Anxiety (3)
12. Dislike of gamification (3)
13. Lack of improvement (3)
14. Time constraints (3)
15. Dislike of competition (2)
16. Discouragement (2)
17. Lack of flow (2)
18. Lack of granularity on grading (2)
19. Novelty effect (2)
20. Perception of high workload (2)
21. Sabotaged cooperation (2)
22. Sabotage of weaker students (2)

It is clear that there are ethically issues with Gamification, and if it is to be integrated into a module, it is important that it is done carefully. Thus, to aid the potential introduction of gamification into a module, a structured and ethically-centred model of instructional design is presented in the following section.

6. An Ethical Instructional Design Model

A commonly used model in the discipline of Instructional Design is called ADDIE, which outlines the process for developing teaching materials, in the following stages: Analysis, Design, Development, Implementation, and Evaluation [41]. The origins of the model have proven to be elusive to identify [42], but the model is widely used and can be seen as the basis of many other instructional design models [43]. In this research two scenarios are being considered, the introduction of gamification into a pre-existing module, and the introduction of gamification into a new module. Presented below is a table of the five stages of the ADDIE model explaining both the Pedagogical Components of that phase, as well as some of the Ethical Components that should be reflected on in that particular stage of the model:

ANALYSIS
<p style="text-align: center;"><i>Pedagogical Components</i></p> <p><i>Pre-existing module:</i></p> <ul style="list-style-type: none"> • Reflect on the existing and previous learners <ul style="list-style-type: none"> ○ Consider if they would have benefited from (or been hindered by) a gamification approach. ○ Consider if there are particular students within the classes who would have benefited from (or been hindered by) a gamification approach. • Review the goals of the programme. <ul style="list-style-type: none"> ○ Consider if any of the goals prevent (or assist) in the introduction of gamification. ○ Consider if any of the goals need to be modified to aid in the introduction of gamification. <p><i>Newly created module:</i></p> <ul style="list-style-type: none"> • Identify the learners, and the intended audience. <ul style="list-style-type: none"> ○ Consider if they are the types of students who would benefit from (or be hindered by) a gamification approach. • Identify the goals of the programme. <ul style="list-style-type: none"> ○ Consider if any of the goals prevent (or assist) in the introduction of gamification.
<p style="text-align: center;"><i>Ethical Components</i></p> <p>At this stage take time to reflect on the ethics of introducing gamification into the module using the three classic categories of normative ethics:</p> <ul style="list-style-type: none"> • <i>Deontology</i>: Will adding gamification to this module adhere to a set of principles that most people would agree are morally, right? • <i>Utilitarianism</i>: Will the outcomes of the adding gamification to this module result in a greater good for all participants? • <i>Virtue Ethics</i>: Would adding gamification to this module be the act of someone who is a fully flourishing human being?
DESIGN
<p style="text-align: center;"><i>Pedagogical Components</i></p> <p><i>Pre-existing module:</i></p> <ul style="list-style-type: none"> • Review the module learning outcomes. <ul style="list-style-type: none"> ○ Consider if any of the outcomes prevent (or assist) in the introduction of gamification. ○ Consider if any of the outcomes need to be modified to aid in the introduction of gamification. • Review the course content <ul style="list-style-type: none"> ○ Consider which aspects of the course content

<p>can be more readily adapted for the introduction of gamification.</p> <ul style="list-style-type: none"> ○ Consider if any of the content needs to be modified to aid in the introduction of gamification. ● Review the media types being used <ul style="list-style-type: none"> ○ Consider if any of the existing media types prevent (or assist) in the introduction of gamification ○ Consider if any new media types need to be introduced to aid in the introduction of gamification. <p><i>Newly created module:</i></p> <ul style="list-style-type: none"> ● Create the module learning outcomes. <ul style="list-style-type: none"> ○ Consider if any of the outcomes prevent (or assist) in the introduction of gamification. ● Create an outline for the course content <ul style="list-style-type: none"> ○ Consider which aspects of the course content can be more readily adapted for the introduction of gamification. ● Choose the media types to be used <ul style="list-style-type: none"> ○ Consider which media types can be introduced to aid in the introduction of gamification.
<p><i>Ethical Components</i></p> <p>In O’Keefe and O’Brien’s 2018 book “Ethical Data and Information Management: Concepts, Tools, and Methods” [44] four key questions are presented on ethics that can be reframed in this context:</p> <ol style="list-style-type: none"> 1. Will the gamification aspects of the module preserve or enhance human dignity? 2. Will the gamification aspects of the module preserve the autonomy of the human? 3. Is the data processing associated with the gamification aspects of the module both necessary and proportionate? 4. Do the gamification aspects of the module uphold the common good?

<p>DEVELOPMENT</p>
<p><i>Pedagogical Components</i></p> <p><i>Pre-existing module:</i></p> <ul style="list-style-type: none"> ● Review the lesson plans <ul style="list-style-type: none"> ○ Consider if any of the existing lesson plans prevent (or assist) in the introduction of gamification. ○ Consider if any of the existing lesson plans need to be modified to aid in the introduction of gamification. ● Review all the existing media and materials <ul style="list-style-type: none"> ○ Consider if any of the existing media and

<p>materials prevent (or assist) in the introduction of gamification.</p> <ul style="list-style-type: none"> ○ Consider if any of the existing media and materials need to be modified to aid in the introduction of gamification. ● Package the course for delivery <p><i>Newly created module:</i></p> <ul style="list-style-type: none"> ● Create the lesson plans <ul style="list-style-type: none"> ○ Consider if any of the lesson plans prevent (or assist) in the introduction of gamification. ● Create the all the media and materials <ul style="list-style-type: none"> ○ Consider if any of the media and materials prevent (or assist) in the introduction of gamification. ● Package the course for delivery.
<p><i>Ethical Components</i></p> <p>If the institute in which this module is being delivered has a formal ethics review process (either for research projects or teaching projects), consider undertaking this process (or at least filling out the requisite forms). If there is no formal review process, then explore the British Educational Research Association (BERA)’s <i>Ethical Guidelines for Educational Research</i>, which includes key considerations, such as:</p> <ul style="list-style-type: none"> ● Consent ● Transparency ● Right to withdraw ● Incentives ● Harm arising from participation in research ● Privacy and data storage ● Disclosure <p>Alternatively, many universities have their own ethics guidelines that are published on the web that include Ethics Application Forms and Participant Consent Forms.</p>

<p>IMPLEMENTATION</p>
<p><i>Pedagogical Components</i></p> <p><i>Pre-existing and newly created modules:</i></p> <ul style="list-style-type: none"> ● Deliver the content in an effective and efficient way <ul style="list-style-type: none"> ○ Reflect on the gamification aspects of the module ● Promote the students’ understanding of the content <ul style="list-style-type: none"> ○ Reflect on any learning gains from the gamification processes ● Transfer knowledge for the teacher to the students.

<ul style="list-style-type: none"> ○ Also note any student-to-student transfer of knowledge from the gamification aspects.
<p><i>Ethical Components</i></p>
<p>Consider getting the students to complete the Internet Gaming Disorder test [45] to measure their potential for gaming addiction. Use the checksheet included in Appendix A, it should be discussed in meetings, and reflected on carefully throughout the Implementation process. Also, consider using a reflective journal to reflect more deeply on the gamification aspects of the module [46].</p>
<p style="text-align: center;">EVALUATION</p>
<p><i>Pedagogical Components</i></p>
<p><i>Pre-existing and newly created modules:</i></p> <ul style="list-style-type: none"> • Reflect on what aspects of the Implementation process did not go as well as expected • Reflect on what aspects of the Implementation process went better than expected (accidentally or on purpose) • Reflect on how well the gamification aspects of the Implementation process went retrospectively. • Make any updates to teaching content for the next delivery.
<p><i>Ethical Components</i></p>
<p>Consider undertaking a Data Protection Impact Assessment at this stage [47]. All participants of this process should consider if there are any lingering ethical issues that need to be addressed.</p>

7. Conclusions

In this paper we have discussed some of the key ethical issues associated with the use of gamification in education [48][49]. Gamification is focused on imbuing game-type characteristics into educational processes, and we discussed some of the key drivers and benefits of this approach, as well as identifying parallels with digital nudges and other persuasion techniques. From there, some of the ethical challenges of gamification are outlined, and a modified model of instructional design based on ADDIE was developed that incorporated ethical checks at all stages, with a checksheet to help reflect on some of the key ethical issues. Crucially, if teachers are planning to incorporate gamification into their lessons, they should carefully consider how it might impact all of the students in their class, because students are not all the same, and some will respond well to a challenge, but others may become despondent undertaking that same challenge.

8. References

- [1] Blohm, I., and Leimeister, J.M. (2013) "Gamification". *Business and Information Systems Engineering*, 5(4), 275-278.
- [2] Deterding, S., Dixon, D., Khaled, R., and Nacke, L. (2011, September). "From Game Design Elements to Gamefulness: Defining Gamification". In *Proceedings of the 15th International Academic Mindtrek Conference: Envisioning Future Media Environments* (pp. 9-15).
- [3] McGonigal, J. (2011). *Reality is Broken: Why Games Make us Better and How They Can Change The World*. Penguin.
- [4] Lucero, A., Karapanos, E., Arrasvuori, J., and Korhonen, H. (2014). "Playful or Gameful? Creating Delightful User Experiences". *interactions*, 21(3), 34-39.
- [5] Caillois, R. (2001). *Man, Play, and Games*. University of Illinois Press.
- [6] De Croon, R., Wildemeersch, D., Wille, J., Verbert, K., and Abeele, V. V. (2018, June). "Gamification and Serious Games in a Healthcare Informatics Context". In *2018 IEEE International Conference on Healthcare Informatics (ICHI)* (pp. 53-63). IEEE.
- [7] Michael, D. R., and Chen, S. L. (2005). *Serious Games: Games that Educate, Train, and Inform*. Muska and Lipman/Premier-Trade.
- [8] Jackson, A. (2021, October 3). *The Playfulness Continuum*. Available on LinkedIn at the following page: <https://www.linkedin.com/pulse/playfulness-continuum-ale-x-jackson/>. (Access Date: 21 September 2022).
- [9] Filatro, A., and Cavalcanti, C. C. (2016, November). "Structural and Content Gamification Design for Tutor Education". In *E-Learn: World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education* (pp. 1152-1157). Association for the Advancement of Computing in Education (AACE).
- [10] Ryan, R.M., and Deci, E.L. (2000). "Self-Determination Theory and the Facilitation of Intrinsic Motivation, Social Development, and Well-Being". *American Psychologist*, 55(1), 68.
- [11] Ritterfeld, U., Cody, M., Vorderer, P. (2009) *Serious Games: Mechanisms and Effects*. Routledge.
- [12] Chou, Y. (2015). *Actionable Gamification - Beyond Points, Badges, and Leaderboards*. Octalysis Media. Retrieved from <https://yukaichou.com/gamification-book/>. (Access Date: 26 January 2022).
- [13] Kaufmann, D. A. (2018). "Reflection: Benefits of Gamification in Online Higher Education". *Journal of Instructional Research*, 7, 125-132.
- [14] Brull, S., and Finlayson, S. (2016). "Importance of Gamification in Increasing Learning". *The Journal of Continuing Education in Nursing*, 47(8), 372-375.

- [15] Fraçz, W. (2015, September). "An Empirical Study Inspecting the Benefits of Gamification Applied to University Classes". In 2015 7th Computer Science and Electronic Engineering Conference (CEECE) (pp. 135-139). IEEE.
- [16] Marín, B., Frez, J., Cruz-Lemus, J., and Genero, M. (2018). "An Empirical Investigation on the Benefits of Gamification in Programming Courses". *ACM Transactions on Computing Education (TOCE)*, 19(1), 1-22.
- [17] Chapman, J. R., and Rich, P. J. (2018). "Does educational gamification improve students' motivation? If so, which game elements work best?". *Journal of Education for Business*, 93(7), 315-322.
- [18] Koivisto, J., Hamari, J. (2014). Demographic Differences in Perceived Benefits from Gamification". *Computers in Human Behavior*, 35, 179-188.
- [19] Campbell, D.T. 1976. *Assessing the Impact of Planned Social Change*. Hanover, NH: The Public Affairs Center, Dartmouth College.
- [20] Sidorkin, A. M. (2016). "Campbell's Law and the Ethics of Immensurability". *Studies in Philosophy and Education*, 35(4), 321-332.
- [21] Bogost, I. (2013). *Exploitationware*. In *Rhetoric / Composition / Play Through Video Games* (pp. 139-147). Palgrave MacMillan, New York.
- [22] Bogost, I. (2014) "Why Gamification is Bullshit". *The Gameful World: Approaches, Issues, Applications*, 65-79.
- [23] Forberger, S., Reisch, L., Kampfmann, T., Zeeb, H. (2019). "Nudging to Move: A Scoping Review of the Use of Choice Architecture Interventions to Promote Physical Activity in the General Population". *International Journal of Behavioral Nutrition and Physical Activity*, 16(1), 1-14.
- [24] Acquisti, A. (2009) "Nudging Privacy: The Behavioral Economics of Personal Information," *IEEE Security and Privacy*, 7(6), pp. 82-85.
- [25] Sunstein C.R., Thaler R. (2009). *Nudge: Improving Decisions About Health, Wealth, and Happiness*, Penguin Books.
- [26] Almuhammedi, H., Schaub, F., Sadeh, N., Adjerid, N.I., Acquisti, A., Gluck, J., Agarwal, Y. (2015) "Your location has been shared 5,398 times! A field study on mobile app privacy nudging". In *Proceedings of the 33rd annual ACM conference on human factors in computing systems*, pp. 787-796.
- [27] Peer, E., Egelman, S., Harbach, M., Malkin, N., Mathur, A., Frik, A. (2020) "Nudge me right: Personalizing online security nudges to people's decision-making styles". *Computers in Human Behavior*, 109.
- [28] Schöbel, S., Janson, A., Jahn, K., Kordyaka, B., Turetken, O., Djafarova, N., Saqr, M., Wu, D., Söllner, M., Adam, M., Heiberg Gad, P., Wesseloh, H. and Leimeister, J. M. (2020). *A Research Agenda for the Why, What, and How of Gamification Designs: Outcomes of an ECIS 2019 Panel*. *Communications of the Association for Information Systems*, 46(1), 30.
- [29] Waldman, A.E. (2020). "Cognitive biases, dark patterns, and the 'privacy paradox'". *Current Opinion in Psychology*, 31, pp. 105-109.
- [30] Cialdini, R. (1984). *Influence: The Psychology of Persuasion*. William Morrow Company.
- [31] Cialdini, R. (2001). "The Science of Persuasion". *Scientific American*, 284(2), pp. 76-81.
- [32] Bösch, C., Erb, B., Kargl, F., Kopp, H., Pfattheicher, S., (2016) "Tales from the Dark Side: Privacy Dark Strategies and Privacy Dark Patterns". In *Proceedings on Privacy Enhancing Technologies*, 2016(4), pp. 237-254.
- [33] Kim, T.W., and Werbach, K. (2016). "More than just a game: ethical issues in gamification". *Ethics and Information Technology*, 18(2), 157-173
- [34] Foot, P. (2009). "Morality as a System of Hypothetical Imperatives". In S. M. Cahn, and P. Markie, *Ethics: History, Theory, and Contemporary Issues* (pp. 556-561). New York: Oxford University Press.
- [35] Fletcher, J. (1970). "Virtue is a Predicate". *The Monist*, 66-85.
- [36] Huizinga, J. (1949) *Homo Ludens: A Study of the Play-Element in Culture*, London: Routledge.
- [37] Toda, A.M., Valle, P.H., and Isotani, S. (2017). "The dark side of gamification: An overview of negative effects of gamification in education". In *Researcher links workshop: higher education for all* (pp. 143-156). Springer.
- [38] Hyrynsalmi, S., Smed, J., and Kimppa, K. (2017). "The Dark Side of Gamification: How We Should Stop Worrying and Study also the Negative Impacts of Bringing Game Design Elements to Everywhere". In *GamiFIN 2017 Proceedings* (pp. 96-104).
- [39] Nyström, T. (2021). "Exploring the Darkness of Gamification: You Want It Darker?" In *Intelligent Computing* (pp. 491-506). Springer, Cham.
- [40] Almeida, C., Kalinowski, M., and Feijó, B. (2021). "A Systematic Mapping of Negative Effects of Gamification in Education/Learning Systems". In *47th Euromicro Conference on Software Engineering and Advanced Applications (SEAA)*, pp. 17-24. IEEE.
- [41] Branch, R.M. (2009) *Instructional Design: The ADDIE Approach* (Vol. 722). Springer Science and Business Media.
- [42] Molenda, M. (2003). "In Search of the Elusive ADDIE Model". *Performance Improvement*, 42(5), pp.34-37.
- [43] Bajracharya, J.R. (2019). "Instructional Design and Models: ASSURE and Kemp". *Journal of Education and Research*, 9(2), pp.1-9.

[44] O'Keefe K. and O. Brien, D. (2018). *Ethical Data and Information Management: Concepts, Tools and Methods* (1st. ed.). Kogan Page Ltd., GBR.

[45] Pontes, H.M., Griffiths, M. D. (2015). "Measuring DS M-5 Internet gaming disorder: Development and validation of a short psychometric scale". *Computers in Human Behavior*, 45, 137-143. Questionnaire is available online here: <https://www.halleypontes.com/igds9sf>. (Access Date: 21 October 2021).

[46] Morrison, K. (1996). "Developing Reflective Practice in Higher Degree Students through a Learning Journal". *Studies in Higher Education*, 21(3).

[47] Bieker, F., Friedewald, M., Hansen, M., Obersteller, H. and Rost, M. (2016) "A Process for Data Protection Impact Assessment under the European General Data Protection Regulation". In *Annual Privacy Forum* (pp. 21-37). Springer, Cham.

[48] Gordon, D., O'Sullivan, D., Stavrakakis, I., and Curley, A. (2020). "Homo Ludens Moralis: Designing and Developing a Board Game to Teach Ethics for ICT Education", 18th International Conference on the Ethical and Social Impacts of ICT, 17th-19th June 2020, La Rioja, Spain.

[49] O'Sullivan, D., Gordon, D. (2020). "Check Your Tech – Considering the Provenance of Data Used to Build Digital Products and Services: Case Studies and an Ethical CheckSheet", IFIP WG 9.4 European Conference on the Social Implications of Computers in Developing Countries, 10th–11th June 2020, Salford, UK.

9. Acknowledgements

The Authors of this paper and the participants of the Ethics4EU project gratefully acknowledge the support of the Erasmus+ programme of the Eanduropean Union. The European Commission's support for the production of this publication does not constitute an endorsement of the contents, which reflect the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Appendix A: Gamification Ethics Checksheet

A task sheet for teachers to work through several times and hopefully then internalise.

Name of topic _____

Evaluation criteria	Notes
Is there a clear purpose for adding gamification to this content?	Gamification Process:
Can you allow the students to anonymously let you know if they have addictive tendencies?	Gamification Process:
Are the students generally more intrinsically or extrinsically motivated?	Gamification Process:
Have the students any previous experiences with gamification, and how were they?	Gamification Process:
Will there be sufficient time to deliver the gamified process in a pedagogically sound way?	Gamification Process:
If there is groupwork in the process, will it still be possible to mark each student fairly?	Gamification Process:
Is it possible that this will negatively impact the students' ability to cooperate in future?	Gamification Process:
Will this process be fair on all students? Both weaker and stronger students?	Gamification Process:
Is there a data management policy for the gamification process? Is it clear?	Data Management:
How will the data generated by this process be kept secure?	Data Management:
How can you ensure the data generated by this process will only be used for this purpose?	Data Management:
Is there a process to allow the students to indicate which data they want to make public?	Data Management:
Is it possible that a student could feel excessively anxious participating in the process?	Student Experience:
Is it possible that a student could feel exploited participating in the process?	Student Experience:
Is it possible that a student could feel humiliated participating in the process?	Student Experience:
Is it possible that a student could feel that the gamified process increased their workload unfairly?	Student Experience:
Could this process encourage some students to cheat or "game the system" in some way?	Student Experience:
Could this process unintentionally harm the students?	Student Experience: