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Executive summary

Gaming Horizons is a 'sister project' funded by the European Commission under Horizon 2020. The project's objective was to examine gaming and gamification as areas of research and development in Europe, adopting a multidisciplinary perspective based on the integration of the social sciences and the humanities, and proposing 'alternative framings' informed by criteria of responsible research and innovation. The project run from December 2016 to January 2018. This report provides an account of the empirical strands that informed the recommendations and practical advice of our project (i.e. the Scenarios and the 'Manifesto for European Video games'). While individual research reports about the strands have also been produced (Perrotta et al., 2017; Persico et al., 2017a; Persico et al., 2017b), the present document offers a synthetic account in which the various research tasks are considered as parts of a consistent, unified process of data collection and public engagement. Fittingly, this is Gaming Horizons' last official output, serving the double purpose of reiterating the evidence-based nature of our work, and paving the way for more targeted dissemination activities.

The report is organised as follows:

- An introductory section provides some conceptual framing and situates the report in the interdisciplinary field of game studies. This section takes into account the historical development of the game industry and its economic and cultural relevance at the time

of writing. A number of theoretical and empirical contributions from various disciplines are reviewed. The separation between serious/applied games and entertainment games begins to be critically examined here.

- A methodology section describes the various approaches we adopted to collect and analyse evidence, based on our overarching objective: to produce an accurate snapshot of this medium at the interface of research, usage, professional practice and policy, but also to engage in a more critical analysis of the 'social imaginary' associated with video games. The 'twin focus' of the project is introduced here: the views and perceptions of five stakeholder groups (developers, researchers, policy makers, educators, young players and their families) and the institutional discourse of the European Commission, as articulated in the Horizon 2020 Research and Development programme concerned with ICT in general and games more specifically.
- Following on from the methodology, the two operative phases are described in relative detail. These are the 'landscape analysis' phase, based on a systematic literature review, the analysis of the official H2020 discourse, and in-depth interviews, and the 'cultural expansion' phase, which was based on public engagement activities (workshops and webinars) and the production of key dissemination outputs (the Manifesto for European Video Games and the Scenarios).
- A findings section provides an overview of the insights emerged from the empirical strands based on the analysis of primary and secondary evidence: the literature review, the discourse analysis of a textual corpus that included 49055 words, and 73 interviews with informants.
- A concluding section focuses on the findings from the cultural expansion activities, which are articulated as a set of recommendations that mostly aim to inform the following areas: future policies including funding and regulatory frameworks, educational practice in formal and informal learning contexts, the relationship between game development and research, and areas for future research.

In an effort to improve the readability of this online report, a selection of findings are reported below as short vignettes. Similarly, the recommendations are grouped by headings with links to the concluding section, where they are described in full.

Evidence on specific game mechanics and/or player characteristics is scant. Although the relationship between violence in games and players' aggressive behaviours is by far the most thoroughly investigated topic, there are contradictory findings about this theme. Other aspects of game design that can negatively impact players' lives only recently attracted researchers' attention and proved to be less explored in the academic contest while it is cited by several stakeholders we consulted. We refer in particular to monetisation and so-called 'dark design', i.e. design principles that specifically try to elicit intense, potentially unbalanced engagement and compulsive 'microtransactions'.

Findings about identity and social inclusion reflect some positive developments in the area of gender representation, but suggest that while the gaming market is shifting away from its stereotypical roots, there is still much to be done in terms of developing a more diverse and inclusive gaming culture.

The Analysis of the H2020 Discourse on ICT and gaming more specifically shows a gap between the stated political aims and the actual implementation priorities. On the one hand, themes of Responsible Research and Innovation are, without doubt, visible within the European R&D agenda. In particular, compared with its predecessors (FP6 and FP7) Horizon 2020 represents a more explicit attempt to account for a range of societal, environmental and cultural concerns associated with technological innovation. On the other hand, there appears to be a discrepancy between the rhetoric of ethics and social responsibility in the high-level strategic discourse, and the way these themes are featured in the more operational documents - the funding calls above all.

The European Commission makes a clear distinction between the serious and applied games sector and the mainstream entertainment sector, implicitly conveying the assumption that themes of social and cultural import- i.e. those worthy of public funding - can only be found in the former. Game development is largely represented in engineering terms, and the social applications of games and gamification emphasise a strongly utilitarian mindset focused on measurable impacts and benefits.

We found that video games are viewed as formidable motivating experiences, but we also saw signs of very informed and active types of engagement in which this potential is moderated by contextual aspects. Whether as a form of active cultural consumption (playing games) or in the context of professional practice (using games in education and learning), interviewees represented themselves as informed and critical agents, capable of navigating the gaming landscape and, mostly, of spotting the difference between actual potential and 'hype'.

Stakeholders were generally doubtful about efforts to attain specific, predetermined and measurable impacts of an educational and/or pro-social nature via engineered pathways passing all the way from game design to implementation, deployment, interaction and real-world transfer. This hard-wired approach to 'applied' gaming, arguably the direction that has until now been prioritised within the 'research and policy making' perspective, was viewed with scepticism by many interviewees, who tended to look elsewhere when considering the benefits that can and do flow from gameplay. A standout example here is the importance many educators placed on video games generally as cultural artefacts that can provide opportunities for media studies, e-literacy, ethical thinking, and transversal skill development, rather than as dedicated tools for imparting subject-area knowledge.

Our mandate as a sister project was to expand the horizon of what is possible in this area, and this led us to engage with the world of mainstream and independent game development, which largely operates in highly competitive market conditions outside of the existing frameworks of European funding. These developers - often small studios - expressed significant reservations about the current institutional frameworks to support serious and applied games in Europe. While they are very interested in the potential of games to tackle socially and culturally relevant themes, they find themselves pressed between the rock of the market and the hard place of European funding, viewed as constraining and rife with creativity-stifling requirements.

Gaming Horizons' recommendations

1. Introduction

In the 40 years since 'Pong' was first playable by the public, video games have moved from being confined to arcades to being an everyday activity for half of Europe. Video games are now played with mobile phones, on office computers, with head-mounted Virtual Reality helmets, or simply in front of the television. The business has grown to be worth €85bn, more than the television, music, or film industries, and has an average player age in their mid-thirties, meaning that for every 16 year old, there is another 56 year old playing games. Games are also used in a variety of contexts and for a range of purposes- some undeniably positive, others more problematic. These contexts and purposes include education (formal and informal), corporate training, artistic expression, political commentary, social activism, behavioural engineering, ideological influencing, military recruitment, and so forth. This industry, in other words, has developed to embrace a plethora of genres, signifiers, and interactions. However, like all new media before them, video games have been dogged by controversy. In particular, accusations of violent video games causing aggression remains an area where conclusive evidence is lacking, despite this being one of the most heavily investigated areas. Nonetheless, the stigma has remained. Alongside violent content, enduring concerns about leisure and productivity have stifled the cultural debate around video games, as the prejudiced perception that they lack quantifiable benefits (i.e. playing games as 'timewasting') has led them to be excluded from many research and development funds except with strict provisos regarding their content. In this regard, a strand of video game development focused on 'serious' or 'applied' games exists. These games purport to be only prosocial in their impact and, therefore, have been framed as suitable candidates for research funding. Our position, as a project, is that this approach is constraining and should be challenged.

In the 21st century, video games are as common in daily life as television was during the previous four decades. This may shock non-players, but the spectrum of games that would traditionally be classified as 'entertainment products', i.e. their topics, their gameplay mechanics, their narrative aspects and the characters in them, has become significantly

broader. This trend affirms that video games are a significant new medium of expression. The Gaming Horizons project examined whether the existing framing of video games in research and development fits with their reality, and whether the funding goals of Horizon 2020 matched the Responsible Research and Innovation (RRI) goals of the programme, the needs for Social Sciences and the Humanities (SSH) to be included in the assessment of European culture, and the wider goals of political, economic, and cultural harmony that are part of the EU's core structures. Recommendations have been made in the Gaming Horizons project's outcomes on various fronts: to inform more nuanced and diverse approaches to the development, the study and the use of games in various contexts, and to revise their framing for future funding policies. Ultimately, this project represents an invitation to turn away from seeing video games as being intrinsically problematic, towards reframing them as a powerful expressive medium that needs a combination of both the existing engineering-related grants and new multidisciplinary research - a research that is more open to contributions from the social sciences and the humanities, and aware of the complex ethical ramifications of game development and game usage. Without this change, it is possible that the EU's video game development community will be left behind by market-driven development from other major global media production areas.

2. Positioning this report

Situating the empirical study of video games in a field of academic interest is not an easy task. There is indeed a body of work called 'game studies' that has evolved over the last ten years or so, vying for legitimacy and trying to position itself in the tradition of cultural and media scholarship. This body of work is often construed as an expression of the 'digital turn' in the humanities and the social sciences, with authors trying to extricate gaming from a stubborn discourse in which biased notions of academic relevance (where other media, old and new, are afforded more attention) and technocentrism (where games are viewed exclusively as an area of technological innovation and commercial exploitation) play a role. Therefore, the more 'socio-cultural' study of video games found itself looking for a niche, pressed between more dominant lines of enquiry: a computer science and cognitivist (increasingly neuroscientific) approach where games are analysed as instruments to support learning and behavioural change, and a social and health psychology perspective traditionally interested in effects on well-being and risk factors. In this regard, authors like Jasper Juul (2013), Greg Costikyan (2013), Graeme Kirkpatrick (2013), and Mary Flanagan (2009) are paving the way for the interdisciplinary research of this most complex medium, drawing on psychology, philosophy, critical theory, literary scholarship, and other disciplines. The general feeling is that we are now beginning to cast our attention to the inner workings of video games from a non-reductionist, more theoretically rich angle, to interrogate critically their key components and features, such as the competition-collaboration dialectic, the role of uncertain rewards, the importance of social values informing the design process, the cultural constructions of gaming as an identity-defining social practice, and so forth.

At the same time, the various cultural sites in which diverse uses (and misuses) of gaming occur are beginning to attract empirical interest, beyond narrow concerns for market segmentation

and expansion. We refer here to the study of gaming in the household, in non-traditional public spaces, or among underrepresented groups; studies informed more by a critical interest in identities, practices, and values than by the goal to grow the video games market beyond traditional demographics. Valuable research in this space has been carried out on the gendered nature of gaming habits in the family, which reinforce stereotypical regulatory roles for fathers and mothers, and equally stereotypical narratives of ability vs. inability for boys and girls (Harvey 2015).

Another important line of enquiry focuses on diverse representation (of gender, race or class) in gaming. Indeed, this is a prominent concern to be found among popular culture commentators, media scholars, and education researchers. The underlying assumption here is that engagement with media, and technology more broadly, is part of a system of inequalities that include gender-skewed patterns of cultural consumption associated with privilege and, in some cases, social oppression (Shaw, 2012). Similarly, for many educational researchers gaming is a gateway to further studies in STEM[1] and related careers, hence traditional roles and identities among young players perpetuate a status quo that marginalises women and other minorities in a vital economic sector.

Despite a remarkable dynamism in the academic discourse around video games, contradictions persist: yes, video games are an important cultural phenomenon but their value still hinges on social and economic benefits of a different order, i.e. not related to the 'here and now' of playing. These issues have informed Gaming Horizons policy recommendations and practical advice, collated in our manifesto and stakeholder-tailored scenarios. In this regard, the nature of play, in all its ineffability and complexity, clearly needs a more informed policy focus. Playing can be a worthwhile activity in its own right, but this is not always the case. Playing may also lead to educational or cognitive benefits, but only if other contextual circumstances are also present.

In fact, social research on the various forms of social and digital divides amply shows that engagement with games (or any form of technology) on its own is unlikely to find productive outlets unless it intersects with other forms of social and cultural advantage: broad socio-economic conditions (where and how one lives), family background, access to local and online support and expertise, and so forth (Van Deursen and Van Dijk, 2014). The economisation and instrumentalization of leisure and cultural activities, i.e. the idea that an activity is not worthwhile unless it is explicitly and accountably related to some kind of economically ratified outcome, should also be problematised.

3. Methodology

The overall methodological approach adopted in Gaming Horizons was, as it is often the case in social research, the result of a compromise. Our objective was to 'take the pulse' of this

[1] Science Technology Engineering and Maths

medium, looking at its articulations as a topic of academic interest and an area of educational practice, without neglecting its most visible incarnations: a form of culturally pervasive interactive entertainment and a field of great creative vibrancy. Empirically, this posed the challenge to strike the right balance between disciplinary outreach, empirical representativeness and qualitative depth. Our overarching objective was to produce an accurate snapshot of this medium at the interface of research, usage, professional practice and policy, but also to engage in a more critical analysis of what Graeme Kirkpatrick (2013) called the 'social imaginary' associated with video games. That is, the 'rules of sense-making that we use from day to day and which maintain the notion of a society in which we live' (p.14). These sense-making rules, coupled with an often indeterminate system of 'images, ideas and impressions' (ibid) about digital media and their impacts, have been systematically examined in this project through a twin, interpretative focus on the following dimensions:

a) Their manifestations among various groups that have a 'stake' in this medium. Those we focused on are: researchers, developers, policy makers, educators and young players with their families.

b) Their reproduction and legitimation through the institutional discourse of the European Commission, as articulated in the Horizon 2020 Research and Development programme concerned with ICT in general and games more specifically.

Gaming Horizons' empirical foci are therefore top-down and bottom-up: a discourse analysis of the Horizon 2020 official discourse and a systematic process of data collection and consultation with 'experts', informants and stakeholders. These strands were framed by a preliminary scene-setting and context-defining exercise, which resulted in possibly the first multidisciplinary literature review of the current 'state of the art' in video games research and practice. This approach is represented visually in fig. 1

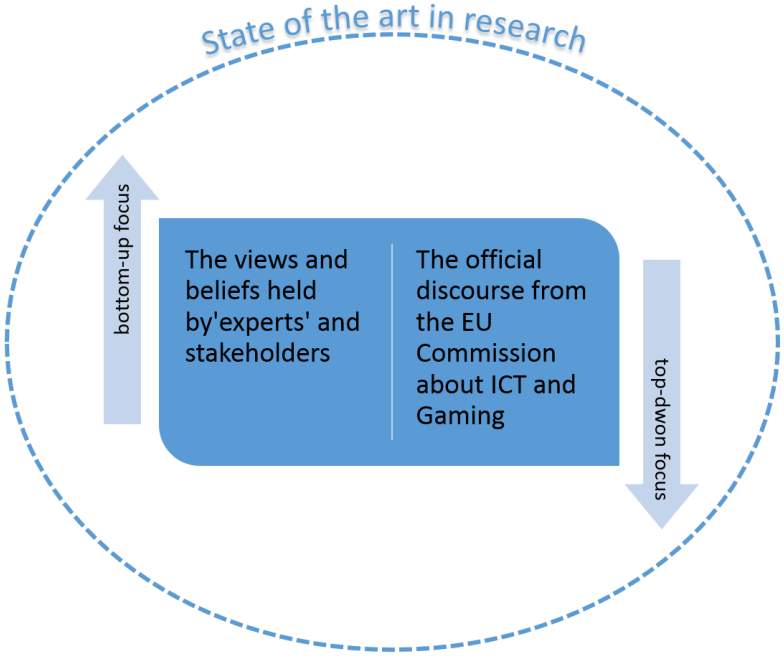

Figure 1 Gaming Horizons research strands and the general framing

In more operative terms, this resulted in two phases of work:

1) A landscape analysis phase concerned with the multidisciplinary literature review, the discourse analysis of H2020 official 'texts' (strategic documents and funding calls) and in-depth interviews.
2) A 'cultural expansion' phase concerned with a more proactive, public-facing process of delineating policy recommendations and practical advice, drawing on the previous phase, as well as additional consultation activities with stakeholders.

The two phases will now be described in more detail in the next section.

3.1 The landscape analysis phase

a) The literature review

The main challenge presented by the literature review was in devising a methodology for efficiently gaining a bird's eye view of social sciences research on video games and gamification since 2010. The literature review had to be at the same time rapid and systematic, comprehensive while still being manageable. This trade-off influenced all steps of the review.

Academic contributions were collected from the Web of Science and Scopus databases using three separate queries targeting, respectively, the psychological, educational, and ethical perspective. Only published papers, papers in press, and books in English were included in the dataset. The large amount of records obtained (N=10290) was analysed using a two-way approach: first, we generated keyword networks for each perspective by considering the co-occurrence of keywords in the papers collected; secondly, the most highly-cited reviews and meta-analyses of the dataset (N=47) were selected for full reading and coding according to a codebook devised for the project.

The keyword networks were analysed using clustering, in order to identify the main research lines and trends for each perspective and to ensure that all of them were properly represented in the papers selected for full reading. The reviews and meta-analyses read and coded informed us on the most influential social sciences findings regarding video games.

Focusing on reviews and meta-analyses allowed us to obtain a bird's eye view of the main themes tackled by researchers so far and their diachronic evolution, thus improving our understanding of up to date evidence of social phenomena regarding video games and gamification. Manual coding of the papers selected for full reading supported the analysis and allowed the construction of a dataset articulated in type of games considered, perspective adopted, scope of review, methodological soundness, and stakeholders addressed in recommendations for all contributions considered.

b) The discourse analysis (Leeds)

Critical discourse analysis is, at the same time, a theoretical framework and a social research method that involves the examination of how language is implicated in the generation of the social world. This method focuses on how relationships and identities are both represented and constructed through text, words, and communicative practices (Fairclough, 2003, Wodak & Meyer, 2009).

In Gaming Horizons, discourse analysis was applied to official policy documents and funding calls published from 2011 to 2016 as part of the process leading to Horizon 2020, the flagship research and innovation programme of the European Commission. We turned our attention to the policy and funding context that surrounds gaming in Europe, in order to examine implicit biases and cultural assumptions.

We proceeded gradually from a descriptive account of how themes of Responsible Research and Innovation (RRI) and ethics are featured in the H2020 documents concerned with Information and Communication Technologies (ICTs), to the analysis of how actors (who include, for instance, 'researchers' or 'citizens') are represented across the H2020 thematic priorities, to finally shift our focus to a more detailed examination of funding calls directly and indirectly concerned with gaming, serious games and gamification. We carried out a targeted web search to identify official EU sources in the public domain, selecting: a) four documents outlining the strategic and policy outlook of H2020; b) a subset of seven funding calls where gaming, gamification and serious games were primary or secondary aspects. In total, the textual corpus included 49055 words. The analysis was supported by the software package for qualitative analysis Nvivo (Bazeley and Jackson, 2013). Nvivo offers light-touch corpus analysis functionalities and provided a framework for the collaborative coding involving two analysts. For a more detailed description of the dataset and the methodology, please refer to the related research report (Perrotta et al., 2017).

c) The interviews

The first step in Gaming Horizons' primary data collection was the identification of stakeholder groups, based on the project's overarching methodological framework (Persico et al., 2017a), as well as insights from the literature review, the discourse analysis and internal discussions in the research team.

This resulted in five groups, i.e. categories representing various concerns and motivations associated with the development, the study and the use of video games: educators, researchers, policy makers, young people/players, and developers. After having identified the categories, research sub teams in the three participating countries (the UK, Italy and the Netherlands) proceeded to recruit informants in a snowball fashion, as well as by drawing on pre-existing

professional and personal networks. A total of 77 interviews were carried out as part of Gaming Horizons' research between May and June 2017. An additional set of 10 interviews took place at the Game Developers Conference (GDC) in March 2017 at an earlier stage of the project, bringing the total number to 87.

Table 1 reports some basic descriptive information about the informants and how the workload was distributed across the three research sub teams. The interviews involved a combination of VOIP (Skype) and face-to-face approaches, and all of them were digitally recorded and individually transcribed. The transcripts have been released as open data on the Open Science platform Zenodo[2]. Given the restricted timeframe available, we only selected 73 interviews for further analysis. These were entered in the software for qualitative analysis Nvivo and coded systematically by three separate research teams (Braun & Clarke, 2006). A set of six overarching questions were agreed, which informed a loose semi-structured interview schedule:

1. What is the role of gaming in society?
2. How are games framed for social change?
3. What is innovation/disruption in gaming and through gaming?
4. What is the relationship between games and institutional goals and priorities in the stakeholders' own fields?
5. What do 'ethics in gaming and 'politics in gaming' mean? What are ethical and political goals? What are ethical and political development practices?
6. What recommendations can be made to support a more socially/culturally/educationally relevant approach to gaming in the future?

Specific methodological approaches for each stakeholder groups were then adopted, resulting in modifications to the interview design, in order to address the different targets with appropriate communication modes (for example, visual prompts were devised to interview educators and players). As far as the transcripts analysis is concerned, internal methodological consistency was ensured through the use of a commonly developed codebook.

Stakeholder group	N	Gender split	Research Team
Educators	12	F(6), M(6)	ITD
Players	13	F(5), M(8)	ITD
Developers	30	F(12), M(18)	NHTV

[2] https://zenodo.org/record/1163698#.Wnxki66gKpo

Researchers	14	F(6), M(8)	Univleeds
Policy Makers	4	F(2), M(2)	Univleeds

Table 1 Interviews by stakeholder group and division of labour

3.2 The cultural expansion phase

a) The workshops

The purpose of the 15 workshops run by ITD and UnivLeeds at the outset of the 'cultural expansion' phase was to extend engagement with stakeholders initiated in the previous phase to inform the development of the two main conclusive deliverables of the project: the Scenarios and the Manifesto (Haggis et al., 2018). A core workshop format was agreed upon by ITD and UnivLeeds, with a total of 206 attendees representing a wide spectrum of stakeholders groups. According to this format, the workshops were based an ice breaking activity intended to facilitate familiarisation among participants and reflect on the proposed topic of discussion, and a main collaborative phase where a graphical metaphor was used to scaffold discussion and knowledge building. The format was flexibly adapted to the different contexts of the workshops and participants numbers. Each workshop had a different theme and addressed different type(s) of stakeholders. The themes were chosen among the most contentious issues arisen during the literature review and the interviews (called 'areas of tension'), and the mix of stakeholders involved was chosen to offer a wealth of opportunities for confrontation among a range of different positions (e.g. parents and players, researchers and policy makers, people with different inclusion needs, etc.). Relevant phases of the workshops were recorded and the audio and video scripts analysed (with no transcriptions). The graphical outputs of the group work was also a precious input for the analysis, because it summarized the main points emerged from the discussions.

b) The webinars

'Webinars' are live online discussions in which viewers can watch, add points of discussion, ask questions, and further respond to the answers. The webinars were conducted on the premises of NHTV and featured interviewees from the video game industry, education, and research backgrounds. The discussion topics were inspired by the research outputs of the earlier Gaming Horizons deliverables. Topics included 'culturalisation versus localisation' (examining cross-cultural awareness, global market differences, and touching on issues of gender and minority representation), 'realism versus fun' (focusing on how close games can be to reality and the priorities within active development studios), 'the meaning of zombies' (a light-hearted and very popular webinar broadcast on Halloween, looking at the reasons behind the ongoing popularity of zombies in recent media as a tool of cultural analysis), and many more. Each participant was given time to research their subject before the discussion, and topics were prepared in advance in the possibility that viewers did not ask questions. Interviewees included Kate Edwards (former executive director of the International Game Developers' Association

and named as one of the '10 most powerful women in gaming' by Fortune magazine in 2013[3]), David Wessman (former lead designer on Star Wars games in the 1990s and now founder of Impeller Studios), and Oscar Bastiaens (researcher into transmedia storytelling and semiotics), among others.

The webinars were broadcast between June and December 2017 using the 'Facebook Live' online broadcasting system, and have been seen by approximately 6000 viewers. The webinars helped build the Gaming Horizons Facebook group to over 100 members (122 at the time of writing, https://www.facebook.com/groups/gaminghorizons/).

NHTV staff have expressed interest in continuing the webinars into the future, and industry figures have privately contacted Mata Haggis (the host of the webinars) to express their enjoyment of the series.

c) The manifesto and the scenarios

The development of scenarios and the production of a 'manifesto' were the culmination of Gaming Horizons' process of evidence analysis and stakeholder engagement. Together, these two outputs are the result of a conscious, systematic effort to produce recommendations and practical advice in an accessible and even provocative fashion. One recurring theme throughout our project was the gap between the language and the conventions of the academic community and the world of industry. It would have been incongruous, for a project devoted to the dialogic and negotiated definition of 'alternative framings' like ours, to release a traditional list of recommendations (as we do in this report) without attempting a more outreaching and potentially impactful approach. The manifesto, which can be downloaded from Gaming Horizon's website [4] (see fig.2), uses an expressly 'political' language to articulate an unambiguous request for change, based on five foundational statements and nine 'actions' which have bearing on European policy first and foremost.

[3] http://fortune.com/2013/10/24/the-10-most-powerful-women-in-gaming/

[4] https://www.gaminghorizons.eu/wp-content/uploads/sites/18/2018/02/D3.4-Gaming-Horizons-Manifesto.pdf

Figure 2 The Manifesto's cover page

The Manifesto deliberately places the empirical process in the background, in order to amplify the urgency of the main message and the immediacy of the delivery method. This line of reasoning also underpins the development of the scenarios which, in line with the project DOA, are primarily online outputs that speak directly to stakeholders through an accessible language, the use of comics, and story vignettes in which recommendations and advice take a more concrete and relatable form (see figure 3)[5].

[5] Scenarios can be viewed on our website: https://www.gaminghorizons.eu/scenarios/

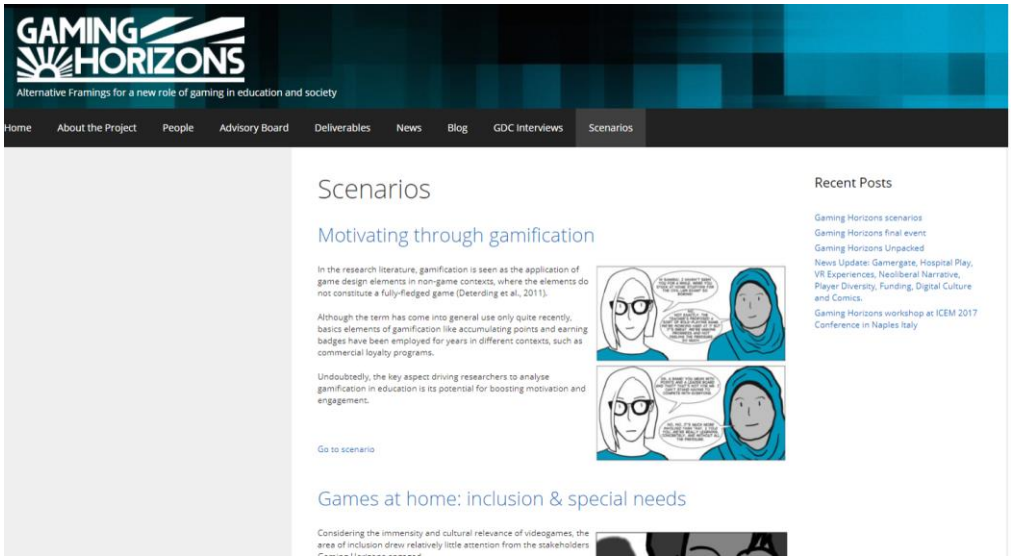

Figure 3 The scenarios on the Gaming Horizons' website

At their heart, however, the scenarios remain a set of evidence-based recommendations which can be articulated in the canonical style of policy and practice-oriented research. The concluding section of this report does precisely this, providing a synthetic, perhaps a little dry, distillation of what Gaming Horizons has to offer as a delivery-based, publicly funded project.

Findings

Main findings from the literature review

The landscape of research on games and gamification proved to be extremely rich, but the methodology described in section 3 allowed us to delineate a picture of the most prominent research themes for each of the project perspectives (the educational, psychological, ethical and sociocultural artistic). While for many themes conclusive findings have not been reached, relevant recommendations for the project stakeholders were easier to elicit.

As for the educational perspective, a wealth of empirical studies focused on the impact of games and gamification on learning, but evidence of this has been rather scant until Clark et al.'s (2016) extensive meta-analysis has provided stronger empirical evidence for games' learning effectiveness, moderated by several variables, including games features, students' characteristics (cultural, individual, etc.), context and teachers' support. In this light, careful design of game-based learning activities becomes of paramount importance, together with the need for building on teacher competence in this area. Moreover, researchers recommend a closer collaboration among the different stakeholder groups with an interest in game-based learning (e.g. companies, game developers, researchers, teachers, etc.). This recommendation resonates with results of the

subsequent tasks carried out in the project, such as the interviews with developers and researchers.

Psychological research highlighted both strengths and weaknesses concerning the impact of games and gamification on people's life. Addiction, cognitive benefits, motivation and engagement are among the most investigated themes. Other themes that received considerable attention include the concepts of flow and immersion, as well as exergaming, games for rehabilitation of older adults and, more generally, games to improve health. Research in these fields is lively and evidence-based, but the emerging recommendations were mostly directed to other researchers and, to a lesser extent, to healthcare professionals and policy makers, hence the impact outside academia of psychological research appears rather limited. In addition, research in this area tends to consider games as a whole, while evidence on specific game mechanics and/or player characteristics is scant, thus hindering the possibility of investigating in more depth what features of games determine their effects. Among the outcomes of psychological research, positive and negative implications of games and gamification on motivation and engagement turned out to be of interest of the Gaming Horizons stakeholders and were thoroughly investigated in the subsequent phases of the project.

Research literature about ethical aspects of gaming covers aspects such as violent games and their presumed effects on aggression; identity and social inclusion (comprising gender and race issues, special needs, sexual identity); and game monetisation, as well as value-sensitive game design. Although the relationship between violence in games and players' aggressive behaviours is by far the most thoroughly investigated topic, there are contradictory findings about this theme (Ferguson, 2015; Greitemeyer & Mügge, 2014). Recommendations for developers, however, seem to suggest that the inclusion of pro-social elements and teamwork should attenuate possible harmful effects on players. Other aspects of game design that can negatively impact players' lives only recently attracted researchers' attention and proved to be less explored in the academic contest while it is cited by several stakeholders (e.g. players, developers) during the following phases of the project. We refer in particular to monetisation and so-called 'dark design', i.e. design principles that specifically try to elicit intense, potentially unbalanced engagement and compulsive 'microtransactions', where players use real world currency to purchase virtual goods or gameplay boosts .

Findings about identity and social inclusion reflect some positive developments in the area of gender representation, but suggest that while the gaming market is shifting away from its stereotypical roots, there is still much to be done in terms of developing a more diverse and inclusive gaming culture.

Last but not least, the sociocultural and artistic perspective does not focus on scholarly outputs, but rather on a selected number of seminal video games that have made history in this industry, thanks to their innovative nature in terms of their relations to the market, their technological features and their political and cultural positioning in the gaming world. This perspective is critical in nature and much needed to transversally inform the discourse in the following phases of the project, because it complements the panorama of academic research with a number of themes that have been object of debate in media among professional game developers.

Main findings from the discourse analysis

The discourse analysis highlighted a number of biases and assumptions that underlie the European Commission's official position on ICTs and gaming more specifically. In this respect, the analysis contributed to the delineation of an institutional discourse where discrepancies between the stated political aims and the actual implementation priorities could be observed. On the one hand, the analysis suggested that themes of Responsible Research and Innovation are, without doubt, visible within the European R&D agenda. In particular, compared with its predecessors (FP6 and FP7) Horizon 2020 represents a more explicit attempt to account for a range of societal, environmental and cultural concerns associated with technological innovation. On the other hand, there appears to be a gap between the rhetoric of ethics and social responsibility in the high-level strategic discourse, and the way these themes are featured in the more operational documents - the funding calls above all. Two selected insights that emerged from this research task can be summarised as follows:

A clear hierarchy of actors and themes emerged from the texts, with the prominent notion of Europe framed as an 'ailing' collective entity that must increase its competitiveness and economic output in the global business race. Similarly, the H2020 discourse places Small and Medium Enterprises (SMEs) and 'excellent', internationally mobile scientists on the centre-stage, whereas 'citizens', i.e. the actors making up the broader collective body of society, have a more secondary role - mostly as 'users' of technological innovations, solutions and products. While their involvement is championed in rhetorical terms, citizens-as-users are framed as passive: they hope for science and technology to improve their lives, they need protection, they are 'affected by issues', and they are the recipients of improvement and efficiency actions where technology always brings great, unquestioned benefits.

Demonstrating a certain consistency with the previous points, the themes of serious gaming and gamification were framed in largely economic terms, i.e. as emerging markets to be stimulated. The EC makes a clear distinction between the serious and applied games sector and the mainstream entertainment sector, implicitly conveying the assumption that themes of social and cultural import - i.e. those worthy of public funding - can only be found in the former. Game development is largely represented in engineering terms, and the social applications of games and gamification emphasise a strongly utilitarian mindset focused on measurable impacts and benefits. In our analysis, we found little appreciation for more 'nuanced' desirable outcomes; for instance those concerned with critical digital literacy or with positive cultural representation. Similarly, we found no mentions of the expressive, cultural and aesthetic aspects of game design or gameplay, viewed not only as engineering or usability processes but also as cultural practices mediated by values and politics.

Main findings from the Interviews

The main theoretical assumption underlying Gaming Horizons' interview study was that it was possible to gather systematic, qualitative evidence about the broader 'discourse' of video games in Europe, and indeed globally. The notion of discourse is used here in a similar but more general sense than in the analysis of official documents from the European Commission

(Perrotta et al., 2017). In social theory, discourse refers to the linguistic, practical and embodied ways in which society is reproduced, that is, to the fact that, unlike the natural world, the worlds of society and culture are the products of texts, communicative practices, ideas, politics and man-made artefacts (Beck et al., 1994; Foucault, 1977; Fairclough, 2000). Setting off from this broad theoretical position, the interviews highlighted that several complex beliefs and views coexist in the domain of the contemporary gaming. More importantly, the interviews suggested that those views and beliefs have relevance across sectorial distinctions (e.g. between serious or applied games and entertainment games), thus pointing to a multifaceted set of concerns that, if examined and addressed, can inform a more critical engagement with this medium as a whole and, simultaneously, at various levels: policy, research, development, professional practice, and usage/consumption. In the related report (Persico et al., 2017) we cautioned the readers about the limits of our approach in terms of statistical representativeness, but also emphasised the advantages that the expert interview offers in terms of data depth – a depth that enabled us to articulate a critical, ambitious examination of themes increasingly recognised to be crucial to the future of this medium.

We found that video games are viewed as formidable motivating experiences, but we also saw signs of very informed and active types of engagement in which this potential is moderated by contextual aspects. Whether as a form of active cultural consumption (playing games) or in the context of professional practice (using games in education and learning), interviewees represented themselves as informed and critical agents, capable of navigating the gaming landscape and, mostly, of spotting the difference between actual potential and 'hype'. Interestingly, this more informed approach was often underpinned by a considerable degree of scepticism about serious and applied games. While most interviews acknowledged and welcomed that video games could be used for serious purposes, they placed great emphasis on artistry, design prowess and storytelling, framed as indispensable 'assets' for the development of all gaming experiences.

The position of game developers in this regard was particularly striking, as they all expressed significant reservations about the current institutional frameworks to support serious and applied games in Europe. It should be noted that the majority of developers we interviewed were not part of the existing, rather small, serious and applied games community, which already relies heavily on public funding. Our mandate as a sister project was to expand the horizon of what is possible in this area, and this led us to engage with the world of mainstream and independent game development, which largely operates in highly competitive market conditions. These developers, some of which are very small studios, are drawn to the potential of games to tackle socially and culturally relevant themes, but find themselves pressed between the rock of the market and the hard place of European funding, viewed as constraining and rife with creativity-stifling requirements.

Finally, our interviews with researchers pointed to a growing critical awareness of how game-based design principles often walk on a line between ethical dubiousness and genuine educational and cultural value.

We noted an emerging emphasis on games as diverse and multifaceted experiences, with the academic discourse beginning to move away from simplifications and conflations, whereby video

games are treated as a monolithic entity with effects on minds and behaviours. In this respect, most interviewees were highly sceptical of the supposed violent games = aggressive players equation, framing aggressive reactions more in terms of personal frustrations arising from (individually) competitive gameplay, and from the nature of some online gaming subcultures, which can amplify attitudes and behaviours of an anti-social nature.

Similarly, respondents were less concerned with the types of questionable content, which has been extensively researched, (e.g. depictions of violence, although these remain an issue when young people are involved), and more with issues of inclusion, equal representation (of gender and race), and 'dark design patterns'. The fact that games (and many gamification techniques) often aim to influence behaviours by exploiting psychological reward systems was framed by some as problematic, possibly even manipulative, thus necessitating a separate ethical examination beyond the usual concerns for access, inclusion and safety. Finally, a number of interviewees saw such an emergent 'critical game literacy' as being strongly linked with the narrative dimension of video games. Indeed, narrative was seen not only as a primary driver of engaging and also potentially pro-social gameplay, but also (significantly) as a key to more innovative game experiences. Indeed, while interviewees saw new frontiers opening up through the audience-based phenomena of e-sports and game streaming sites, and also via technological 'advances' like virtual and augmented reality, they also identified creative approaches to narrative as a key way forward.

Main findings of the cultural expansion phase: Gaming Horizons' final recommendations

The overarching objective of Gaming Horizons was to examine the state of the art and the potential of gaming and gamification in the context of European research and innovation, from an explicit ethical stance, and to put forward proposals for 'alternative framings' capable of informing future European policies on the topic. As detailed in the research outputs produced so far (Persico et al., 2017b; Perrotta et al., 2017), and in line with Responsible Research and Innovation (RRI) principles (von Schomberg, 2013), our project assumed that ethics and social responsibility should not only be limited to compliance with requirements (e.g. to ensure data confidentiality), but also represent a proactive approach to inform the design and study of technological innovations from the outset. The following recommendations, as already mentioned earlier, informed the development of our stakeholder-targeted scenarios. They are reported below as a more traditional list and grouped by themes – a format perhaps more fitting to the nature of this report as a final, comprehensive summary of all project activities.

Innovation, industry relevance and cultural sensitivity in European funding frameworks

1. During Gaming Horizons' research, it emerged that opportunities for applied and fundamental research into serious/applied games differed sharply from those for arts/entertainment games. Games research was most commonly situated in instrumentalist contexts, focusing on direct and measurable impacts on learning or antisocial behaviour, and rarely in the context of their creative, expressive, or artistic possibilities. From an industrial perspective, there was no sense of established collaboration with researchers, nor any sense that a change was impending in this relationship. The work of academic researchers appears to be out of touch with the arts and entertainment games sector. Our work highlighted that the current funding framework is entirely inadequate to the needs of developers and players with an interest in art games. Many game developers in Europe would be very much interested in tackling culturally significant, 'serious' themes but are put off by the restrictive, techno-centric and quantified approach of current funding streams. Possible solutions are as follows:

a. Removing arbitrary delineations between serious/applied games funding and arts/entertainment funding would allow more interchange of knowledge and creative approaches to the use of gaming technologies.

b. Showing recognition in research funding calls for the cultural impact of games (beyond only technological and economic impacts) will open avenues of both applied and fundamental research into video game development.

c. Fundamental aspects of video game development beyond narrow 'tech', which include for instance, visual arts, animation, audio, production, storytelling methods and technologies, and so forth need to be explicitly supported to enhance the creative range and strength of the industry. This is a necessary long-term investment for the future competitiveness of European games development when compared with other global regions.

d. Applied collaborations of research with industry partners need to occur on game-production timescales, not academic/administrative ones, and so funding calls must reflect the fast-changing and unpredictable nature of creative industry requirements – year long application and review processes are entirely inadequate for the needs of the video game industry.

2. Criteria of social, artistic and cultural value can be part of an effective business model for games 'with a conscience', beyond restrictive labels such as 'serious' or 'recreational'. Artistic and cultural relevance are not barriers to commercial viability but can in fact enhance market appeal in some cases. Public funding is still needed to support game developers or researchers that seek not only commercial success but also positive social impacts. Hence, criteria of social, artistic and cultural value should have more weight than they currently do in funding strategies. These criteria should not be viewed as fixed but can

be negotiated through regular consultations with relevant stakeholders.

Recommendations concerning games and learning in formal education

3. The one thing that research literature on games and the Gaming Horizons stakeholders agree upon is that games have great potential for learning, thanks to their motivating capacity, their engaging power and their ability to create active and student-centred learning opportunities. However, harnessing such potential in formal education is far from easy, and the Gaming Horizons project has identified several reasons of this.

a. Firstly, not all teachers are familiar with games or game-based learning: sometimes their assumptions about the impact of games in formal education are rather naive and their competence in design principles for game based learning is shallow and restricted to their own personal experience. For example, a common belief is that games or gamified experiences engender motivation, but academic debate has shown that the relationship between motivation and learning is very complex and that distinctions should be made between motivation to learn and motivation to play or win, extrinsic and intrinsic motivation, etc. So, when the game mechanics and the learning objectives are not aligned, learning and playing may follow diverging routes, rather than harmonically combine. Awareness of these nuances should inform game choice, together with extensive knowledge of the wide range of existing games and their different potential.

b. Secondly, formal education has its rules, its constraints, and sometimes the use of games clashes with these restrictions. To overcome these limitations, there is a need for a flexible school organisation in terms of time and space, which is achievable only when teachers can count on active support from all stakeholders: school leaders, fellow teachers, researchers, students and parents.

c. Thirdly, students' positive acceptance of game based education cannot be taken for granted: gaming is by definition a free exploratory activity; hence, playing when, where and what the teacher decides contradicts the very nature of play. Besides, students do have personal preferences as far as games are concerned, that make game choice a very critical decision. This is particularly true for some serious games where the playful/gameful dimension is a mere cosmetic layer added to instructional interactions. Special attention should also be paid to gender and cultural differences, digital divide issues, and special education needs in order to avoid exclusion, demotivation and frustration. Respecting preferences and differences requires being open to creative and personalized learning strategies, as well as availing of a broad knowledge of all the possible options.

d. Finally, a frequent design component of games and gamification is competition. However, many teachers believe that competition, especially within the class, can create stress and harm collaboration. Its integration in learning environments therefore requires careful appreciation of the emotional atmosphere in the class and should preferably take the form of personal challenge to achieve a goal, or become part of a mixed collaborative (inside the class)/competitive (with other classes) strategy.

Against this background, the European Commission could play a key role by supporting research into learning design principles for game-based education and promoting teacher education/ professional development initiatives to improve educators' competence in how to harness the potential of games for learning and avoid their pitfalls. In line with the participatory approaches to learning design advocated by researchers in this area, priorities should be placed on fostering a participatory approach to learning design, based on teachers' communities of practice for the exchange of know-how and experience, and on the establishment of open repositories, to facilitate information sharing about effective games and innovative lesson plans.

Recommendations concerning gaming and learning in informal contexts

4. Investigation of gaming in informal learning contexts also revealed a number of lights and shadows concerning what and how people learn when they play, especially in relation to young players and the behaviour of parents. Recommendations concerning this context regard what parents should do and what policy makers can do.

e. While parents should be ready and willing to play with their children, take an active interest in the games they play and foster their self-regulation with games, when adolescents are concerned, games become a space for self-discovery that should be respected. In both cases, parents need to be aware of the risks of gaming, negotiate regulations about play time and don't disregard labels for violent, explicit, or sexual content when they buy games to their children. On the other hand, parents should not even underestimate the ability of games to help bring forward the identity, personality and intellectual potential of their daughters and sons. In other words, they should try to get to know the world of games, because it is a world where their children spend much of their time.

f. While it is true that games can help to overcome cultural barriers between players, caution is needed when children with Special Education Needs (SEN) are involved. Educators, practitioners and parents engaged in this area caution that much work is still needed to make harnessing gaming for inclusive purposes possible when there are marked differences in children's cognitive or perceptual skills. More awareness of design-for-all principles is needed to lessen barriers and improve everyone's

> experience, just like with our streets and buildings. Such awareness, and serious commitment to promote design-for-all principles on the side of the industry and the policy makers, can reap concrete gains for everyone: for players who, for some reason, are underserved or excluded; for player-consumers desiring more immersive and diverse game experiences; for the game industry growing markets. Here, video games – considered by many as a pariah – could be seen instead as a standard-bearer.

Policy makers and researchers should promote actions to raise awareness among parents and educators about games, and about the power and influence games have on child psychological and cultural development. Policy makers should also foster the adoption of design-for-all principles among developers, for example, by including explicit reference to these principles in funding programs.

Ethics, regulatory frameworks and self-regulation

5. Video games can bring ethical and moral complications with them, particularly where children are involved. However, there are also multiple benefits of playing video games. While the idea of banning video games belongs in the past, moderation in usage and age-appropriateness of content are important. The need for 'soft regulation' at home (actively and positively involving parents and guardians) is important and should be discussed more.

6. The influence games can have on children is a sensitive issue, and there is continued and serious concern about games' potential for encouraging antisocial behaviour. Regulations are in place for labelling violent, explicit, or sexual content (e.g. PEGI in the EU or the ESRB rating in the USA). The main addressees of these labelling systems are parents, who should be informed about the content of the games their children play. Those same parents have the power to disregard the label altogether, either as a reasoned decision or because they lack the context to understand the meaning of the labels. Our interviews, on the other hand, offered positive parenting examples. Several of the players we interviewed reported that they had started out playing with their parents. This was especially common for women, who often reported having been introduced to the world of gaming by their fathers. Parents should be ready and willing to play with their children, take an active interest in the games they play and foster their self-regulation with games. For children, video games can be an activity to be shared with parents; but in adolescence, games are also a space for self-discovery that should be respected. Policy makers and researchers should promote actions to raise awareness among parents and educators about games, and about the power and influence games have on child psychological and cultural development.

7. The ethical spotlight in video game research is often pointed at violent games, but other aspects of game design would benefit from ethical study. 'Dark design' patterns that exploit or manipulate players need to be closely examined with a balanced review that can guide developers away from using them either intentionally or accidentally. Studies into past and present systems of monetisation and compulsion-inducing gameplay should be conducted. Great care needs to be taken to recognise the complexity of game systems and balancing: loot

crates and many similar aspects of game design are not automatically unethical, and neither are free-to-play games, but aspects of their content and context may lead them to be exploitative or manipulative. Such studies will need to be conducted with the assistance of industry professionals who can assess and the multiple subtle ways in which such systems are implemented across the whole game experience, not only as an isolated systems. Such an isolation would result in flawed or binary moral/immoral judgement that does not match the nuance with which such systems can be integrated into games; such an outcome would not benefit the industry, nor would it contribute to potential guidelines.

8. Ethics in research and development are often viewed as a restrictive set of requirements simply to be complied with. In our project, we often came across this limited interpretation, but we also saw signs of a different position where ethics are part of a more positive mindset, and where notions of what is good, decent, and worth pursuing are grounded in the priorities and concerns of society. Funders and key institutional actors like the EU Commission could make more efforts to establish platforms (including face to face events and social media initiatives) to explore definitions of responsible research and innovation in a dialogic and democratic fashion. For instance, one possible approach could involve citizen panels collectively recruited through social media, which examine through a form of 'crowd-sourced' evaluation, the social of cultural impact of games developed under the patronage of the EU Commission.

Diversity in all its shapes and forms

9. There is great potential for video games to assist in the visibility of gender, racial and ethnic minorities in European culture, encouraging variety and inclusion as well as potentially increasing the expressive range and themes of the medium. The wide reach of video games into European society allows them to function as a key asset in improving cultural understanding, relationships, and community. It is also likely to stimulate creativity in the industry, presenting new gameplay scenarios and inspiring new interactions.

Three approaches would contribute to progress in this area:

A. further research to understand the current, past, and possible future states of gender, race and ethnicity in video games, particularly in a European cultural context;
B. training and workshops aimed at minority groups specifically intended to give participants game development skills;
C. targeted arts funding for creative video games that specifies inclusivity (either in theme, individual/team, or both) as a metric of consideration.

Building bridges between academia and game development

10. The general disconnect between academia and industry is real, and it is particularly acute between those who research video games, and those who develop and sell them. Researchers and developers can find ways to establish meaningful and mutually beneficial industry-academia collaborations. A degree of negotiation and compromising may be needed, and the terms of the collaboration can be formalised in simple, easily drafted agreements inspired by the principles of Open Science.

11. Instead of using traditional academic resources, games industry conferences were framed by several stakeholders as 'nexus points' of knowledge sharing within the game development community. However, industry conferences are not always amenable to academic contributions because of perceived problems of accessibility of academic language, data presentation, timeliness, or the lack of immediate practical implications from the research. If academic research is to enter a discourse with the professional world of game development it will need to adopt the methods and media that the industry uses. This approach must also be supported by governmental and academic institutions understanding that industry conferences, webinars, online videos, and blog-posts on industry websites such as Gamastura.com or GamesIndustry.biz and other media are more impactful than traditional models (such as journal publications and more traditional academic conferences) in this domain.

12. The tendency of academic research to operate in 'silos' has been accused many times before of being counterproductive and not conducive to the sort of social impacts funders increasingly seek. This problem runs deep in the entire academic world and is compounded by the fact that small and large scholarly communities tend to gravitate around highly selective journals and specialised conferences. In a field so practically (and commercially) oriented like game development, this is particularly confusing and unhelpful. The situation is unlikely to change until the current system of specialised journals and conferences is challenged. Universities, journal editors and conference organising committees in the area of gaming research should focus more on establishing mechanisms and platforms for researchers from different backgrounds and with different research interests to collaborate.

Towards the multidisciplinary study of play: areas for future research

13. A theme that emerged strongly from our research concerned the assumptions made about the use of video games and gamification techniques in particular contexts. This suggests the need for a consideration of ethics around video games that is highly contextualised and dependent on the particular experiences of those involved in gameplay. Play can be powerful, enjoyable, exciting and empowering. However, play does not suit everyone, all the time. The European Commission could provide more support for critical social science and humanities research into game play, in order to encourage a more informed debate about the contexts in which it may and may not be most appropriate.

14. There is a significant and relatively untapped potential for using video games in educational

contexts, often held back by the restrictions posed by standardised curriculum requirements. This has been a recurring theme throughout the project, with the overarching recommendation being that we all need research to identify productive ways, beyond the realm of 'serious games', to include what might otherwise be considered 'entertainment' games into the classroom. This process of inclusion has more to do with digital literacy, than with the computing or information technology aspects of the school curriculum.

15. Although we often talk about video games as a singular entity, they are, in reality, diverse and complex. As a medium they offer a range of different features, experiences and opportunities to players in a varied range of contexts. By considering games as singular, however, we are potentially simplifying debates and maybe even lowering our expectations. Funders, researchers, educators and developers are all responsible for advocating a more diverse and multifaceted notion of what a game can be or do. Funding Social Science and Humanities (SSH) research projects that survey the representation of cultural themes would allow the development of video games studies in curricula at all educational levels, and increase their future relevance.

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