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Project report

Games as Education in the United Kingdom

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Abstract

Digital game studies and design have rapidly become popular teaching areas in the United Kingdom. They also have a long history as tools for education in a range of disciplines through game-based learning. This project sought to inform teaching and learning within the College of Social Sciences, Arts, and Humanities, the College of Science and Engineering, and the College of Life Sciences through an exploration of the challenges, practices, and feedback of instructors and instructional designers on teaching with, through and on digital games. A workshop was held in the School of Media, Communication, and Sociology in May 2016 to understand emerging challenges and opportunities related to games-based teaching practice, innovations in assessment, available and needed resources for teaching, and game-based curricula. Participants included staff across the University of Leicester using digital games for learning and assessment as well as digital game studies and design instructors across the United Kingdom. Through collaborative discussion and workshopping of best practices related to teaching with games, this workshop generated a sharable portfolio of materials. It also provided insight into several possibilities for integrating this media form into higher education as well as significant challenges to consider moving forward, which are reported on here.

Keywords: Games-based learning, educational games, digital games design, games in teaching and learning, games and assessment

Background

The precursors for the Leicester workshop were workshops related to the teaching of game studies at international conferences in the field in recent years (at the Digital Games Research Association Annual Conference in Germany in 2015 and the United States in 2014, and the Foundations of Digital Games Annual Conference in 2014). These sessions with international scholars highlighted the value of sharing the challenges and best practices for teaching digital game studies across diverse faculties, ranging from Engineering to Art and Design to Communications and Culture.

The workshop held at Leicester sought to complement these meetings and the documentation they produced in two ways:

1) To draw together UK-based instructors in order to provide a sense of the nuance and special considerations of this national context for teaching with games and
2) To bring together both game studies instructors and those seeking to integrate game-based learning within a range of disciplines to share broader best practices related to teaching, learning, and assessment with digital games.

The power of game studies lies in a long tradition within educational technology circles considering the potential role of games in learning (Gros, 2014; Kiili, 2005; Prensky, 2007; Van Eck, 2006), including instructors at the University of Leicester (see for example Whitton & Moseley, 2012). Indeed games-based learning is practised in varying ways in History, Genetics, and Archaeology, and among other subject areas, leading to the formation of an Educational Games group at the University of Leicester, which includes participants from Mathematics, Physics and Astronomy, Computer Science, and Genetics.

Digital games are often grouped with other forms of digital media as providing new ways for delivering course content in the contemporary classroom (Race, 2014), and for better engaging with students immersed in new technologies (Pearce, Weller, Scanlon & Kinsley, 2010). What game studies indicates however is the central role of the social practice of teaching games (Squire, 2002) - how games are situated in the pedagogy and how they are scaffolded in learning environments to account for enduring inequalities in access, competence, and expertise in digital media use (Taylor, Jenson, & de Castell, 2007) in a range of formal and informal educational contexts (Fisher & Harvey, 2013).

This project contributes to this conversation by highlighting the actual practices of teaching digital game studies and design and in assessing learning in this context, as well as how student learning is enhanced through games. Derived from grounded insights and concrete discussion of how games are used for education, this project compiles best practices and relevant documents from the teacher perspective, which in turn informs the development of empirically-informed recommendations for innovating on teaching and assessment practice in emerging fields across the Colleges at the University of Leicester.

Project Aims and Objectives

The objective of the project was to develop, plan, and execute a workshop hosted in the School of Media, Communication, and Sociology with game instructors from across the UK and instructors using games for education at the University of Leicester to provide the grounds for dialogue and collaboration as well as the development of a sharable repository of teaching resources. Participants in the workshop came from the School and the College as well as instructors from across the United Kingdom teaching in digital game studies and design. The aim of the

workshop was to form the basis for a network of collaborators interested in larger initiatives and projects related to game-based learning and teaching enhancement. We also sought to assemble a repository of useful games and educational materials, and to discuss challenges and opportunities moving forward with games in teaching and assessment. This report collates the findings of these objectives.

Project Outcomes and Achievements

The proposed output of this project was a repository of teaching tools and assessment activities that use digital games for education, as well as a report with recommendations for moving forward in games-based learning. Through this, the project sought to contribute a UK-focused document collating examples of pedagogical excellence in module design, assessment, and evaluation related to games-based learning. These documents have been collated and shared with participants as a public Google Drive folder, and include module handbooks, articles and books on games-based learning, presenter slides, and links to educational games, publications, communities, and game-making tools.

What follows below under Evaluation is the report from the workshop with recommendations based on discussions and presentations as well as the materials shared by the participants.

Evaluation

This report is based on transcriptions of the discussions facilitated by the author at the workshop in May 2016. The event was attended by students and staff from the University of Leicester and beyond, and included lightning talks on a range of topics including gamification and learning, the use of games for discipline-specific skills such as mapping and public speaking, and exploration of the value of games for learning theory, failure, engagement, and reflection. The sessions were recorded, transcribed and analysed based on themes raised by participants. The findings are organised according to four general thematic areas: the role, promise, and problems of games in higher education; applications of games in learning; the role of games in assessment; and the future of games-based learning.

Chocolate-Covered Broccoli? Games in Education

There is a long history of understanding digital games as a tool for embedded stealth learning. In this formulation, digital games are the metaphorical spoonful of sugar that helps the medicine of learning go down. A parallel simile characterizing games-based learning and educational games is that of chocolate-covered broccoli. As this suggests, this vision of games is thoroughly appealing if unwholesome (a tasty chocolate coating) while education and learning are seen as vitally important but dull, dry, and not inherently interesting (the nutritive broccoli).

Discussions during the workshop revealed that this perspective is not always accurate in teaching in higher education. In particular, students enrolled in subjects such as mathematics and physics seek applications and understandings of real-world experiences and problems, and playful modes such as games may be seen as antithetical to the more authentic grounding they desire in their learning experiences. Indeed, in some disciplines such as maths, the use of games is familiar from primary and secondary education and can be interpreted therefore as infantile in higher education. Therefore students may resist the use of play in their teaching and fail to engage with precisely that which is intended to grab their attention and appeal to their perceived interests in fun. As this example demonstrates, the universal characterisation of games as necessarily appealing must be

questioned, as it can for instance suggest a lack of seriousness and abstraction from practice that can actually be repellent to students in higher education contexts.

There are also challenges related to the design of educational games. For instance, games that are explicitly about education have not been well-tolerated by students, in the experience of the workshop participants. For many students, games in learning seem optional rather than summative or core. For this reason, the use of games as an alternative where students can self-select their participation in games-based learning is advised. Another option is to avoid the terminology of games, and frame them as virtual training environments, which can dispel expectations and assumptions linked to the medium of the digital game.

That said, the format of digital games can be productive depending on the student, the topic area, and the desired learning outcome. For instance, games can appeal to those learners who have preferences for competitive formats in a similar manner to debates and other agonistic teaching modes. As this suggests, preferences for game genres (and not just the medium itself) will impact on the power of games for learning. In terms of topic area, disciplines that require safe, consequence-free trial and error work, such as physics and geology, can valuably draw on the virtual worlds of games. When designed properly, games can allow students to engage with abstract concepts and allow them to grasp these instinctively. The example given for physics is Angry Birds, which is an entertainment game that models velocity and acceleration. While the game is not explicitly about education, its mechanics are based on physics, which makes it a good learning tool in this area. Indeed, games that are designed for entertainment can be educational. For example, games like fantasy football, which are very popular, are at their core spreadsheets entailing projections based on player coordination and analysis of a range of quantitative data. However, games that are purpose-made for educational purposes can be off-putting to students and this is an enduring challenge for educators. Perhaps one of the greatest challenges to face is simply that games as an industry have been consistently tied to leisure and entertainment in a way that differs from other media forms and student response to them is shaped by this.

Additional reasons for student resistance have to do with the historically low quality of educational games design, which does not align with expectations that digital games are increasingly immersive, realistic, complex, and visually appealing. There is, therefore, a disconnect between expectations of those who are players, fans, and consumers of digital games, who are assumed to be attracted to the 'chocolate-coating' noted above in terms of how games look and feel. These students may resist games that they feel too expert for, as in the case of using Minecraft in the classroom.

However, there is the other side to be considered here, which is that not all students are game players and there may, therefore, be elements of digital games that are not attractive to them, including the emphasis as noted above on competition rather than collaboration. For these reasons, the base notion that digital games are inherently attractive needs to be discarded in favour of a more nuanced approach to what the affordances of this media form can offer for a given subject area, intended learning outcome, or set of desired skills.

One observation that emerged from the workshop was that we need to question both elements of games in learning - the digital as well as the game. The assumption that students are 'digital natives' compelled by technology regardless of application is fallacious. Indeed, experience shows that the digital element can act as a hindrance to students, and therefore there may be opportunities worth pursuing in terms of low- or no-tech role-playing, interactive fiction, and board and card games. When considering the use of digital games for teaching and learning, it is also valuable to consider whether the skills, ideas, and approaches the educator seeks to model can be achieved through analogue modes, which have the advantage of being less expensive and time-consuming to design

than digital games. However, this can present a challenge to students who are passionate about games; insights from game design instructors reveal that such students have high expectations of the worthiness of games for engagement, including analogue games.

In terms of questioning the use of the game form, this is vitally important. The chocolate-covered broccoli metaphor demonstrates that games are assumed to be a compelling vehicle for delivery of educational materials. But challenges faced by educators indicates that gamifying education is in practice neither easy not necessarily effective. Educators need to question what it is about games that is useful for their teaching. Is it the role-play element? The movement through virtual spaces? The simulation of relationships? The decision-making? The creation of fictional universes? The interactivity and participation? In other words, the use of games should be guided by the desired learning outcomes rather than by a fetishisation of the media form as a sweetening agent for learning. Games have many unique affordances that can be valuable for educational purposes, but the focus needs to be on the player rather than the game itself. What experiences and outcomes do we seek for them? How might games provide them and might there be other means of achieving this that is less complex than creating a digital game? This is particularly poignant given the multiple and complex expectations of students related to games as noted above.

A final point to note on games in learning is that there exists a disconnect between the objectives and conditions of play and those of the University. As one participant noted, "the boringness of the university is always going to beat the fun of games". The point being made here is that when play is imposed, mandated, and arbitrated, it loses its necessary condition of voluntariness and therefore is no longer fun. In order to have games function as playful and creative modes for teaching purposes, we would require greater flexibility and openness in our modules and in particular in our assessment to allow students to determine desired outcomes, explore, fail, and try again without serious consequences (such as failing the assessment or module). In this way there is a disconnect between fixed and rigid quality metrics in higher education institutions and the possibility spaces allowed by games. Because of this disconnect, participants discussed whether we need to move away from the expectation of games in education as fun, and to consider their value for being engaging in way that differs from traditional approaches such as lectures, examinations and essays.

"Where's the Zombie?" Games-Based Learning in Practice

Despite the challenges noted above, in practice, the use of games has been a gradual introduction for many instructors interested in games-based learning, with largely positive feedback from external evaluators as well as students related to these approaches. The presenters at the workshop contextualised the questions raised above in their own practice and how they dealt with them, and highlighted other, more specific opportunities and challenges in their experiences. In discussing their discipline-specific learning outcomes and teaching practices, the presenters noted that games can provide unique and promising tools for trial-and-error experiments/experiences and challenge the status quo in terms of testing and assessing students. Games are also about process as much as outcome, and can be useful for teaching procedural skills such as those valued in forensic science, policing and pharmacy education.

It was clear from these presentations that each instructor had approached games-based learning in divergent ways based on their subject matter and student populations. One presenter noted that he evaded the expectations related to high quality graphics in professionally-produced games by using interactive fiction tools such as Twine, Inform 7 and Wunderverse for teaching public speaking. These are relatively accessible tools that can allow inexperienced teachers and students alike to engage in narrative-based game-making. This emphasis on less technically-complex games was emphasized by other presenters, including one who uses role-playing analogue games as a means of

promoting transferrable skills development amongst research scientists. For the players of this game, publishing in an academic journal is a form of recognition with media attention highly rewarded in the game. In this way role-play becomes a means of fostering professional and employability skills, but the presenter also noted that taking the time to develop an immersive experience is fundamental to effective role-play in teaching.

Another presenter found that while games for learning were viewed by students as engaging, enjoyable, and effective, the type of game made a significant impact on learning outcomes and they therefore advised others to be selective about genres and play styles. The assumption that games must be characterised by win conditions was questioned by another presenter, who explored whether we could design games where it is not the best player that wins but the one who demonstrates the skills and knowledge being tested by the game. He also noted that asking students to design and make their own games can be a valuable teaching tool as they must then engage in thinking about process and cause-and-effect themselves.

Generally, presenters began from the question of how to teach their subjects and identified in games the ability to simulate and assess practical work such as fieldwork and groundwork in a virtual realm, particularly in the sciences where these can be expensive, sometimes inaccessible, and logistically challenging. While games can present solutions to these challenges in teaching, experience has shown that lessons need to be heavily signposted for students in these activities and learning spaces as students do not expect to see games in many learning contexts. Within virtual worlds and realities, students can develop time management and note-taking skills, and games can make fieldwork more accessible to those with mobility issues as well as physical and mental health difficulties, which is an important consideration for widening participation in higher education.
In implementing games-based learning, instructors have faced several challenges that are cultural, institutional, and technical in nature. Across the board, university constraints on acquiring and updating software and hardware can limit the ease in which instructors deploy games in learning. Many tools for game design need regular updates and upgrades, but this often does not align with fiscal years and teaching timelines in higher education institutions. In this way, the culture and ethos of games does not align with that of UK Higher Education and can make the implementation of games-based learning very difficult.

Some of the presenters in the workshop had been able to subsidize the payment of professional game designers for educational games through grant income, and they noted here another misalignment between cultures, in this case between instructors focused on intended learning outcomes, and designers focused on the principles of entertainment and games design. The question "where's the zombie?" indicates the mismatch between pedagogical goals and the norms of game-making, and the need for the development of a shared language between these stakeholders.

Overall the effectiveness of games for education is not linked to realism or expense per se, but how well engagement and motivation are tied to the desired learning outcomes. The benefits range from simulating challenging learning environments virtually to role-playing for transferable skills, but what is clear from the practices of these instructors is that reward in games must be well-linked to the intended learning outcomes. For this reason, assessment in games was a key topic of discussion at the workshop.

Lone Wolves and Social Loafers - the Role of Games in Assessment

Games and assessment may seem to have some conceptual affinities. In games, mastery of processes are rewarded with feedback and quantified metrics of achievement, including trophies, points, stats, leader boards and other rewards. In this way, it may seem evident that games as

assessment are an important opportunity and, indeed, the power for using game-like elements to encourage engagement is at the core of the trend towards gamification, which we see at play in consumer loyalty schemes from airline status to social media platforms.

In practice, however, the role of games for assessment is still largely theoretical. As noted above, there are challenges related to aligning games with institutionalized standards related to quality and assessment as the strength of games lies in how their players engage in their processes rather than simply the end state of winning or topping a leader board. Participants from game design backgrounds noted that students who play games will always be able to 'game' a game as assessment because they are experienced in identifying how systems work and seeking advantages in playing more efficiently. Peer assessment was a mode of evaluation that was identified as a particularly easy mode for students to gain advantage. For this reason, games when used in assessment have been largely supplementary and formative, providing ongoing feedback and a means to monitor ongoing progress. The lowered stakes of formative assessment can provide a solid basis for allowing students to engage in trial-and-error and failure in the process.

A contentious topic of discussion in the workshop was whether games could be deployed to automate and rationalize assessment of abstract concepts in a more objective manner than an individual instructor's subjective opinion. There are two assumptions at work in such a goal, the first being that assessment can or should be objective, and the second that a game can be objective in its evaluation. Participants largely disagreed with both precepts, as the vast majority of intended learning objectives in higher education are seen to need qualitative evaluation. Gamification entails distilling learning into quantifiable metrics, which in the case of critical thinking and original thought would be impossible. Participants from a range of disciplines felt this to be the case with the desired learning outcomes of their subject areas as well. Furthermore, the inculcation of values into games through design is itself not an objective activity and this reveals that games like other technologies are not objective either. One participant asked how we could know that the final score a game gives a student for the module is reliable and this indicates the ways in which the currently functioning modes of ascertaining fairness in marking at the university - through double marking, moderation, and external evaluation - are seen as necessary regardless of how technological teaching may become.

While not all assessment can or should be objective or gamified, participants agreed that there was more room for playfulness and creativity in assessment, depending on the discipline, teaching area, and educational needs within a module. This was expressed with the caveat that we need to tie games for learning into reward systems that benefit students beyond the mark and the degree. Games could be deployed in the pursuit of greater flexibility and openness in assessment, particularly in terms of group-based assessment. One opportunity that was discussed was having students design games themselves across disciplines. In a multidisciplinary task, students could work together and have the intended learning objectives of diverse subject areas such as geology and mathematics tested based on team roles.

Building communities around games as assessment was an exciting prospect for the participants, but the game design instructors were quick here to note that clearly defined team roles are vitally important in group work with games in order to assess each contributor's work rather than content produced overall. In game development, producers cannot do it alone, and even a solo developer has to work with others throughout the process. Therefore in constructing a team, be it subject-specific or multidisciplinary, the instructor must consider the synthesis of attributes, talents, skills, and personalities in a team. Those using team-based game assessment must also consider how to structure the teams. Some game design programmes draw on the principles of agile development with scrum methods such as sprint and flat hierarchies. Whether to adapt the working practices of software development or to rely on more traditional team structures depends on the module

objectives and needs to be defined by the instructor for all teams. Team-building activities are common in game design education, as are incentives for making an effort in supporting the team and iterative milestones for evaluating progress. Rewarding the values you want to teach in regards to the team/community is as important as evaluating the final outcomes of the design work.

As with all group work, instructors grappled with those who are less oriented towards collaboration- the so-called lone wolves (perfectionists who prefer to work alone) and social loafers (slackers who claim the work of their team-mates). Game design instructors noted that this is also a component of employability and transferrable skills in team-work, but that disciplinary issues must be planned and accounted for in these forms of assessment. This includes the use of social media. Many game design students use Facebook to discuss their work, but bullying and harassment did occur on these sites until the instructors took control over groups. In this way, it is important to remember that communities can facilitate antisocial as well as prosocial activity. Team work also cannot comprise the entirely of assessed work as this leads to student complaints, but deploying it carefully and in proportion with individual work can be a unique selling point that appeals to parents in recruitment activities.

Playing Together- Collaboration and the Future of Games-Based Learning

To conclude the workshop, our final discussion was of the resources needed for implementing games-based learning more effectively across subject areas and module and discipline-specific needs. Of course, the major need identified by participants was financial and temporal support. This is not surprising as game design is highly complex as a practice alone. Integrating learning within it in a manner that is nuanced, subject-specific and avoids the prevalent issues noted above is yet another layer of complexity for time-pressed educators.

Aside from additional funding and time relief, the majority of participants saw the need for greater collaboration with game designers. Educational games for the most part operate as closed loops with set actions leading to set outcomes with every play. With more advanced and complex game design, it would be possible to have procedurally generated content within educational games, which would allow for randomness and less predictable gameplay. In order to achieve this, networking and connections with professional game designers (or those in training) is vital.

Matching game design students and their projects to those interested in games-based learning was discussed as a potential direction for this, though the sharing of talent pools is somewhat limited by the expectations of game design students themselves. Game design instructors noted that the emphasis is still largely on entertainment games in many programmes. The culture of game design is still about slick and high-end entertainment games. Pitching serious games such as educational games is a challenge unless the educator emphasizes growing markets to these students. Programmes focused on independent game design that are not so oriented towards the industry may be a potential area of collaboration, but as yet this is an untapped resource. There are other challenges as well in that pedagogy is a different outcome and set of considerations than immersion, engagement and other game design principles. Therefore, collaborations would have to be carefully coordinated and scaffolded, and game designers could not simply be approached as providing value to educators. Skills and knowledge exchange across stakeholders would need to be a core element of this collaboration.

Other kinds of support were also required in terms of latitude to experiment with games-based learning and research this investigation. As games-based learning activities take a great deal more time to develop than other teaching materials, there is an increased risk entailed in this practice. If students do not respond to the engagement, the consequences can be quite high unless we

encourage innovative teaching and assessment with a tolerance for failure. This is related to support for pedagogic research on these activities; there is currently insufficient funding available to explore these initiatives in any depth.

Based on these needs, the repository of shared existing resources that were not necessarily known by those interested in games-based learning was validated. The repository was also seen as a useful tool for those interested in sharing game design tools as well as trading information and skills across disciplines and institutions. The repository is available through the Leicester Learning Institute website (2017). One possible direction for collaboration and connection was the use of local game jams for designing educational game prototypes. Hosting a University event as part of the annual Global Game Jam activities each January was seen as a way of kickstarting game design collaborations.

To summarise, games were discussed as an exciting means of supporting learning, though its value was dependent on a number of elements, including the quality of the game design, the skills of the educator in linking them to intended learning outcomes, and student abilities, preferences, and interests. Therefore the value of games as tools for learning, both teaching and assessment, can be harnessed but not in a quick or artificially-imposed manner. Processes must be as valued as outcomes in assessing the effectiveness of games in learning environments. The practical challenges faced in implementing games-based learning must be addressed institutionally to ensure greater support and games as teaching tools must not be viewed as universally productive or efficient in all contexts. The motivation and engagement games provide will depend on both the students and the game's quality, and context will shape how well the goals and expectations of students and learners are met by games and gamification. Games will not always be the best way to deliver subject area content, nor to assess it, and their adoption should be considered carefully at the outset. Game mechanics may be useful for measuring some intended learning outcomes, but not all, and they will not universally meet the needs of a student population, regardless of popular discourses such as that of 'digital natives'. Therefore game-based learning must be seen as a complex and time-consuming approach to education rather than a simple matter of candy-coating our teaching materials.

Continuation of the project

This report and the sharable portfolio of resources are the major outputs on the project, and they are intended to be widely useful to educators in a range of disciplines. The added benefit of the workshop is the formation of a broader network of UK instructors interested in games in education and the planning of resources for teaching, assessment and evaluation in this domain. As noted above, greater collaboration, networking, and connections were identified as centrally important to developing games-based learning in the contemporary university. The workshop was the basis for this nascent networking, as well as the portfolio of sharable resources. All portfolio materials are open to editing and addition as well as sharing by workshop participants and presenters, which will fulfil the aim of wider dissemination.

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