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Student attitudes to games-based skills development: Learning from video games in higher education



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ABSTRACT

Qualitative interview data is presented in support of previously-published quantitative evidence that suggests commercial video games may be used to develop useful skills and competencies in undergraduate students. The purpose of the work described here was to document the attitudes of those students involved in the quantitative study and to explore how the game-based intervention was perceived. To this end, student attitudes to the use of specified games to develop communication skill, resourcefulness and adaptability are examined. A broadly positive perception of the games' efficacy for skills development is revealed, and the aspects of game play that students believe contribute to skills development are discussed. These aspects include the need to communicate with team mates in order to succeed, and the fluid, unpredictable nature of in-game challenges. It is suggested that while the games played an important role in skills development, interaction between students, facilitated by game play, was also a significant factor.

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1. Introduction

In Barr (2017), quantitative evidence is presented to suggest that commercial video games may be used to develop in students a number of useful skills and competencies: communication, resourcefulness and adaptability. Such skills are referred to as 'graduate attributes' (Barrie, 2006; Hughes & Barrie, 2010) and are generally associated with the employability of higher education graduates. The rationale behind the work described by Barr was that commercial video games are designed to exercise such skills. In that study, a randomised controlled experiment was used to measure the effects of playing selected games on the attainment of the specified graduate attributes. Undergraduate students were randomly assigned to either an intervention or a control group and previously validated, self-report instruments to measure adaptability, resourcefulness and communication skill were administered to both groups. The intervention group played specified, high quality video games under controlled conditions over an eight-week period.

The selected titles comprised: *Portal 2* (Valve Corporation, 2011), *Team Fortress 2* (Valve Corporation, 2007), *Gone Home* (The Fullbright Company, 2013), *Minecraft* (Mojang, 2009), *Papers,*

Please (Lucas Pope, 2013), *Borderlands 2* (Gearbox Software, 2012), *Lara Croft and the Guardian of Light* (Crystal Dynamics, 2010), and *Warcraft III* (Blizzard Entertainment, 2002). The games were selected by presenting a panel of games scholars and games industry personnel with a list of the specified attributes and asking these experts to suggest games that might exercise such attributes. The suggested titles were then filtered based on logistical concerns, including hardware constraints (the specification of the computers used in the study) and network restrictions (availability of the ports required for online play). For example, both *Minecraft* and *World of Warcraft* (Blizzard Entertainment, 2004) were suggested as candidates for developing communication skills. However, while *Minecraft* was included in the study, the MMORPG (Massively Multiplayer Online Role-Playing Games) *World of Warcraft* was not, due to the technical challenges involved (an internet connection is essential to play, and the university infrastructure did not permit such a connection) and the steep learning curve associated with the game. With just 2 h of play per game, novice players would barely scratch the surface of *World of Warcraft*, and not experience the collaborative team-based questing that might exercise their communication skills.

A large effect size was observed with mean score change 1.1, 1.15, and 0.9 standard deviations more positive in the intervention group than the control on the communication, adaptability, and resourcefulness scales respectively ($p = 0.004$, $p = 0.002$, and

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$p = 0.013$ for differences in groups by unpaired t -test). The large effect size and statistical significance of these results supported the hypothesis that playing video games can improve graduate skills, and suggested that such game-based learning interventions have a role to play in higher education.

However significant, these quantitative results do not explore the vitally important human implications of the work – put simply, research-led educational interventions can only be effective if they are received positively by the students involved. Students may resist learning activities that do not align with their preconceived notions of education, which are often rooted in the didactic, instructor-led forms of teaching to which they are exposed at school and college (Seidel & Tanner, 2013). Johnson et al. (2009), for example, describe student resistance to moving from traditional (teacher-centered) to non-traditional (learner-centered) approaches to learning. Henderson and Dancy (2007) list student resistance to active, research-led learning as one of several barriers to educational reform, also noting that students “do not like to interact with each other and are often not prepared to think independently”. Perhaps most pertinent here, given the experimental, game-based nature of this intervention, is the recommendation of Felder and Brent (1996):

...to minimize resistance to any student-centered method, try to persuade the students from the outset that you are neither playing a game nor performing an experiment, but teaching in a way known to help students learn more and understand better.

Looking specifically at game-based learning inventions, there is evidence that these may not be accepted by all students. Egenfeldt-Nielsen (2007, pp. 146–150), for example, documents a high degree of student resistance to the very idea of learning from a game, again related to their expectations – in this case, expectations of the manner in which the ‘serious’ academic subject of history should be taught. Students have also been revealed to be resistant to the idea of developing their graduate attributes by means of additional, stand-alone activities. The expectation is that such skills development should be embedded in their regular classes, and there is little appetite for ‘non-core activities’ in the face of, for example, increased part-time working commitments (Swingler et al., 2016; O’Leary, 2016; Gbadamosi, Evans, Richardson, & Ridolfo, 2015). As described below, playing video games could develop skills other than those considered in this study (see also Granic, Lobel, & Engels, 2014, for an overview of the cognitive, emotional, educational and social benefits associated with playing video games). However, the focus on graduate attributes here is motivated by a desire to address the problem of how such important skills may be developed in higher education. Barrie (2004, p. 263), has noted that “university teachers charged with responsibility for developing students’ generic graduate attributes do not share a common understanding of either the nature of these outcomes, or the teaching and learning processes that might facilitate the development of these outcomes”. Therefore, despite institutional best intentions, the lack of a shared understanding of graduate attributes, and how to cultivate them, is one barrier to their development. Similarly, Green, Hammer, and Star (2009) note that graduate attributes can be difficult to develop due to the confusion that surrounds their definition and implementation, a problem exacerbated by institutional resistance and under-estimation of the resources required to embed related practices. Thus, a potentially engaging and low-cost game-based approach to the development of graduate attributes was trialled to address this specific problem.

The literature includes accounts of several studies designed to test games’ efficacy for skills development or education. Shute et al. (2015), for example, showed by means of a robust randomised

design that playing *Portal 2* – one of the games used in the study described here – could improve players’ problem solving, spatial skill, and persistence. This is an influential and well-designed quantitative study but it is not possible to determine from the published work *why* the participants felt their problem solving and other skills were improved. Similarly, Adachi and Willoughby (2013), demonstrated by means of a four-year longitudinal study that playing strategy and role-playing games predicted self-reported problem-solving skills among a sample of 1492 high school-aged participants. Again, however, some account of the students’ attitudes is lacking, and we do not know what aspects of the games participants felt had exercised the requisite skills.

That is not to say that attitudes cannot be measured by quantitative means. Hamari et al. (2016) used survey instruments to measure participants’ subjective experience of playing educational games, asking questions such as “How interesting was the game?” and “Did you feel bored with the game?”. Ruggiero (2015) used a survey instrument to measure students’ affective learning and attitude after they had played a game designed to affect players’ attitude towards homelessness. Shin and Ahn (2013) also used a survey instrument, in this case to explore the negative association between game use and cognitive empathy. However, these studies were designed to measure specific aspects of participants’ attitudes. For more exploratory studies, qualitative methods such as interviews can yield rich data that are less influenced by the pre-conceptions of the researcher, whilst remaining grounded within a particular framework (such as the stated graduate attributes described here). Bourgonjon et al. (2016), for example, used qualitative means to explore player perspectives on the positive impact of video games, analysing a body of data drawn from online discussion forums in terms of a pre-existing framework of potential impacts. Ortiz de Gortari, Aronsson, and Griffiths (2011) used qualitative interviews to investigate what the authors term ‘game transfer phenomena’, wherein players appear to integrate elements of their game-playing experience into real life. Exploring somewhat similar territory to that described here, this example serves to highlight the usefulness of qualitative interviews in understanding the effects of video games on those who play them.

The purpose of the work described here is to explore student attitudes to a game-based intervention intended to develop graduate skills, which might be considered as important as the previous quantitative results. While quantitative means, such as Likert-type scales, may be used to measure attitudes, there are limitations to such an approach. As Karavas-Doukas (1996) notes, middle-of-the-range scores may be obtained where the respondent’s attitude is uncertain or inconsistent. Qualitative designs, however, allow for more nuanced data collection, capturing respondents’ doubts, caveats and rationale, rather than reducing attitudes to unidimensional variables. As Sofaer (1999, p. 1102) suggests, “qualitative methods help provide rich descriptions of phenomena. They enhance understanding of the context of events as well as the events themselves”. Furthermore, the qualitative approach taken here provides indications of *how* and *why* students believe video games may help develop the skills in question, providing insight that is not readily obtained by the quantitative means employed in the earlier study. As such, efforts to examine the attitudes of the participants in a quantitative study go some way towards addressing a perceived gap in the literature, where quantitative results are reported with little context.

2. Method

Each of the participants in the intervention group who saw the study through to its conclusion, and played all of the specified games, was interviewed, an exercise which comprised 20

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