

Aspects of the Integration of Games into Educational Processes

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ABSTRACT

This paper presents the results of a literature search and review focused on the integration of digital games into educational processes, specifically in primary schools. It briefly analyses around 78 papers reporting research carried out in a range of different countries and with a variety of educational objectives. The study confirms the increasing wealth of scientific studies dealing with game based learning and its implementation in formal educational contexts. This also holds true for primary education, which is at the core of this study. The review reveals that in this sector there is a predominance of papers that could be classified as theoretical or as position papers; only 78 out of more than 700 published papers surveyed actually reported concrete school experiences of any kind. Detailed analysis of this sub-group has highlighted some clues that may prove useful for interpreting the data as a whole and for reflecting on the current and future trends that they may indicate.

Keywords: Educational Process, Game-Based Learning, Literature Review, Primary Education, Serious Games

1. INTRODUCTION

Game Based Learning (GBL) is widely recognized as a potentially powerful approach for learning (de Freitas & Maharg, 2011; Zyda, 2005; Kirriemuir & McFarlane, 2004). Recent studies have highlighted the opportunities that digital games offer to support immersive, situated and learner-centred educational experiences (de Freitas, 2006; Lytras, Sakkopoulos & Ordóñez de Pablos, 2009; Lytras, Ordóñez

de Pablos, Damiani & Diaz, 2011; Lytras, Tennyson & Ordóñez de Pablos, 2008) with considerable capacity to enhance students' engagement and motivation (Boyle et al., 2012). Researchers focusing on the effectiveness of game-based learning have stressed the contribution that games may offer for reaching a variety of learning goals (McFarlane et al., 2002), not only *within* subject areas like mathematics (e.g. Kebritchi et al., 2010) but also *across* them, supporting transversal skills like logical thinking

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(Bottino et al., 2009). Alongside the increasing number of field experiments being conducted by researchers, there is now also increased deployment of games in teaching practice. Thus, a growing body of experience is being accrued in the use of digital games within formal education settings. Nevertheless, as underlined by Razak et al. (2012), “*educators still find it a challenge to integrate this approach in their teaching practice*”; this indicates that there is still a need for further guidance and a general rethink of pedagogical approaches (Arnab et al., 2012; Sandford et al., 2006).

This paper presents the results of a literature search and review aimed at investigating the actual concrete use of digital games in primary schools. It follows a wide-ranging review and study carried out by Connolly and colleagues (2012) reporting “*empirical evidence about the impacts and outcomes of computer games and serious games with respect to learning and engagement*”. This study, by contrast, focuses on trends in the process of integrating games into (primary) education and how these relate to the concerns and agenda of the research world.

2. A LITERATURE SEARCH AND REVIEW OF DIGITAL GAMES IN THE PRIMARY CLASSROOM

In the effort to gain a clearer picture of the extent to which digital games are being adopted in primary schools and on how that process is unfolding, the authors performed an extended literature search. The ultimate objective was to shed more light on concrete field experiences being conducted in school settings.

2.1. Search and Review Methodology

The raw data for the survey were derived from two web services that aggregate bibliographic records from a range of major databases of scientific literature. One is Thomson’s Web of Knowledge, which is generic, and the other is the University of Western Scotland’s Serious Games Literature Database¹, which is specifi-

cally dedicated to academic papers and publications related to GBL (Connolly et al., 2012).

Given the stated aims, the threshold criteria for inclusion of any paper in the review were that it should report:

- Use of one or more digital games for learning;
- Details of an experience of some kind or other, not just reflection on the educational potential of digital games;
- Piloting or adoption in primary school (up to the age of 10-11).

No specific limitation was posed on the type/category of games to be considered (Djaouti et al., 2008).

The timespan considered was from 1992 onwards, while the search terms used were as follows: serious game, serious gaming, digital game, digital gaming, educational game, educational gaming, learning game, computer game, computer gaming, primary, elementary, K-12, young, preschool; where appropriate, keyword stems were used with a wildcard, e.g. <gam*>.

A total of 753 papers were returned from the global search and subsequent filtering using the above-mentioned threshold criteria generated 78 matches. As shown in Table 1, these papers come from a variety of different bibliographical sources, with a preponderance from scientific journals in the fields of educational technology and psychology/educational psychology. Only a few come from game-specific conferences and proceedings, and a minority derive from journals in the field of ICT and health (those regarding field experiments in the use of games with disabled students as remediation aids).

The experiences reported in the papers were carried out in a variety of countries, the most prominent being the USA (31%), UK (15%), Italy (8%), Taiwan (7%) and Turkey (5%). A further 20% of papers came from a constellation of other countries, while the remainder were of unspecified origin. As well as reflecting the general predominance of American-origin papers in all scientific literature, the figure for the USA also reflects the strong interest that the

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