Motivation Monitoring and Assessment Extension for Input-Process-Outcome Game Model

Ioana Ghergulescu, School of Computing, National College of Ireland, Dublin, Ireland
Cristina Hava Muntean, School of Computing, National College of Ireland, Dublin, Ireland

ABSTRACT

This article proposes a Motivation Assessment-oriented Input-Process-Outcome Game Model (MotIPO), which extends the Input-Process-Outcome game model with game-centred and player-centred motivation assessments performed right from the beginning of the game-play. A feasibility case-study involving 67 participants playing an educational game and measuring their motivation through a questionnaire was conducted. The results have shown statistical significant difference between the motivation to play and motivation to learn, as well as statistical significant relationship between the player’s motivation during the game-play and the player’s initial motivation. A statistical significant increase in player’s motivation to learn about the subject presented in the game was also found. These facts confirm the usefulness of assessing player’s motivation from the beginning of the game-play. Furthermore, the results have shown the usefulness of the proposed model for assessing the impact of the game-play on player’s motivation.

Keywords: Assessment, Game-Based E-Learning, Game Design Model, Input-Process-Outcome Game Model (MotIPO), Player Motivation

INTRODUCTION

As technology is increasingly used in every aspect of people’s life, and as learners gradually shift to so called “digital natives” that use and manipulate technology easily, innovative ways of deploying technology in education are necessary in order to help learners become wiser, to provide them with the knowledge and skills required to compete in a fast changing world (Prensky, 2012). In order to bridge the gap between the new learner generation and the traditional learning process, while aiming to address learner’s low level of engagement, games have started to be integrated into the learning process (Ghergulescu & Muntean, 2012b).

As a result, new paradigms such as “games-based learning” and “game-based e-learning” have emerged. Game-based e-learning is defined as the “use of a computer games-based approach to deliver, support, and enhance teaching, learning, assessment, and evaluation” (Connolly & Stansfield, 2011). Game-based learning is a broader concept covering “both computer and
non-computer games, such as card and board games” (Connolly & Stansfield, 2011). However, the area of game-based e-learning is still not mature with a number of challenges such as assessment, adaptation and game design and authoring that need to be overcome.

Like in any form of learning, assessment is an important aspect that has to be considered also in the game-based e-learning, in order to determine how successfully the learning goals are met. Furthermore, assessment is a prerequisite for enabling further game adaptation that can better support the achievement of the learning goals. The assessment in game-based e-learning can be categorised in game-centred assessment and player-centred assessment (Ghergulescu & Muntean, 2012a). Game-centred assessment refers to the assessment of the game in terms of different aspects such as game’s educational values, enjoyment, usability, quality of experience with the game, etc. Player-centred assessment refers to learner’s assessment in terms of knowledge, skills, emotions, motivation, etc. While the game-centred assessment provides evidence of the game’s effectiveness and it is useful for further improvements of the game design, the player-centred assessment can be used to adapt the game and to provide the player with personalised and effective feedback.

The implementation of various assessment features into the game-based e-learning environments is in an early stage. Not only that better integration of assessment in games is necessary, but the development and integration of generic assessment mechanisms that are applicable across different games may increase efficacy in designing games and authoring content (Bellotti, Kapralos, Lee, Moreno-Ger, & Berta, 2013).

In particular, learner motivation assessment has become an important research topic in the e-learning and game-based e-learning areas, as “it is almost universally accepted that there is a positive correlation between motivation and learning” and “the more motivated a person is about a given subject, the more likely s/he will learn about that subject” (Bixler, 2006). However, although currently motivation represents the most important research topic in the area of game-based e-learning (Hwang & Wu, 2012), a generic game model that integrates motivation assessment is still missing.

This article proposes Motivation Assessment-oriented Input-Process-Outcome Game Model (MotIPO), a model for player’s motivation-aware game-based e-learning systems. MotIPO extends Garris et al.’s Input-Process-Outcome (IPO) game model (Garris, Ahlers, & Driskell, 2002) with both game-centred and learner-centred motivation assessments. The first aspect is concerned with assessing the impact of playing the game on player’s motivation, whereas the second aspect is concerned with assessing player’s motivation in order to enable motivation-based game adaptation from the beginning of the game-play. While motivation is an important aspect in learning and game-play, motivation assessment has not been considered by other research works that have proposed game models.

The remaining of this article is structured as follows. The next section presents previous research works, on areas related to this paper such as motivation assessment and game models. The IPO game model is briefly presented after that. The following sections present the proposed MotIPO game model, as well as the methodology and the results of the evaluation case study. The final two sections discuss the findings of this paper, conclude the paper and indicate future research directions.

RELATED WORK

Motivation Assessment

One important aspect addressed in game-based e-learning is the motivational state, simply referred as motivation. The motivational state shows the energy, the persistence, and the direction of a person for taking and continuing an activity and their beliefs, self-perception of their capabilities to execute a task (Ryan & Deci, 2000). Motivation can be expressed as a stand-alone attribute or as an aggregated measure of various motivational indicators, such as: interest, engagement, confidence, effort, importance,
Female Gamers: A Thematic Analysis of Their Gaming Experience
Lavinia McLean and Mark D. Griffiths (2013). *International Journal of Game-Based Learning* (pp. 54-71).

[www.igi-global.com/article/female-gamers/95082?camid=4v1a](http://www.igi-global.com/article/female-gamers/95082?camid=4v1a)