Students’ Time Perspective And Its Effect On Game-Based Learning

Mireia Usart & Margarida Romero
ESADE School of Law and Business, Spain

Abstract
Previous research in face-to-face learning modality demonstrated that students’ Time Perspective (TP) is related to motivation and learning performance. Concretely, results show students with a future-oriented TP having higher motivation for learning, higher self-regulation, and academic performance. By contrast, students’ having a present-oriented TP tend to engage in games and prefer instant reward activities. Despite the wide corpus of research on TP and learning, albeit Serious Games (SG) are widely used for professional development and lifelong learning, no studies have focused, as per our knowledge, on TP in Game Based Learning (GBL). The present study aims to explore this new field of research. We conducted a case study using the Serious Game MetaVals. Results of the experience show no significant differences in game performance among individuals with different TP. Furthermore, students with a future-oriented TP foresee the future usefulness of the game compared to those focused on the present. These results might be useful for instructional designers and teachers, in terms of knowledge acquisition, outlining the benefits of using GBL activities that could help different TP profiles to equally engage and better perform in the learning processes.

KEY WORDS: Game Based Learning, Serious Games, Time Factor, Time Management, Time Perspective, Learning Performance

I. Introduction
Continuing professional development and lifelong learning are vital to both individual and organizational success (Wall and Ahmed 2008). Present trends in management education are committed to active learning models, including Serious Games (SG), in their curriculums. Especially, Game Based Learning (GBL) has long been used for management training courses, to safely practice key skills and competencies in students’ improvement (Mawdesley et al. 2011). Furthermore, the time factor plays an important role in these new learning scenarios (Gros, Barberà, and Kirshner 2010): students have to be aware of the existing time constraints in their life, and therefore manage time to take advantage of their learning process. This study aims to analyze a specific aspect of the time factor, namely Time Perspective (TP). We analyzed students’ TP in relation to learning performance, intention of use, and usefulness of MetaVals, in SG on finance basics.

This study was developed within the context of a PhD, focused on adult students’ Time Perspective (TP) and its possible effects on GBL activities, conducted in ESADE Business and Law School. The study is set within the Network of Excellence FP7 Games and Learning Alliance (GaLA), in the Special Interest Groups of Pedagogy and Psychology.
1.1. Game based learning

The use of SG in education is also called Game Based Learning (GBL). Following Zyda (2005), GBL activities are designed to help achieve a balance between fun and educational value. GBL could enhance problem-solving competence, decision making, knowledge transfer, and meta-analytical skills (Kirriemuir and McFarlane 2004). Specifically, those games involving collaborative actions can help to put learning into an authentic and realistic context allowing students to practice in a safe environment (Leemkuil et al. 2003). These authors also point to the fact that games can provide realism and motivation to players; they do it through good pedagogical design that brings complexity, risk, role-play, and access to information into the game.

It must be noted that these scenarios may show a lack of effectiveness when no instructional measures or support are added in order to guide this process. In this respect, de Freitas et al. (2010) affirms that negative learning transfer may occur with some game players in SG contexts, where an expectation for high fidelity environments may be related to negative learning processes. Collaborative GBL activities, as a type of Computer Supported Collaborative Learning (CSCL), demand participants to monitor and adapt their cognitive and metacognitive processes, such as temporal competence, to changes in their motivational state (Azevedo 2008). Therefore, we can expect students’ TP to play an important role in achievement of optimal learning outcomes in GBL environments. Due to the lack of research in the field of TP in collaborative GBL, we aimed at focusing on analyzing the relation of the students’ TP to their game scores (game performance hereinafter).

1.2. Time perspective and learning

This study is based on the definition and operationalization of Time Perspective (TP) by Zimbardo, Kcough, and Boyd (1997): “the manner in which individuals, and cultures, partition the flow of human experience into distinct temporal categories of past, present and future”. These temporal frames are subdivided into five subscales. Past Negative (PN) individuals are those who present a pessimistic attitude toward the past and possibly the experience of sad events in their past. Past Positive (PP) individuals have a sentimental and positive view of “the old days”. Present Hedonistic (PH) will have immediate pleasure, with slight regard to risk without thinking of the consequences, while Present Fatalistic (PF) have no hope for the future and believe that external forces determine their fate. The fifth temporal dimension, the Future (FTP), is characterized by delay of gratification, as a result of the desire of future-oriented individuals to achieve specific long-term goals. An ideal time orientation (high in PP, PH, and FTP) is defined as “balanced” (Zimbardo and Boyd 1999). Individuals with a balanced TP can make plans for the future, consider the past for future successes and possible failures, and enjoy the present.

The importance of TP lies in its relation with different behaviors such as achievement, goal-setting, and risk-taking (Zimbardo and Boyd 1999). TP has been the object of study for educational psychologists because of its relation with learning processes and outcomes. According to Kauffman and Husman (Kauffman and Husman 2004), TP is fundamental in understanding our activities, hopes, goals, and motivations. It was noted that individuals with high Grade Point Average (GPA) are characterized by being future oriented (Mello and Worrell 2006; Ozceit and Eren 2010). Some authors affirm that college students’ thoughts about their future could have an impact on their academic achievement (Shell and Husman 2001). Using a self-report scale instrument, the Temporal Orientation Scale (TOS), Brown and Jones (Brown and Jones 2004) found that past- and present-oriented students were likely to engage in social activities more
than academic ones. Future-oriented university students more easily anticipate the implications of their present classroom activities for the distant future (Phalet, Andriessen, and Lens 2004). In a study on TP and academic achievement conducted on African American high school students, Brown and Jones (2004) observed that future-oriented individuals saw education as more useful for future success in life and showed higher GPA.

Education is defined as a future-oriented process because it involves processes oriented toward future goals and delay of gratification (de Bilde, Vansteenkiste, and Lens 2011). Due to this fact, the relation between TP and education has focused on the concept Future Time Perspective (FTP). Nevertheless, GBL as a learning methodology focused on instant rewards, involving competition and social activities (Bateman and Boon 2006), is supposed to help present-oriented individuals to improve their performance and engagement in these activities. Despite a lack of studies in GBL, present-focused individuals perform better in instant feedback situations such as competitions while future-oriented students may engage in seeking academic goals (Kauffman and Husman 2004). There is a need to study how different TP students perform in GBL and explore the possible relation between TP and learning performance.

1.3. Research question and hypotheses
According to the previously conducted experiences in TP and learning, there are empirical and theoretical reasons to affirm that there are no significant differences in a GBL scenario between present-oriented and future-oriented participants. This could be due to two different underlying reasons; based on GBL studies, and as studied by Moreno-Ger et al. (Moreno-Ger et al. 2008), the mix of fun and learning introduced by the GBL methodology could neutralize the heterogeneous learning outcomes expected from the results seen in classic learning activities. Focusing on motivation, present-oriented students prefer instant-reward activities (Wassarman 2002) while future and balanced individuals can foresee investment in learning as a source of future rewards. Therefore, we state two hypotheses: Hypothesis 1 predicts that both individual and collaborative game performance (dependent variable) are not correlated to TP (independent variable); that is, all students can perform equally in a GBL activity. Hypothesis 2 affirms that future-oriented individuals foresee the learning usefulness of the activity in the future, while present-oriented students play for fun, without taking into account the future usefulness of the GBL activity (Hypothesis 2a). On the other hand, as present-oriented students face MetaVals as a game, they may have a similar intention of use in the future as future-oriented. Therefore, all students will have similar intention of use, albeit due to different reasons (Hypothesis 2b).

II. Methods

2.1. Participants
Master students participating in this case study (9 women and 15 men, age M=31.90, SD=4.09, age range: 26–42 years) were engaged in an introductory finance course in ESADE Law and Business school. Names and personal data from participants are treated confidentially and they do not appear in the research. All of the participants in the two expected experiences and the professor were informed of the study and its
purpose. The professional profile of the participants in these programs was composed of marketing and sales, law, and operations experts.

2.2. Research design
To study our hypotheses, the SG MetaVals was developed and implemented in an introductory finance course. The use of a pre-test on finance literacy, together with the GBL activity and a post-test, where students were asked about future usefulness and intentions of use of the game, composed the scenario. All of the activities were set in the Moodle page of the course, and the participants could access the contents one week before the first face-to-face class and one week after. Students played the MetaVals game on their laptops in the context of the first face-to-face class.

2.3. Instruments and operationalization of variables

2.3.1. ZTPI
The analysis of the students’ TP was conducted using the Zimbardo Time Perspective Inventory (ZTPI; Zimbardo and Boyd 1999). Fifty-six statements represent the five theoretically independent factors described by Zimbardo and Boyd (Zimbardo and Boyd 1999). Each statement is rated using a 5-point Likert scale (1 = strongly disagree, and 5 = totally agree). After its completion, the ZTPI shows a value of individual’s TP. Following these authors, the individuals have a tendency toward one of the five orientations or present a balanced TP. In our research, the participants were found to be present, future, and balanced. The Spanish version of the ZTPI was implemented in Moodle. This instrument had been previously validated through a psychometric study conducted by Díaz-Morales (Díaz-Morales 2006) among a reliable sample of Spanish adults (N=756) and was used in the present study to be consistent with the theoretical approach of the chosen TP definition.

2.3.2. MetaVals
MetaVals is a computer-based Serious Game designed by ESADE in the context of the FP7 Network of Excellence Games and Learning Alliance (GaLA). MetaVals was adapted from an existing class activity used to practice basic finance concepts (Massons et al. 2011). Despite the pedagogical interest of the initial activity, only some students actively participated, and it was difficult to incentivize discussion among peers in that context. Therefore, MetaVals was designed through a process that involved a 1) paper-based release, and 2) computer-based versions of the game that were tested in different environments (Padrós, Romero, and Usart 2011). The present MetaVals is a sorting game where students play in dyads with a virtual peer against the rest of the class. A welcome screen asks players to introduce their age and previous knowledge on finance. It leads to a second screen with virtual peers’ information (see Figure 1). This key data can help players in the correction and discussion phases (e.g. a virtual peer with a low level on finance may give wrong answers). After general instructions are given by a virtual lecturer, the player starts playing individually by classifying six items as assets or liabilities (e.g. “Computer software”, “Bank Loan”); after this first phase, six different items appear, but now the player has access to his virtual peer’s answers. After this correction phase, a final discussion phase starts; the player has to decide if the 12 classified items were correctly classified; the dyad with a higher number of correct answers in less time, wins the game.
The present version of MetaVals implements a countdown in each classifying phase screen and a MySQL database to monitor and record all of the participants’ individual and collaborative scores, and time logs. Final scores are an operationalization of the game performance’s variable.

2.3.3. Future usefulness and future intentions of use operationalization
After the GBL activity, the students were invited to fill out a questionnaire on future usefulness and future intentions of use for the MetaVals. This instrument was based on the Technology Acceptance Model and had been previously studied in other contexts using MetaVals (Padrós, Romero, and Usart 2011). Four statements on the future uses of the game (3 months and 1 year time) had to be rated by using a 5-point Likert scale (1 = strongly disagree, and 5 = totally agree).

III. Data Analysis and Results
In order to study the two hypotheses, Analysis of Variance or One-Way ANOVA was used. It is important to bear in mind the normality of the sample and equality of variances. Both assumptions were studied. First, the normality test on Origin8Pro (Kolmogorov–Smirnov; K–S) was run for different dependent variables; the use of the K–S test follows the method of different authors on TP that conducted similar experiences (de Bilde, Vansteenkiste, and Lens 2011). It confirmed that the sample followed a normal distribution. The only variables providing an ambiguous result were game performances (both individual and collaborative), but as they were close to the significant level (p=0.04 <0.05), we decided to use the parametric test.

Our first hypothesis was aimed at studying whether there was a relation among Time Perspective (TP) and both Individual and Collaborative Game Performance. Participants’ scores in the individual phase of the game did not differ significantly across the three TP groups, \[ F (2, 21) = 0.14, p = 0.87. \] None of the collaborative scores were significantly different among groups, \[ F (2, 21) = 2.10, p = 0.15. \] However, future-oriented showed a higher score for the collaborative phases (M=11.5; SD=0.9) than present (M=10.5; SD=1.51) and future (M=10.5; SD=1.29) individuals (see Figure 1).

Due to the fact that the tendency is not significant, we can confirm the first hypothesis (Figure 2).
For the second hypothesis, students’ answers on future Usefulness and Intention of Use in the post-test were analyzed. Results showed that future-oriented individuals believed the game would be useful within one year $F (2, 15) = 4.35$, $p=0.03 (<0.05)$ when compared to present-oriented participants. This result is significant, and therefore, it confirms Hypothesis 2a. Nevertheless, when asked on future Intention of Use, no significant results showed, although a tendency was clear; future-oriented students made explicit their future intentions of using the MetaVals within less than one year $F (2, 15)= 3.21, p=0.07$; more studies should be conducted to confirm or reject Hypothesis 2b.

IV. Discussion and Conclusions
The sample was composed of 50% of future-oriented students, 33.33% balanced and 16.7% present-oriented. ANOVA results confirm Hypotheses 1; there is no significant relation between TP and Game Performance, neither for the individual nor for the collaborative phase of the game. Due to the lack of previous studies in the field of Game Based Learning (GBL) and TP, more research should be done to confirm the tendency of future-oriented students to score higher than balanced and present-oriented individuals. This could be faced with a greater sample size and a more difficult game activity that permitted a wider range of scores. Similar results shown among the three TP groups in the game could be confirming the idea that a mix of fun and learning introduced by the GBL methodology (Moreno-Ger et al. 2008) neutralizes different learning performances found in classical learning activities. The underlying reasons for these equal performances could be the fact that present-hedonists tend to engage in instant-reward activities (Wassarman 2002); they face a GBL activity as an amusing, challenging activity. On the contrary, future-oriented students could be engaging in the GBL activity not for fun, but thinking of the learning and future outcomes of playing in an educational context. Finally, balanced individuals adapt their time orientation to the needs of the present moment, having fun and thinking of their future learning gains (Zimbardo and Boyd 1999). The results in the post-test on future usefulness point to this direction; future-oriented participants significantly foresee the usefulness of the game in one-year’s time, while present oriented individuals probably play for fun; although they think of playing again, they do not consider the future usefulness of the game (Brown and Jones 2004).

This study could set the groundwork for future research in the field of TP and GBL. Results point to the importance of including GBL activities in management learning courses, which could lead to an equilibrium of performance among students
and enhance knowledge acquisition in present-oriented individuals; these goals could be reached by engaging them in activities that give an immediate feedback, such as GBL. These results should also serve as a base for educational psychologists to help individuals in managing their learning processes in terms of performance and usefulness.

4.1. Limitations of the study and future research
One of the limitations of the present study is the size of the sample. The fact that it was the second time that MetaVals was used in a real learning environment could be a handicap. Second, the voluntary filling of the ZTPI questionnaire caused the students to respond in a very irregular number. Researchers cannot generalize the results of the experience; therefore, increasing the size of the samples, and therefore decreasing the standard deviation is the goal of the researchers for the next month. Concretely, in the context of GaLA, the MetaVals game will be adapted and implemented in Scotland and Romania. The retrieval of data from different samples of adult students may also permit the study of GBL and TP, considering cultural differences between Western and Eastern Europe.

Another limitation of the study is the short time period in which the research was conducted. Following Nurmi (Nurmi 2005), a consequence of the lack of longitudinal data in TP studies is that very little is still known about the antecedents and consequences of TP in learning. In the following months, we will study if GBL performance significantly means an improvement in students’ knowledge within a long-term perspective. A longitudinal study of the two masters should help understanding if observed performances are related to deep learning processes and if self-reported future Intention of Use is confirmed in these prospective studies.

About the Authors
Mireia Usart is a junior researcher with the Fellowship at the Direction of Educational Innovation and Academic Quality (DIPQA) at the ESADE School of Law and Business in Spain.
Margarida Romero is the Associate Director of E-Learning at the ESADE School of Law and Business in Spain.

References
