



Contents lists available at ScienceDirect

Computers & Education

journal homepage: www.elsevier.com/locate/compedu

University students' ability-expectancy beliefs and subjective task values for exergames



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ARTICLE INFO

Article history:

Received 31 August 2013
Received in revised form
13 February 2014
Accepted 25 February 2014
Available online 7 March 2014

Keywords:

Exergames
Expectancy beliefs
Task values
Young adults
Tertiary education

ABSTRACT

The purpose of this study was to use the Eccles' expectancy-value model of choice as a framework to examine university students' expectancy beliefs and task values in exergaming systems compared to those in physical education activities. Two hundred and thirty two first-year undergraduate students at the Democritus University of Thrace completed questionnaires assessing their expectancy-related beliefs, subjective task values, and intention for future participation in the physical education and the exergames fields. Participants' activity level was also assessed using the Godin and Shephard leisure-time exercise questionnaire. Results indicated that expectancy-related beliefs and task values are positively correlated and both constructs are correlated to intention to participate in the future for the physical education and the exergames fields. Expectancy-related beliefs, task values, and intentions across fields, however, were not correlated supporting the hypothesis that exergames represent a distinct field from traditional physical education activities. Physical education was considered as more important and more useful than exergames, nevertheless inactive students found exergames to be more interesting than physical education activities. In addition inactive students had higher beliefs about ability and higher intention for future participation in exergames activities were compared to those of physical education. Conclusively, findings support the notion that exergames could be integrated into physical education and recreation programs in order to attract inactive young adults.

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1. Introduction

The health benefits associated with proper levels of physical activity are well documented, however a large percentage of the population is not sufficiently active to attain those health benefits (Tzetzis, Avgerinos, Vernadakis, & Kioumourtzoglou, 2001). Young adults are also not as active as they should be, and their activity levels decline during adulthood. Research shows that individuals who participate in regular physical activity achieve greater health benefits compared to sedentary individuals (Janssen & LeBlanc, 2010; Lioret, Maire, Volatier, & Charles, 2007; Loucaides, Jago, & Theophanous, 2011). According to the American College of Sports Medicine (ACSM), healthy individuals should participate in at least 30 min of moderate intensity physical activity, at least three days per week (Haskell et al., 2007; Janssen & LeBlanc, 2010). Regular participation in physical activity reduces the risk of obesity, hypertension, congestive heart failure, atherosclerosis, and cardiovascular disease (Thompson, Gordon, & Pescatello, 2010).

Young adults are the one population, in particular, experiencing the most rapid decline in physical activity participation, in part because of the perception that exercise is not enjoyable and because of lack of time to devote toward exercise (VanKim, Laska, Ehlinger, Lust, & Story, 2010). Decline in physical activity begins in high school and by college, data compiled reveal that nearly 35% of persons between the ages of 18 and 24 years are physically inactive. An additional 27% do participate in some leisure-time activity but fail to meet current physical activity recommendations (Armstrong & Welsman, 2006; Nelson, Gortmaker, Subramanian, & Wechsler, 2007). A key barrier to participation for sedentary individuals and those who do not meet ACSM requirements for physical activity is inconvenience, lack of time for exercise, and the perception that exercise is not an enjoyable activity.

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The motivational factors contributing to a healthy lifestyle are a key component in identifying the appropriate research-based interventions for young adults. One theoretical framework that provides a multidimensional approach for examining aspects of motivation in physical activity is Eccles' expectancy-value theory of achievement motivation (Wigfield & Eccles, 2000). The expectancy-value theory can be used to explore motivation in physical education programs. Physical education in schools, colleges and universities provides students with the ideal setting to explore, learn, and connect with activities that can become lifelong modes of health promoting behavior (McKenzie, 2003; VanKim et al., 2010).

As information & Communication technology advances and young adults find different ways to remain physically active, it is important that physical education professionals adapt to the ever changing interests of their students. Video gaming has been established in our society and persons of all ages, especially children and young adults, already play on a regular basis (Gioftsidou et al., 2013; Papastergiou, 2009; Vernadakis, Zetou, Tsitskari, Giannousi, & Kioumourtzoglou, 2008). Traditionally, these games have been equally considered as sedentary as watching television (Lyons et al., 2012). However, recently the gaming world has been revolutionized by the introduction of exergaming systems such as Nintendo Wii Sports, Xbox Kinect and PlayStation EyeToy. These gaming systems offer the opportunity for players to actively play the games, requiring part or whole-body movement. Therefore, compared to traditional sedentary-style games, it seems plausible that there may be benefits in encouraging young adults to play active video games at least in terms of increasing daily energy expenditure. The potential of exergames to be used in physical education classes, settings outside of colleges and universities such as community centers, or at home, to increase physical activity levels is a recent topic of research interest. It is likely that today's young adults may be more inclined to use exergames to meet physical activity guidelines over more traditional forms of exercise is worth exploration (Papastergiou, 2009; Sell, Lillie, & Taylor, 2008; Vernadakis, Gioftsidou, Antoniou, Ioannidis, & Giannousi, 2012). Examining the motivational factors that influence young adults' participation in exergames, will hopefully provide physical education professionals with information to design effective intervention strategies for students to enjoy physical activity.

Thus, given the widespread use of exergames in our society by children and young adults, one important area of inquiry, is to examine how exergames motivate young adults of different physical abilities compared to more traditional forms of exercise. The expectancy-value theory has been validated for use in several different achievement domains; although this model has not been used to examine motivation for exergames, it provides a framework to investigate motivational constructs of exergames.

2. Review of literature

2.1. Expectancy-value theory of achievement motivation

Many researchers over the years have developed several different theories and models to help explain and identify factors that affect person's choices and participation behaviors, and ultimately, their motivation. One of these theories was developed by Eccles and her colleagues to clarify psychological and social factors that contribute to gender differences in educational and professional decisions, especially in mathematics, science and engineering fields (Eccles, 2007; Eccles et al., 1983). Within this model, the choices to engage in tasks is based on beliefs of an individual's competence regarding to that task and the subjective value or importance he or she places on successful achievement of that task. For instance, a student who believes he or she is competent in computers and/or believes that computers are interesting or potentially useful in future courses is more likely to enroll in an advanced computer class.

Expectancy-value theory of achievement motivation has been applied to a number of different settings including sport. It has been used to investigate the relationships among self-beliefs and task beliefs with activity choices and participation behaviors, and to explore the social and psychological determinants of ability perceptions and task value (Weiss & Amorose, 2008). According to the model, there are two major determinants that directly influence achievement choices and behaviors, expectancies of success and subjective task value. Expectancies of success refer to a person's competence beliefs in a particular achievement domain. The sense of how well they will do on an upcoming task reflects the person's beliefs about one's own ability and the possibility of success or failure (Xiang, McBride, Guan, & Solmon, 2003). Subjective task value, the second major determinant, refers to the importance that the person places on being successful in an achievement domain.

Eccles et al. (1983) outlined four elements of subjective task values that can influence achievement motivation: a) attainment value or importance, b) intrinsic value or interest, c) utility value or usefulness of the task, and d) cost. Attainment value is the importance of doing well in a particular/specific task. Intrinsic value is the enjoyment one gains from doing the task. Utility value or usefulness describes how a task fits into an individual's future plans. Cost refers to how the choice to engage in one activity (e.g., doing homework) limits access to other activities (e.g., play with friends), assessments of how much effort will be required to perform the activity, and its emotional cost. However, the empirical studies conducted by Eccles and colleagues have focused solely on the first three of these characteristics (Eccles, 2007; Eccles et al., 1983; Wigfield & Eccles, 2000). Cost has received less research attention (Chen & Chen, 2012); therefore, it is not examined in the present study.

Using Eccles model, educational psychology researchers have define standards on how elementary and secondary school children develop competence and value beliefs and how these change with time (Eccles & Wigfield, 2002; Jacobs, Lanza, Osgood, Eccles, & Wigfield, 2002). Among university students, researchers have predicted outcomes, such as course selections and professional decisions (Frome, Alfeld, Eccles, & Barber, 2008; Li, McCoach, Swaminathan, & Tang, 2008; Wigfield & Eccles, 2000), examined women's intentions to pursue advanced degrees (Battle & Wigfield, 2003), and examined gender differences in university students' professional decisions (Heyman, Martyna, & Bhatia, 2002). Several researchers have recently begun using this framework within physical education (Zhu & Chen, 2010). For instance, Chen and Liu (2008) reported that university students in China were motivated by intrinsic and utility values to continue attending physical education, whereas the attainment value motivates the students for self-initiated physical activity. Gao, Lee, Solmon, and Zhang (2009) mentioned that subjective task values were positive predictors of intention, as seen in high school physical education students. Additionally, Xiang, McBride, and Bruene (2006) verified that expectancy beliefs were significant predictors for student running performance and persistence in running. Finally, Zhu and Chen (2010) found that expectancy-value motivation might predict engagement and performance, but not necessarily learning achievement in physical education.

Chen, Martin, Ennis, and Sun (2008) mentioned that researchers investigating expectancy-value model constructs within the physical education settings must also be aware of how the context of the activity can change the nature of achievement and motivation. Students' enrollment in physical education may be required and motivation to perform well in the class may be driven by different factors in school than outside of school for the same activity. When identifying the content domain in which researchers are trying to assess, it is important to take into account that expectancy beliefs and task values can differ for certain tasks within the same content domain (Chen et al., 2008). In the physical education setting Xiang et al. (2003) found expectancy-related beliefs and subjective task values for the domain of physical education in general, and expectancy-related beliefs and subjective task values for the specific domain of throwing to be differentiated. The importance of examining expectancy-beliefs and task values of specific domains within the physical activity setting has led researchers to use the expectancy-value model as a framework to investigate the effectiveness of different approaches to increasing children's and young adults' physical activity levels.

2.2. Exergames and physical education

Exergames are intrinsically motivating, support collaborative learning among young players and challenge them at multiple levels of experience (Roemmich, Lambiase, McCarthy, Fedra, & Kozlowski, 2012). These attributes might explain why several youths choose exergame play over traditional exercise (Papastergiou, 2009). Enhanced motivation to participate in exergames can be viewed through an educational perspective. If physical education professionals can use exergames to enhance the motivation of their students, the opportunity to learn and promote healthy behaviors grows. Chen et al. (2008) demonstrated how increased motivation leads to effective learning. Physical education programs that have a limited amount of time with students to instruct and have them obtain the complex motor skills of the activity can benefit from the use of exergames because they can be used to challenge participants of different abilities. The social implications from children and young adults of varying abilities and genders competing and enjoying activities together can aid in creating a socially tolerant environment.

Initial research efforts have provided some evidence that individuals may be more willing to adhere to training programs that incorporate exergames as compared to traditional training programs. For instance, Brumels, Basius, Cortright, Oumedian, and Brent (2008) examined the impact of exergames on perceived difficulty and enjoyment by comparing three training programs: Konami's Dance Dance Revolution (DDR), the Wii Fit game collection including the Wii Fit Balance Board and a traditional balance training program. Participants exercised three days a week for four weeks. After the treatments a brief email survey was sent to each participant requesting their feedback on the balance training exercise programs that they participated in. The results showed that the video based games are perceived as less strenuous and more enjoyable than the traditional balance program.

In a different study, Hoffman and Nadelson (2009) explored motivational engagement during video game play in college aged adults who played a minimum of 5 h per week. A mixed-method design was used, including focus group interviews and administration of standardized questionnaires regarding motivational engagement. Engagement was described as being associated with achievement, motivation, and persistence in the involvement of a task. Participants' responses indicated that gaming was fun, socially captivating when playing with others, challenging yet relaxing, and having a positive affect associated with gaming achievements even when unsuccessful results were reported. Exergames, being a category of video game, have the potential to provide the above reported attitudes but at the same time adding a physical activity component.

Kliem and Wiemeyer (2010) compared the efficiency of traditional and exergame based balance training programs concerning mood state, self-efficacy, physical activity enjoyment, flow and subjective experience in order to evaluate the psychological effects of the interventions. Participants were randomly assigned to two experimental groups: one group underwent a traditional training program, while the other group trained using the Nintendo Wii Fit Balance Board. Between pre and post-test procedures, training sessions were performed three times a week for three weeks. The results from the psychological questionnaires revealed neither significant pre-post effects nor differences between the groups for pre and post-test measurements.

In another study, Vernadakis, Derri, Tsitskari, and Antoniou (2014) explored the effect of an Xbox Kinect intervention to previous injured young competitive athletes' balance, enjoyment and compliance compared to a traditional approach. Participants were randomly divided into two experimental groups: one group received Xbox Kinect training and one group received physical therapy training. Intervention involved a 24 min session, twice weekly for 10 weeks. The results suggest that the use of the Xbox Kinect intervention is a valuable, feasible and pleasant approach in order to improve balance ability of previous injured young competitive male athletes compared to the traditional approach.

Penko and Barkley (2010) compared motivation to play an exergame (Nintendo Wii Sports Boxing) to a sedentary video game alternative where the user tends to sit in 8–12 year old children. Twenty-four children rated how much they liked the game by pointing to a visual scale, and researchers found that the exergame rated significantly higher than the sedentary alternative. In addition, the researchers assessed motivation by using a previously tested tool where children were given the option to work for playtime. Participants could choose to complete increasingly difficult tasks using two different computer screens: one associated with an exergame, or one associated with a sedentary game. The results revealed significantly greater reinforcement for the exergame in lean children whereas the exergame was equally as reinforcing as the sedentary game in obese children.

Finally, Gao (2012), examined the relationships between students' mastery experiences, situational motivation, and physical activity levels in DDR. One hundred and ninety-five high school students participated in a 2-week DDR unit. Participants' physical activity levels and situational motivation were measured for 3 classes. Results indicated that students were motivated to play DDR, but their moderate-to-vigorous physical activity was low. In addition, students with successful mastery experiences had significantly higher situational motivation and moderate-to-vigorous physical activity. Although students were motivated for DDR, they were not physically active in DDR. Furthermore, successful mastery experience played an important role in students' motivation and physical activity levels in DDR.

Considering the above research effort, it seems worthwhile to examine how exergames motivate children and young adults of different physical abilities compared to more traditional forms of activity. Although the expectancy-value theory model has not been used to examine motivation for exergames, it provides a framework to investigate their motivational constructs and has been validated for use in several different achievement domains. Therefore, the purpose of this study was to use the Eccles' expectancy-value model of choice as a framework

to examine university students' ability-expectancy beliefs and subjective task values in exergaming systems compare to those in physical education activities. Given the widespread use of exergames in our society and the familiarity of these systems with children and young adults, it seems worthwhile to explore the feasibility of using exergames in physical education to promote physical activity. This study will provide a sound theoretical examination of young adults' motivation to participate in exergames. The results of this study may help physical education professionals and health promoters develop curriculums and strategies that are effective in providing interesting, challenging, useful, and safe opportunities for young adults of all ability levels. The study looked into the following main research hypotheses:

- (1) University students' expectancy-related beliefs (beliefs about ability, expectancies for success), task values (importance, interest, usefulness), and intentions would be positively related in both physical education and exergames domains.
- (2) Expectancy-related beliefs (beliefs about ability, expectancies for success), task values (importance, interest, usefulness), and intentions would be distinct between the domains of physical education and exergames.
- (3) Expectancy-related beliefs (beliefs about ability, expectancies for success), task values (importance, interest, usefulness), and intentions would be higher for exergames than for physical education.
- (4) University students who are active would have higher expectancy-related beliefs (beliefs about ability, expectancies for success), task values (importance, interest, usefulness) and intentions in physical education than inactive university students.
- (5) There would be no differences in expectancy-related beliefs (beliefs about ability, expectancies for success), task values (importance, interest, usefulness) and intentions between active and inactive university students on exergames.

3. Methods

3.1. Participants

This research involved two hundred and thirty two ($n = 232$) first-year undergraduate students of the Democritus University of Thrace (DUTH). Their age ranged from 18 to 20 years old ($M = 18.85$, $SD = .63$), while 122 of them were male (53.1%) and 110 were female (46.9%). The study population included students from various programs enrolled in every class section of 218 – New Technology in Physical Education course offered in spring semester of the academic year 2011–2012. Participants were included if they had played an exergame such as Nintendo Wii Tennis independently or in a group setting for a period of at least 3 h in the past 12 months. The sampling frame used for this study was self-selected sampling. A total of 267 study-eligible students were approached and 232 completed the study questionnaires, resulting in a response rate of 87%. Attrition in the sample was due primarily to students refused to take part in the study (8.2%), student absences during the data collection periods (3.3%) and students moving away from DUTH (1.5%). The public university setting (DUTH) was chosen for two reasons. First, this population represents young adults from a wide range of different family income levels. Second, the university setting includes young adults who had both high and low value for sport and physical activity, as well as varying levels of fitness. After obtaining permission from the Institutional Review Board of the University, participants were informed about the purpose of the study and the obligations for participation in the experiment. Each student was asked to give consent to participation in the study. Students were informed that participation was voluntary and would have no impact on their grades.

3.2. Instrumentation

3.2.1. Expectancy-related beliefs and task values instrument

A survey was used to evaluate the participants' expectancy-related beliefs and task values for the domains of physical education (PE) and exergames (EXGs). The questionnaire originally developed by Eccles et al. (1983) and was modified by Xiang et al. (2003) to address the domain specific questions for PE and EXGs. All items were answered using a 5-point Likert-type scale. The first section of the survey included questions relative with the participants' demographic information, such as: age, gender and academic year. Subsequent sections measured beliefs about ability, expectancies for success, components of value (importance, interest, usefulness), and intention for future participation. For the beliefs about ability section, participants rated their general ability in PE and EXGs by responding to three questions. In the expectancies for success section, two questions were used to assess expectancies. Furthermore, in the components of value section, two questions addressed the component of attainment value or importance, two questions assessed the component of intrinsic or interest value and once again, two questions were used to assess the component of utility value or usefulness. Finally, in the intention for future participation section, a single item was used to measure participants' intention to engage in PE and EXGs in the future (see Appendix).

Previous administrations of this questionnaire have showed excellent psychometric properties, including good internal consistency and validity (Eccles et al., 1983; Xiang et al., 2003). In the present study, the internal consistency estimates of reliability were calculated for each variable of the expectancy-related beliefs and task values instrument. For the domain of PE the "Beliefs about ability" factor had an $\alpha = .86$, the "Expectancies for success" had an $\alpha = .72$, the "Importance" factor had an $\alpha = .79$, the "Interest" factor had an $\alpha = .85$, and the "Usefulness" factor had an $\alpha = .80$. For the domain of EXGs the "Beliefs about ability" factor had an $\alpha = .76$, the "Expectancies for success" had an $\alpha = .78$, the "Importance" factor had an $\alpha = .86$, the "Interest" factor had an $\alpha = .87$, and the "Usefulness" factor had an $\alpha = .77$. Reliability coefficients for all variables exceeded .76, except for expectancies for success in PE. According to Green and Salkind (2007), the reliability coefficient should be at least .70 for an instrument to be considered reliable. Thus, the determination was made that the expectancy-related beliefs and task values scale was a reliable measuring instrument.

3.2.2. Physical activity instrument

Physical activity levels were measured through self-report using Godin's Leisure-Time Exercise Questionnaire (GLTEQ) (Godin & Shepard, 1985). The GLTEQ has been shown reliable for measuring physical activity among young adults (Karvinen et al., 2007; Van Hoecke et al., 2012) and it has been successfully employed with different populations in Western societies (Karvinen et al., 2007; Rhodes & Pfaeffli, 2010).

The GLTEQ assesses physical activity habits over a seven day period and asks individuals to report the days per week they participate in: a. strenuous exercise (heart beats rapidly), such as running, jogging, etc., b. moderate exercise (not exhausting), such as fast walking, baseball etc., and c. mild exercise (minimal effort), such as yoga, bowling, etc., for at least 15 min. A metabolic equivalent score (MET) was calculated by weighing the frequency of exercise bouts reported for each intensity and summing for a total score by using the following formula: $3(\text{mild}) + 5(\text{moderate}) + 9(\text{strenuous})$.

An additional question is asked to determine the frequency of physical activity during a typical week and to cross check with the total physical activity score reported. The frequency question with responses is as follows: "During a typical 7-Day period (a week), in your leisure time, how often (often, sometimes and never/rarely) do you engage in any regular activity long enough to work up a sweat (heart beats rapidly)?"

3.3. Procedure

Data for this research was collected on two consecutive days to include the entire first-year undergraduate students' population using online questionnaires. Every participant present on these two consecutive days completed the questionnaire in order to maintain the validity and focus of the students during the administration and completion of the questionnaires. Participants were instructed to answer as truthfully as they could and to ask questions if they had difficulty understanding instructions or items in the questionnaires. The researchers began each 30 min testing session by administering the first and the second part of the expectancy-related beliefs and task values questionnaire which included the demographic information and expectancy-related beliefs and task values for physical education. The researchers then proceeded to give a brief power point presentation defining exergames through explanation of visual examples of persons participating in a number of popular EXGs. Directly after the presentation, the third part of the questionnaire, which included expectancy-related beliefs and task values for EXGs, was administered. Lastly, the GLTEQ was administered in order to assess the level of students' physical activity. Participants completed each questionnaire in a section-by-section manner, that is, after the completion of one section, the participant was asked to click a next button to go to the next section, until all sections were completed. After completion of the entire questionnaire, the participant clicked on a submit button, which sent the completed questionnaire to a secure server accessible only by the researchers.

3.4. Data analysis

Normality of distribution was tested with the Kolmogorov–Smirnov test. Homogeneity of variance and Sphericity was verified by the Box's M test, the Levene's test and the Mauchly's test (Green & Salkind, 2007). Pearson correlation coefficients were calculated to identify significant relationships between expectancy-related beliefs, task values, intention for future participation in both PE and EXGs, and self-reported physical activity levels. A series of two-way analyses of variance (ANOVAs) with repeated measures were conducted to evaluate the effect of activity level and type of activity on expectancy-related beliefs, task values, and intentions. The dependent variables were expectancy-related beliefs (ability and expectancies for success), task values (importance, interest, and usefulness), and intentions. The within-individuals factors were activity level groups with two levels (active, inactive) and type of activity with two levels (PE, EXGs). The activity level \times type of activity interaction effect, as well as the activity level and type of activity main effect were tested using the multivariate criterion of Wilks's lambda (λ). Significant differences between the means scores were tested at the 0.05 alpha level. An effect size was computed for each analysis using the eta-squared statistic (η^2) to assess the practical significance of findings. Cohen's guidelines were used to interpret η^2 effect size: 0.01 = small, 0.06 = medium and 0.14 = large (Cohen, 1988).

4. Results

The GLTEQ was used to estimate leisure-time physical activity levels. A score of 24 METS or above is recommended as the point at which a person should be considered active enough to meet recommended public health guidelines (Godin, 2011). This cutoff value was derived based upon the work of several researchers (Gaston, Cramp, & Prapavessis, 2012; Godin, 2011; Paffenbarger, Wing, & Hyde, 1978). According to Godin (2011), this value of METS is equivalent to a weekly energy expenditure of 1400 kcals. An energy expenditure of 1.400 kcals or more per week is associated with a reduced risk of heart disease (Paffenbarger et al., 1978). Based on this criterion, we created a dichotomous variable for GLTEQ: active or inactive. Thus, participants in the current study were characterized as "active" ($n = 114$) if they had activity score of 24 METS or above and "inactive" ($n = 118$) if their activity score fell below the current recommendations (GLTEQ score < 24). Active participants had a mean GLTEQ score of 35.37 ($SD = 16.74$) while inactive participants had a mean GLTEQ score of 10.29 ($SD = 5.13$). Table 1 shows the means and the standard deviations for the PE and EXGs scores of active and inactive groups on expectancy-related beliefs, task values, and intentions.

4.1. Relationships among variables

Pearson correlation coefficients were calculated to evaluate the first hypothesis that university students' expectancy-related beliefs (beliefs about ability, expectancies for success), task values (importance, interest, usefulness), and intentions would be positively related in both PE and EXGs domains and the second hypothesis that these expectancy-related beliefs, task values, and intentions would be distinct between the domains of PE and EXGs. The results of the correlational analyses presented in Table 2 show that 42 out of the 78 correlations were statistically significant and were greater than or equal to .23. Examination of the correlations revealed that expectancy-related beliefs and task values were domain specific, supporting the second hypothesis. For the domain of PE, expectancy-related beliefs and task values had a pattern of positive correlations, and were related to intentions of students to take physical education in the future. For the domain of EXGs, the correlations of expectancy-related beliefs and task values were positive significant, and were related to intentions of students to play exergames in the future. However, expectancies and values across PE and EXGs were unrelated. These results support the first hypothesis.

Table 1
Means and standard deviations for PE and EXGs scores of the active and inactive groups on expectancy-related beliefs, task values, and intentions.

Measurements	PE		EXGs	
	Active (N = 114)	Inactive (N = 118)	Active (N = 114)	Inactive (N = 118)
Beliefs about ability	4.2 ± 86	3.5 ± 78	3.9 ± 83	3.8 ± 62
Expectancies for success	4.3 ± 83	3.8 ± 94	4.2 ± 83	4.0 ± 87
Attainment value or importance	3.7 ± 1.2	3.2 ± 99	2.6 ± 1.2	2.5 ± 99
Intrinsic or interest value	4.3 ± 86	3.7 ± 92	3.9 ± 1.1	4 ± 86
Utility value or usefulness	3.6 ± 95	3.1 ± 1.1	3 ± 1	2.8 ± 99
Intention for future participation	4.1 ± 1.2	3.3 ± 1.3	3.6 ± 1.1	3.7 ± 95

Data are presented as the mean ± SD.

Although, there were small positive correlations between self-reported physical activity and expectancy-related beliefs and task values in PE, these relationships for the domain of EXGs were not significant. The only exception was a small positive relationship between usefulness of EXGs and self-reported physical activity as were quantified in METs.

4.2. Expectancy-related beliefs comparison

Two-way analysis of variance (ANOVA) with repeated measures was conducted to evaluate the third hypothesis that beliefs about ability would be higher for EXGs than for PE. Moreover, follow-up tests were performed to determine the four and five hypotheses that active students would have higher ability beliefs in PE than inactive students, but there would be no differences in beliefs about ability, for future participation between active and inactive students on EXGs. The beliefs about ability comparison showed a significant main effect for the Activity level, $F(1, 230) = 14.81, p < 0.001$, partial $\eta^2 = 0.063$ but not for the Type of activity, $\lambda = 0.99, F(1, 230) = 0.56, p = 0.456$, partial $\eta^2 = 0.003$, while the Activity level × Type of activity interaction effect was also significant, $\lambda = 0.83, F(1, 230) = 45.18, p < 0.001$, partial $\eta^2 = 0.169$. Analyzing the interaction for each level of the independent variable, a significant effect of repeated factor Type of activity was only found in the PE domain, $F(1, 230) = 37.41, p < 0.001$, partial $\eta^2 = 0.144$ and not for the domain of EXGs, $F(1, 230) = 1.187, p = 0.277$, partial $\eta^2 = 0.005$. Pairwise comparisons using *t*-test with a Bonferroni adjustment revealed significant mean differences in the beliefs about ability scores between active and inactive students in PE. As shown in Fig. 1, the active students had higher ability beliefs in PE than inactive students, but those differences were not evident in their ability beliefs about EXGs, supporting the fourth and fifth hypotheses. Overall, the beliefs about ability scores were similar for both PE and EXGs, counter to the third hypothesis.

Two-way analysis of variance (ANOVA) with repeated measures was conducted to evaluate the third hypothesis that expectancies for success would be higher for EXGs than for PE. Moreover, follow-up tests were performed to determine the four and five hypotheses that active students would have higher expectancies for success in PE than inactive students, but there would be no differences in expectancies for success, for future participation between active and inactive students on EXGs. The expectancies for success comparison showed a significant main effect for the Activity level, $F(1, 230) = 8.70, p < 0.05$, partial $\eta^2 = 0.038$ but not for the Type of activity, $\lambda = 0.98, F(1, 230) = 0.85, p = 0.358$, partial $\eta^2 = 0.004$, while the Activity level × Type of activity interaction effect was also significant, $\lambda = 0.91, F(1, 230) = 21.18, p < 0.001$, partial $\eta^2 = 0.087$. Analyzing the interaction for each level of the independent variable, a significant effect of repeated factor Type of activity was only found in the PE domain, $F(1, 230) = 18.60, p < 0.001$, partial $\eta^2 = 0.077$ and not for the domain of EXGs, $F(1, 230) = 2.196, p = 0.140$, partial $\eta^2 = 0.010$. Pairwise comparisons using *t*-test with a Bonferroni adjustment revealed significant mean differences in the expectancies for success scores between active and inactive students in PE. As shown in Fig. 2, the active students had higher expectancies for success in PE than inactive students, but those differences were not evident in their expectancies for success about EXGs, supporting the fourth and fifth hypotheses. Overall, the expectancies for success scores were similar for both PE and EXGs, counter to the third hypothesis.

4.3. Subjective task values comparison

Two-way analysis of variance (ANOVA) with repeated measures was conducted to evaluate the third hypothesis that importance value would be higher for EXGs than for PE. Moreover, follow-up tests were performed to determine the four and five hypotheses that active

Table 2
Correlations among expectancy-related beliefs, task values, intentions, and physical activity levels for PE and EXGs.

	Ability (PE)	Expectancies (PE)	Importance (PE)	Interest (PE)	Usefulness (PE)	Intent (PE)	Ability (EXGs)	Expectancies (EXGs)	Importance (EXGs)	Interest (EXGs)	Usefulness (EXGs)	Intent (EXGs)
Expectancies (PE)	.575**											
Importance (PE)	.590**	.508**										
Interest (PE)	.596**	.605**	.610**									
Usefulness (PE)	.480**	.447**	.594**	.587**								
Intent (PE)	.487**	.331**	.435**	.507**	.483**							
Ability (EXGs)	.204	.301**	.117	.168	.053	.044						
Expectancies (EXGs)	.203	.206	.091	.175	.032	-.133	.458**					
Importance (EXGs)	.031	.082	.249*	.094	.127	-.192	.305**	.417**				
Interest (EXGs)	.029	.139	.058	.101	-.062	-.189	.526**	.562**	.360**			
Usefulness (EXGs)	.178	.191	.327**	.237*	.233*	-.076	.360**	.520**	.619**	.528**		
Intent (EXGs)	.085	.091	.074	.123	.066	-.125	.447**	.521**	.473**	.632**	.533**	
Physical activity	.416**	.268*	.352**	.323**	.343**	.289**	.122	.119	.126	-.028	.303**	.066

** $p < 0.01$, * $p < 0.05$.

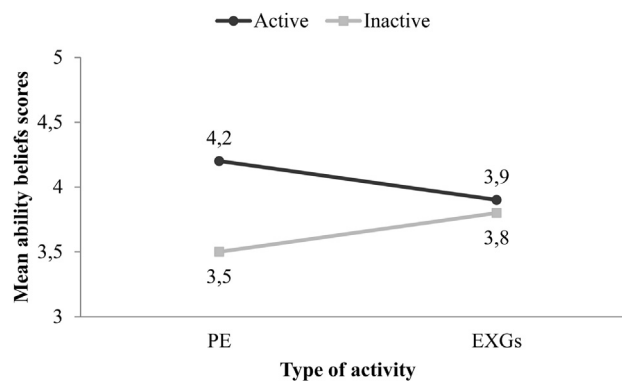


Fig. 1. The effect of activity level and type of activity on beliefs about ability.

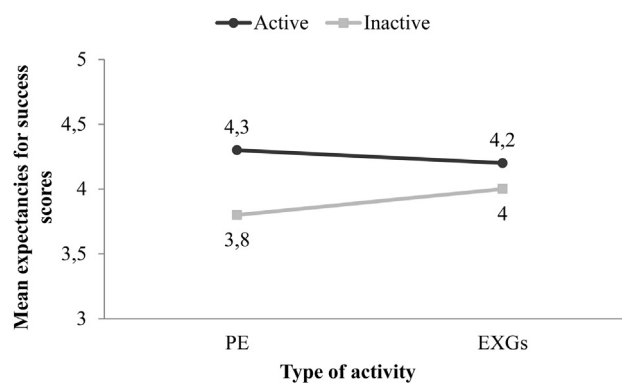


Fig. 2. The effect of activity level and type of activity on expectancies for success.

students would have higher importance value in PE than inactive students, but there would be no differences in importance value, for future participation between active and inactive students on EXGs. The importance comparison showed a significant main effect for the Activity level, $F(1, 230) = 9.02, p < 0.05$, partial $\eta^2 = 0.039$ and for the Type of activity, $\lambda = 0.37, F(1, 230) = 378.37, p < 0.001$, partial $\eta^2 = 0.630$, while the Activity level \times Type of activity interaction effect was also significant, $\lambda = 0.93, F(1, 230) = 17.37, p < 0.001$, partial $\eta^2 = 0.073$. Analyzing the interaction for each level of the independent variable, a significant effect of repeated factor Type of activity was only found in the PE domain, $F(1, 230) = 20.30, p < 0.001$, partial $\eta^2 = 0.084$ and not for the domain of EXGs, $F(1, 230) = 1.168, p = 0.281$, partial $\eta^2 = 0.005$. Pairwise comparisons using t -test with a Bonferroni adjustment revealed significant mean differences in the importance scores between active and inactive students in PE. As shown in Fig. 3, the active students had higher importance to PE than inactive students, but those differences were not evident in their importance about EXGs, supporting the fourth and fifth hypotheses. Overall, the importance scores were higher for PE than for EXGs, counter to the third hypothesis.

Two-way analysis of variance (ANOVA) with repeated measures was conducted to evaluate the third hypothesis that interest value would be higher for EXGs than for PE. Moreover, follow-up tests were performed to determine the four and five hypotheses that active students would have higher interest value in PE than inactive students, but there would be no differences in interest value, for future participation between active and inactive students on EXGs. The interest comparison showed a significant main effect for the Activity level, $F(1, 230) = 4.63, p < 0.05$, partial $\eta^2 = 0.020$ but not for the Type of activity, $\lambda = 0.97, F(1, 230) = 1.60, p = 0.208$, partial $\eta^2 = 0.007$, while the

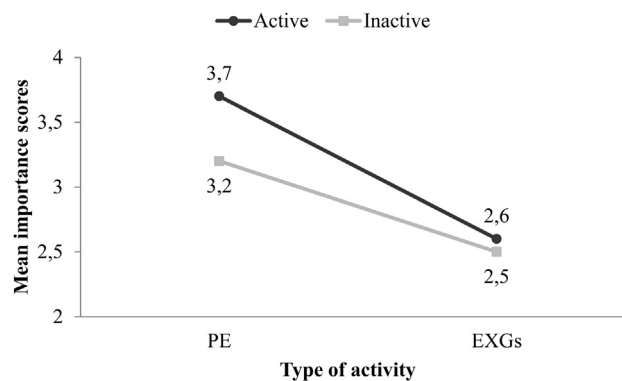


Fig. 3. The effect of activity level and type of activity on importance.

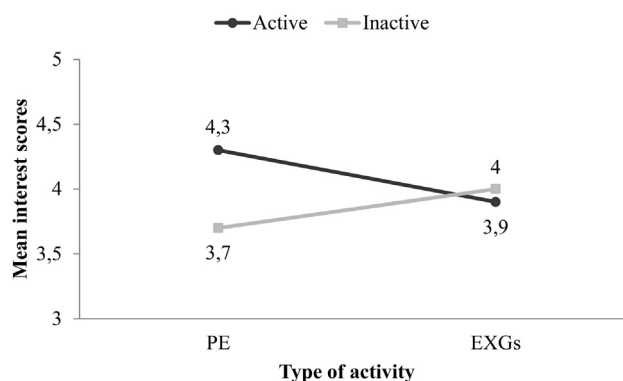


Fig. 4. The effect of activity level and type of activity on interest.

Activity level \times Type of activity interaction effect was also significant, $\lambda = 0.79$, $F(1, 230) = 57.50$, $p < 0.001$, partial $\eta^2 = 0.206$. Analyzing the interaction for each level of the independent variable, a significant effect of repeated factor Type of activity was only found in the PE domain, $F(1, 230) = 33.23$, $p < 0.001$, partial $\eta^2 = 0.130$ and not for the domain of EXGs, $F(1, 230) = 0.776$, $p = 0.379$, partial $\eta^2 = 0.003$. Pairwise comparisons using t -test with a Bonferroni adjustment revealed significant mean differences in the interest scores between active and inactive students in PE. As shown in Fig. 4, the active students had higher level of interest in PE than inactive students, but the interest levels of both groups on EXGs was similar, supporting the fourth and fifth hypotheses. Overall, the interest scores were similar for both PE and EXGs, counter to the third hypothesis.

Two-way analysis of variance (ANOVA) with repeated measures was conducted to evaluate the third hypothesis that usefulness value would be higher for EXGs than for PE. Moreover, follow-up tests were performed to determine the four and five hypotheses that active students would have higher usefulness value in PE than inactive students, but there would be no differences in usefulness value, for future participation between active and inactive students on EXGs. The usefulness comparison showed a significant main effect for the Activity level, $F(1, 230) = 8.59$, $p < 0.05$, partial $\eta^2 = 0.037$ and for the Type of activity, $\lambda = 0.76$, $F(1, 230) = 69.22$, $p < 0.001$, partial $\eta^2 = 0.238$, while the Activity level \times Type of activity interaction effect was also significant, $\lambda = 0.96$, $F(1, 230) = 10.24$, $p < 0.05$, partial $\eta^2 = 0.044$. Analyzing the interaction for each level of the independent variable, a significant effect of repeated factor Type of activity was only found in the PE domain, $F(1, 230) = 15.38$, $p < 0.001$, partial $\eta^2 = 0.065$ and not for the domain of EXGs, $F(1, 230) = 2.196$, $p = 0.140$, partial $\eta^2 = 0.010$. Pairwise comparisons using t -test with a Bonferroni adjustment revealed significant mean differences in the usefulness scores between active and inactive students in PE. As shown in Fig. 5, the active students had higher level of interest in PE than inactive students, but those differences were not evident in their usefulness about EXGs, supporting the fourth and fifth hypotheses. Overall, the usefulness scores were higher for PE than for EXGs, counter to the third hypothesis.

4.4. Intention for future participation comparison

Two-way analysis of variance (ANOVA) with repeated measures was conducted to evaluate the third hypothesis that intention would be higher for EXGs than for PE. Moreover, follow-up tests were performed to determine the four and five hypotheses that active students would have higher intention in PE than inactive students, but there would be no differences in intention, for future participation between active and inactive students on EXGs. The intention comparison showed a significant main effect for the Activity level, $F(1, 230) = 5.70$, $p < 0.001$, partial $\eta^2 = 0.025$ but not for the Type of activity, $\lambda = 0.96$, $F(1, 230) = 2.02$, $p = 0.157$, partial $\eta^2 = 0.009$, while the Activity level \times Type of activity interaction effect was also significant, $\lambda = 0.69$, $F(1, 230) = 98.89$, $p < 0.001$, partial $\eta^2 = 0.308$. Analyzing the interaction for each level of the independent variable, a significant effect of repeated factor Type of activity was only found in the PE domain, $F(1, 230) = 24.74$, $p < 0.001$, partial $\eta^2 = 0.100$ and not for the domain of EXGs, $F(1, 230) = 1.014$, $p = 0.315$, partial $\eta^2 = 0.005$. Pairwise comparisons using t -test with a Bonferroni adjustment revealed significant mean differences in the intention scores between active and inactive students in PE. As

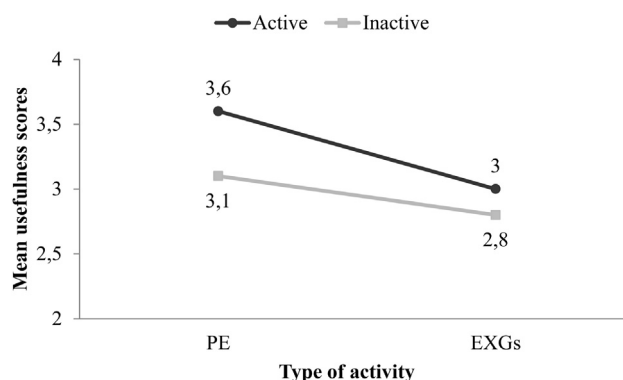


Fig. 5. The effect of activity level and type of activity on usefulness.

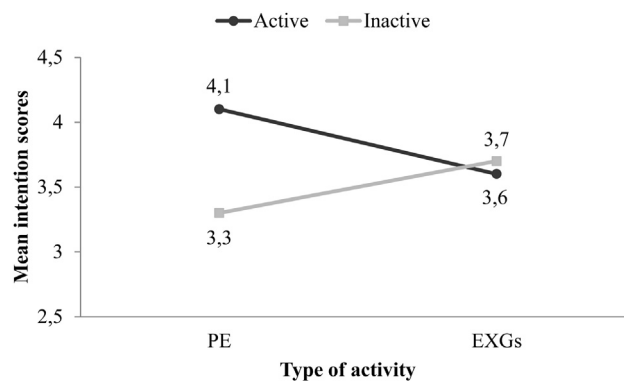


Fig. 6. The effect of activity level and type of activity on intention for future participation.

shown in Fig. 6, the active students had higher level of intention in PE than inactive students, but the intention levels of both groups on EXGs was similar, supporting the fourth and fifth hypotheses. Overall, the intention scores were similar for both PE and EXGs, counter to the third hypothesis.

5. Discussion

The purpose of this study was to examine how EXGs motivate university students of different physical abilities compared to more traditional forms of activity. The theoretical framework in the expectancy-value model of achievement choices and behaviors proposed by Eccles et al. (1983), served as the bases for analyzing the participants' motivation. Results indicated that expectancy-related beliefs and task values are positively correlated and both constructs are correlated to intention to participate in the future for the PE and the EXGs fields. Expectancy-related beliefs, task values, and intentions across fields, however, were not correlated supporting the hypothesis that EXGs represent a distinct field from traditional PE activities. PE was considered as more important and more useful than EXGs, nevertheless inactive students found EXGs to be more interesting than PE activities. In addition inactive students had higher beliefs about ability and higher intention for future participation in EXGs activities were compared to those of PE.

In particular, the study was guided by five related research hypotheses. The first research hypothesis, that expectancy-related beliefs and subjective task values would be positively related within the domains of PE and EXGs was supported. The pattern of relationships between expectancy-related beliefs and subjective task values was similar for both the domains of PE and EXGs. Consistent with expectancy-value research studies in the literature the results of this study demonstrated positive correlations between expectancy-related beliefs and subjective task values (Gao et al., 2009; Jacobs et al., 2002). This means that the participants of this study tended to attach more value to activities in which they had done well and believed they were skillful. Furthermore, expectancy-related beliefs and subjective task values were also positively associated with intention for future participation in both the domain of PE as well as the domain of EXGs. The positive relationship suggests that, expectancy-related beliefs and subjective task values are important predictors of students' intention to engage in PE and EXGs activities in the future. According to Chen et al. (2008), students' expectancy-related beliefs and subjective task values in PE can be affected by the specific content being taught. In addition, Xiang et al. (2003) also argued that even within a specific content PE students can have different expectancy-related beliefs and subjective task values for specific activities or skills such as throwing. Overall, these findings were fairly consistent with other studies in the literature which seem to indicate that students with higher expectancy-related beliefs had higher domain specific subjective task values for both PE and EXGs, and higher expectancy-related beliefs and subjective task values were associated with future intentions to participate (Gao et al., 2009; Jacobs et al., 2002; Xiang et al., 2003, 2006).

Regarding the second research hypothesis, the absence of correlations between expectancy-related beliefs and subjective task values in PE and expectancy-related beliefs and subjective task values in EXGs supports the expectation that EXGs are a separate and distinct domain from traditional PE activities. As Chen et al. (2008) pointed out, researchers investigating expectancy-value model constructs within the physical education settings must also be aware of how the context of the activity can change the nature of achievement and motivation. Therefore, when identifying the content domain in which researchers are trying to assess, it is important to know that expectancy-related beliefs and subjective task values can differ for certain tasks within the same content domain.

The third research hypothesis, that expectancy-related beliefs and subjective task values for EXGs would be higher than those for PE, was not supported. Students' beliefs about ability and expectancies for success did not differ across the domains of PE and EXGs. It was surprising that expectancies for success were similar for both the domains of PE and EXGs, and this was a finding that needs further investigation. A possible explanation could be that success in PE is defined in terms of grades, which are often associated more to compliance than to performance based measures. Conversely, success in EXGs may be more normative and based on experience, ability, and performance. It is possible that participants' degree of familiarity promoted greater relaxation, less playing anxiety, and an improved ability to concentrate and successfully engage in the EXGs activities. Overall, increased concentration and engagement may increase playing time at a relatively higher level of difficulty that would potentially influence that expectancy-related beliefs and subjective task values. Ryan, Williams, Patrick, and Deci (2009) suggested that many people engage in physical activities not because they find the activities are inherently interesting and enjoyable (intrinsic motivation), but because they have something to gain (extrinsic motivation) by it. In the physical education context, this may include health benefits, appearance, or good grades. Therefore, Ryan et al. (2009) mentioned that extrinsic motivation is extremely important in the domain of activities which are physical in nature.

Although it was assumed that EXGs would have higher subjective task values than PE, PE was considered as more important and more useful than EXGs. This was unexpected, since the important and the useful task values have been found to be associated with intention for

future participation in sport and physical activity among young adults (Cox & Whaley, 2004; Gao et al., 2009; Xiang et al., 2003, 2006). The plausible reason might be that participants perceived EXGs in general as purely entertaining or pleasurable, and did not recognize EXGs as important or useful in contributing to their overall fitness or health benefits. Regarding the interest values and the intention for future participation levels there were no overall differences between the domains of PE and EXGs. The fact that these students found PE to be more important and useful than EXGs were encouraging. However, it was unfortunate that the values associated with PE did not translate to stronger intention for future participation. Previous research study indicated that subjective task values are important determinants of task choice, intention for future participation, and of effort and persistence (Cox & Whaley, 2004; Gao et al., 2009; Xiang et al., 2003, 2006). However, Chen and Liu (2008) reported that university students in China were motivated by interest and useful task values to continue attending physical education, whereas the important value motivates the students for self-initiated physical activity. The result of this study showed that knowing the importance and usefulness was a key motivator for traditional forms of physical activity. So researchers would naturally conclude that PE should be focused on revealing the importance of physical activity to health in order to motivate students to learn in physical education. Nevertheless, these task values might not be effective motivators in physical education, because the students were likely to have known the importance and usefulness as early as elementary and high school years. Instead, they were attracted to physical education by interest in the content. This trouble causes researchers to think about how the content, that is important and useful to health, can be taught in ways perceived as interesting by students. Further research is needed to address this challenging issue by including content-specific characteristics in motivation research.

Physical activity levels were the focus of the four and five hypotheses. Examining how expectancy-related beliefs, subjective task values, and intentions for future participation vary by self-reported activity level, provided valuable insight. It was assumed that active students would have higher expectancy-related beliefs, subjective task values and intentions for future participation in PE than inactive students, but there would be no differences in expectancy-related beliefs, subjective task values and intentions for future participation between active and inactive students on EXGs. In this sense, the results gave support to the above hypothesis since active students had higher expectancy-related beliefs, subjective task values, and intention levels than less active students in PE, but expectancy-related beliefs, subjective task values, and intention levels for those groups were similar on EXGs. This finding was fairly consistent with the study of Warburton et al. (2009), which seem to suggest that exergames also were a good tool to involve physical inactive young adults to start a more active lifestyle. A possible explanation of the results might be that inactive students were more familiar and felt more comfortable and confident with the physical activities supported by the exergames than with the physical activities of a typical physical education program. Thus, inactive students in the EXGs domain were relatively more positive in their expectancy-related beliefs, subjective task values, and intentions for future participation than inactive students in the PE domain. Another possible explanation could be that exergames may provide more mental stimulation and challenge for inactive participants, since due to their nature, they may be considered as unstructured physical activity. Therefore, the inactive young adults may have not perceived themselves to be participating in physical activity when they were playing the exergames.

Evaluating the outcomes of the present research study, the following limitations should be taken into account in efforts to generalize these results. First, this study assessed students' physical activity using self-report measures. Researchers have advocated the usage of objective methods, such as accelerometers and pedometers to strengthen the measurement reliability and validity (Shephard, 2003). However, Nader, Bradley, Houts, McRitchie, and O'Brien (2008) noted that assessments of physical activity were often higher when self-report activity measures were used as compared with objective measures. Second, the available commercial games and exergaming systems, even though they encourage improvements in balance, strength, and fitness, they still remain entertainment systems designed for healthy people that offer a gaming experience that differs from the practice needed by people with physical inactivity. Video game companies may need to design more specific games to complement physical activity that are focused on the needs of the user. Finally, the sample population of the study was a further limitation. The data in this study was collected from a limited population in the Democritus University of Thrace who state that they are familiar with exergames. It is possible that participants have a working knowledge of the physical and psychological demands required of game play that potentially influenced their expectancy-related beliefs, subjective task values and intentions for future participation. Transference of this data to other regions or population groups may not have been valid.

Despite these limitations, the results of this study have clear implications for researchers and practitioners who may wish to implement interventions in physical education. First, as this study has shown, university students are motivated to engage in activities and achieve success when they believe they can accomplish the activities. Physical educators can and should help students maintain relatively accurate but high expectancy beliefs, and help them avoid an illusion of incompetence. To achieve this, physical education professionals should help students achieve success by keeping tasks at a relatively challenging but reasonable level of difficulty, providing precise and prompt feedback, and using models to provide vicarious experiences. Thus, an alternative to the typical PE instruction could be the integration of the exergames in the educational process by allowing students of different abilities to achieve a sense of success and establish and maintain positive ability perceptions.

Second, it is critical that physical educators emphasize the values of sport and physical education. Physical education professionals can make the activities meaningful, and positively reinforce task completion in order to help students become more personally invested in the activities. To foster students' interest, physical education professionals could integrate exergames in the educational process by providing students with opportunities to engage in intriguing, personally relevant, and challenging activities through the game play. This approach will help students from a large variety of skill levels and backgrounds be actively engaged in sport and physical education.

Third, due to the physical activity level stereotypes in sport and physical education, it is possible that physical educators can reduce the influence of these stereotypical views by creating a learning environment that integrates exergames. This environment should probably meet the needs of all students and provide learning activities that are enjoyable and interesting to motivate students of different physical activity levels. Using exergames in the educational process might overcome demotivating effects and physical discomfort among the different physical activity's groups. With these efforts to challenge the traditional dominant stereotypical views, young adults can be convinced that participating in a broad range of sport and physical activities regularly is important and meaningful.

Finally, EXGs offer unique advantages as they have the potential to overcome many of the perceived barriers to physical activity. The literature shows that there are a number of factors that young adults perceive as barriers to being physically active (Kahn et al., 2008; Papastergiou, 2009; VanKim et al., 2010). This could perhaps be due to lack of young adults knowledge about the health risks associated

with sedentary behavior. The amount of physical activity that children participate in is influenced by the environment, the lack of time for exercise, and the perception that exercise is not an enjoyable activity (Kahn et al., 2008; VanKim et al., 2010). Environmental issues include neighborhood safety, suburb designs and the weather. The advantages of active video games are that they can be played indoors and irrespective of weather conditions, they are safe to play and they can be played individually or with others. Therefore, EXGs can be a convenient activity that may provide a means to practice physical activity in familiar surroundings to young adults with low self-confidence.

6. Conclusion

Based on the research and the analysis of the data, this study provide support for the belief that EXGs could be incorporated into physical education and community recreation programs in order to attract young adults who are not currently active. These findings suggest EXGs could be a useful educational tool in efforts to equalize the playing field so that all students believe they can participate and be successful in sport and physical education. Creating a success oriented climate in the educational process can lead to enhanced motivation. Additionally, inactive students expressed higher levels of interest in EXGs as compared to physical education. Chen and Liu (2008) suggest that developing student interest is an important component in promoting motivation in physical education, and these data suggest that using EXGs is one way that physical education professionals could increase student interest for students who are at risk for physical inactivity. As students motivation in physical education is increased this can lead to effective learning, which is the ultimate goal of any educator. Hence, physical education programs that have a limited amount of time with students to teach and have them acquire the complex motor skills of the activity can benefit from the use of EXGs because they can be used to challenge participants of varying abilities. The social implications from young adults of different abilities competing and enjoying activities together can aid in creating a socially tolerant environment.

Future research can extend this study in various ways. First, a longitudinal study can be conducted to determine if the effect of incorporating exergames in PE programs on participants' physical activity expectancy beliefs and task values last up to six months or one year after the intervention. Second, future research can also evaluate the effectiveness of different types of exergames, such as fitness, adventure, and dance-based games. Finally, in comparing the physical activity expectancy beliefs and task values across different age groups, future studies should attempt to compare groups with greater age difference to assess if a clearer pattern will emerge, such as among children aged 10 years old and young adults aged 18 or older.

In summary, the most important implication of this research was the understanding of how EXGs had higher levels of beliefs about ability, interest and intention for future participation over traditional PE for inactive students. These are the populations who are often victimized by traditional sport based athlete dominated PE programs. The inclusion and involvement of all populations in a PE program can create an environment where all students are motivated to be physically active for a lifetime.

Appendix

Expectancy-related beliefs and task values instrument.

Expectancy-value constructs	PE items	EXGs items	Item range
Beliefs about ability	How good are you at activities and games in PE?	How good are you at activities and games in EXGs?	1 = Very bad to 5 = very good
	If you were to list all the students in your PE class from the worst to best, where would you put yourself?	If you were to list all the students in your PE class from the worst to best for EXGs, where would you put yourself?	1 = One of the worst to 5 = one of the best
	Compared to most of your other university subjects, how good are you at activities and games in PE?	Compared to most of your other university subjects, how good are you at activities and games in EXGs?	1 = A lot worse in PE/EXGs to 5 = a lot better in PE/EXGS
Expectancies for success	How well do you think you will learn activities and games in PE this year?	How well do you think you will learn activities and games in EXGs this year?	1 = Not at all well to 5 = very well
	How good would you be at learning something new in PE?	How good would you be at learning something new in EXGs?	1 = Very bad to 5 = very good
Attainment value or importance	For me, being good at activities and games in PE is...	For me, being good at activities and games in EXGs is...	1 = Not very important to 5 = very important
	Compared to your other university subjects, how important is it to you to be good at activities and games in PE?	Compared to your other university subjects, how important is it to you to be good at activities and games in EXGs?	1 = Not very important to 5 = very important
Intrinsic or interest value	In general, I find learning new activities and game in PE is...	In general, I find learning new activities and game in EXGs is...	1 = "Way" boring to 5 = "way" fun
	How much do you like activities and games in PE?	How much do you like activities and games in EXGs?	1 = Don't like it at all to 5 = like it very much
Utility value or usefulness	In general, how useful is what you learn in PE?	In general, how useful is what you learn in EXGs?	1 = Not useful at all to 5 = very useful
	Compared to your other university subjects, how useful is what you learn in PE?	Compared to your other university subjects, how useful is what you learn in EXGs?	1 = Not useful at all to 5 = very useful
Intention for future participation	When you get to university, if you could have a choice whether to take PE. How much would you want to take it?	If you owned exergames. How much would you want to play it?	1 = Not at all to 5 = very much minute each leg)

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