Examining the Efficacy of Virtual Golf Simulators on Improving Self-Efficacy and Motivation

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Introduction
According to the National Golf Foundation (NGF) report (2015), the number of latent golfers (number of non-golfers who are interested in playing golf) is 32 million people in the U.S., however, the golf participation rate over the last 3 years remained flat. According to the leisure literature, there are several constraints as to why a person may not engage in recreational activities (Alexandris & Carroll, 1997). In the case of golf, people do not engage because of costs such as green fees, cart fees, time, and accessibility (Won & Hwang, 2008). The convergence of sport and technology helped solve some of these constraints, especially for golfers, as sport industrial products such as simulators alleviate the cost, time, and accessibility constraints (Jung, 2016). Also, the combination of IT and sport helps improve an athlete's physical capability and body abilities (Kim, Park, Park, Cho, & Kang, 2016). Previous studies have found that these new technological sport products help in learning (Han, Hwang, & Woods, 2014; Kang, 2015), however, no study has of yet examined the emotional and psychological aspect behind this phenomenon, or investigated learning efficiency improvement and motivation. Specifically, it has been shown that learning helps to build self-efficacy and motivates one to perform a task (Schunk, 1989). As such, the purpose of this study is to examine how golf simulators can influence self-efficacy and motivation of beginning golfers.

Theoretical Framework and Literature Review
Leisure constraints theory (Crawford & Godbey, 1987) and self-efficacy theory (Bandura, 1989) are framing this study. Leisure constraints are the most powerful influence in a person’s motivation for sport participation (Crawford & Godbey, 1991). Crawford and Gobey (1987) proposed a model of constraints composed of three categories – intrapersonal (stress, perceived self-skill), interpersonal (family relationships), and structural barriers (time, money, opportunity). According to Graef and Csikszentmihalyi (1983), intrinsic motivation is dominant in sport participation and is influenced by leisure constraints (Ellis & Witt, 1984). More motivated individuals perceive lower levels of constraints, and are thus more likely to participate in sports than less motivated ones (Carroll & Alexandris, 1997).

In the past few decades, there has been a convergence of the sport industry with other industries. ScreenGolf, also known as a virtual golf simulator – convergence of sport and technology – was first developed as a practice system and teaching aid in golf clinics; however, with the advancement of technology it has been adopted as a leisure activity (Kwon, Oh, Kim, & Oh, 2014). According to Han, Hwang, and Woods (2014), people are motivated to play Screengolf since it reduces physical effort and time, is convenient, and helps self-improvement.

According to Bandura (1989), self-efficacy is defined as a person’s judgment of one’s abilities to execute courses of action required to attain certain types of performances (Bandura, 1986). The stronger an individuals’ belief in his/her capabilities, the greater and more persistent are one’s efforts (Bandura, 1989). On the other hand, people facing failures develop self-doubt about their abilities settling for mediocre solutions or aborting prematurely (Bandura, 1989). Therefore, it is important to develop strong self-efficacy for people who have low self-efficacy. To date, no research has examined the influence of virtual gaming (simulation) on self-efficacy and motivation in the sport context. Based on the above literature, this study advanced the following hypotheses:

H1a: There will be a significant positive difference between pre/post golf self-efficacy scores in low self-efficacy individuals playing an easy simulated golf course.
H1b: There will be a significant positive difference between pre/post golf motivation scores in low self-efficacy individuals playing an easy simulated golf course.
H2a: There will be a significant positive difference between pre/post golf self-efficacy scores in high self-efficacy individuals playing a difficult simulated golf course.
H2b: There will be a significant positive difference between pre/post golf motivation scores in high self-efficacy individuals playing a difficult simulated golf course

Method
Respondents were recruited from an undergraduate university golf class in South Korea. Fifty-three students completed the pre-test survey; however, 6 participants did not complete the post-test survey and 3 were excluded for incomplete answers. Thus, the final number of usable surveys was 44. Self-efficacy was measured with 8 items developed by Chen, Gully, and Eden (2011) and motivation was measured with 12 items (Martens & Weber, 2002). All survey items were adapted to the golf context using a 7-point Likert scale (1=strongly disagree, 7=strongly agree). To determine reliability, Cronbach’s alpha was conducted in pre- and post-tests. Paired t-test was utilized to compare the mean difference in self-efficacy and motivation before and after the experiment in low and high self-efficacy groups. Low and high self-efficacy groups were determined by mean split. One golf course in easy (rookie) and difficult (professional) mode was selected for the experiment. The low self-efficacy group (n=21) played 3 holes in rookie mode, while the high self-efficacy group (n=23) played 3 holes in professional mode.

Results
The Cronbach’s alpha for the pre- and post-test were 0.954 and 0.956 respectively, showing good reliability. For the low self-efficacy group, there was a significant positive difference in the self-efficacy score between pre- (M=3.37, SD=0.66) and post-playing (M=3.83, SD=0.85) conditions, t(20)=2.22, p=0.038, d=0.60. Also, there was a significant positive difference in the motivation scores between pre- (M=4.63, SD=0.80) and post-playing (M=4.99, SD=0.96) conditions, t(20)=2.23, p=0.038, d=0.41. These results suggest that easy courses for the low self-efficacy group leads to higher self-efficacy and motivation, supporting H1a and H1b. For the high self-efficacy group, there was a significant negative (not positive as per H2a) difference in the self-efficacy score between pre- (M=5.29, SD=0.61) and post-playing (M=4.89, SD=0.76) conditions, t(22)=2.58, p=0.017, d=0.44. Additionally, there was not a significant difference in the motivation scores between pre- (M=5.49, SD=0.69) and post-playing (M=5.55, SD=0.63) conditions, t(22)=0.52, p=0.61. The results suggest that difficult courses for the high self-efficacy group leads to lower self-efficacy levels and has no influence on motivation, not supporting H2a and H2b.

Discussion
The results of this study demonstrate that playing easy golf courses for participants with lower self-efficacy helped increase their self-efficacy and motivation; that is, participants who believed that they could handle playing the easy mode experienced higher motivation to play golf. According to Carroll and Alexandris (1997), motivation is affected by the perceived level of constraint; therefore, when constraints are reduced the higher an individual’s motivation will be. On the other hand, the results show that self-efficacy dropped in high self-efficacy participants. This is inconsistent with the self-efficacy literature that high self-efficacy individuals will exercise more effort to master a challenge (Bandura & Cervone, 1983). One explanation could be that the level of the golf course was extremely difficult for participants; thus, they developed a negative perception towards their self-efficacy. Although there was a slight increase in motivation, it was not significant. This shows that an overly difficult golf course could undermine motivation (Pelletier et al., 1995). Sport managers should customize their programs according to participants’ self-efficacy levels. The results of this study demonstrate that virtual simulators could be an outlet for beginners to engage in sport by lowering leisure barriers, and also, develop motivation to continue playing sports. Theoretically, the current study advances the sport management literature by extending the relationship between convergence of sport and leisure constraint negotiation. Future research directions will also be discussed.