

Effects of Indoor Golf Simulator Users' Participation Intention on Life Satisfaction: Focusing on the Mediating Effect of Self-Efficacy

Kyung Hwan Cho¹, Austin Kang², Yang-Hun Jeung^{3*}

¹Department of Special Physical Education, Daelim University College, Anyang-si, Gyeonggi-do, Republic of Korea

²Department of Medicine, Seoul National University, Seoul, Republic of Korea

³Department of Special Physical Education, Yeosu University, Yeosu-si, Gyeonggi-do, Republic of Korea

Corresponding author: Yang-Hun Jung, Email: iccard@hanmail.net

KEYWORDS

Indoor Golf Simulator; Participation Intention; Life Satisfaction; Mediating effect; Self-efficacy.

ABSTRACT

In investigating indoor virtual golf's impact on self-efficacy and life satisfaction, this study surveyed South Korean adults from March 1 to March 15, 2024. This study examined the motivational factors driving participation in indoor virtual golf and the subsequent effects on self-efficacy and life satisfaction. Data analysis showed that skill development significantly improved self-efficacy ($\beta = .601, p < .001$), while increased physical activity surprisingly showed a negative correlation ($\beta = -.523, p < .001$). Joyfulness was a strong positive predictor of life satisfaction ($\beta = 1.161, p < .001$), suggesting that the enjoyment derived from playing indoor virtual golf could contribute to overall life contentment. Furthermore, self-efficacy fully mediated the relationship between the intention to participate in indoor virtual golf and life satisfaction, indicating the critical role of self-belief in enhancing personal well-being. This study concluded that the participation intention in indoor virtual golf significantly boosts individuals' confidence in their capabilities and overall satisfaction with life, emphasizing the importance of psychological factors in virtual sports activities, which suggests a focus on skill development and fostering joy to enhance participant satisfaction.

1. Introduction

Utilizing golf simulators for indoor virtual golf or screen golf has garnered widespread acclaim, as it presents a recreational activity that transcends the barriers of gender and age, allowing broad public engagement [1]. In South Korea, advancements in VR technology have expedited the proliferation of screen golf, offering a variety of motivational factors for participation such as enjoyment, social interaction, skill learning, health improvement, and weight management. This technological milieu not only fosters leisure activities but also stands as a testament to Korea's place as a leader in VR innovation [2]. The conceptual framework of self-efficacy, as initially proposed by Bandura [3], describes the belief in one's capabilities to organize and execute the courses of action required to manage prospective situations. Fishbein and Ajzen [4] further elucidated this notion, suggesting that higher self-efficacy is associated with proactive behavior in specific situations, whereas lower self-efficacy could result in a sense of helplessness and difficulty adapting to environments. Furthermore, participation in physical activities has been reported to have a meaningful relationship with self-efficacy [5] (Anderson et al., 2006). Participation in sports has been shown to correlate with self-efficacy. For example, Collins et al. [6] discovered that engaging in sports could enhance participants' self-efficacy. Similarly, Orth and Robins [7] identified high self-efficacy as a significant predictor of individual success and happiness. Additionally, Dewar and Kavussanu [8] observed that participation in golf positively influences participants' overall happiness. Considering life satisfaction, it can be defined as the subjective expression of quality of life [9]. Pavot & Diener [10] also reported that active participation in social activities tends to be associated with higher levels of life satisfaction, whereas a lower level of satisfaction is often correlated with passive and isolated activities. Furthermore, Kwon, Cheung, and Ahn [11] examined the impact of recreation specialization and leisure facilitation on leisure satisfaction among golf and yachting participants, showing that while leisure facilitation did not influence recreation specialization, it positively impacted leisure satisfaction, as did recreation specialization. Indoor virtual golf also provides the players with psychological well-being and the ubiquity of indoor virtual golf is observed in modern society [12]. Although there are numerous studies on the self-efficacy and life satisfaction derived from sports participation [13, 14], research exploring the relationship between participation intention and life satisfaction among participants in indoor virtual golf remains scarce. In particular, there are few prior studies that examine the mediating effect of self-efficacy on the relationship between participation intention and life satisfaction. Given this background, this study aimed to fill the gap in the literature by investigating the effects of indoor golf simulator users' participation intention on life

satisfaction, with a focus on the mediating effect of self-efficacy.

2. Methodology

2.1 Participation Intention

Participation intention can be defined as an individual's self-reported likelihood or willingness to engage in a specific behavior or activity [15]. One of the primary components influencing participation intention is skill development [16]. According to Atkins et al. [17], the motivational climate created by peers, parents, and coaches is pivotal in shaping boys' intentions to continue participating in sports. They argued that a supportive environment that fosters skill development could enhance an individual's competence, thereby increasing their likelihood of continued engagement. Skill development provides a sense of achievement, which is critical for sustaining participation intention. Moreover, programs that prioritize skill development and provide regular feedback on progress can effectively boost participation intention [18]. Another significant factor that influences participation intention is the factor of joyfulness. Dowling [19] highlights the role of enjoyment and positive experiences in physical education, suggesting that when participants derive joy from their activities, their intention to continue participating can be enhanced. Biscaia et al. [20] explored the effects of emotions on football spectators' satisfaction and behavioural intentions, showing that joy directly increases satisfaction and indirectly enhances behavioral intentions. Thus, joyfulness in participation can be fostered through various means, such as incorporating fun and engaging elements into the activity, creating a positive and supportive environment, and ensuring that the activities are well-suited to the participants' interests and abilities. Socialization also plays a critical role in shaping participation intention [21]. Weiss [18] discusses the importance of social interactions in youth sports motivation and participation. He emphasizes that the social environment, including the relationships built within the context of the activity, can significantly influence an individual's decision to participate. Interacting with peers, sharing common goals, and participating in group activities can create a sense of camaraderie and collective achievement [21]. Physical activity itself is a crucial factor influencing participation intention. The physical benefits of engaging in sports and exercise, such as improved health, fitness, and well-being, can motivate individuals to continue participating. Atkins et al. [17] highlight the importance of creating a motivational climate that encourages physical activity. Physical activity also contributes to overall life satisfaction, which is a significant predictor of sustained engagement [22]. Thus, participation intention is a multifaceted construct influenced by various factors, including skill development, joyfulness, socialization, and physical activity. Based on the aforementioned factors, this study has selected the following four aspects to define participation intention: skill development, joyfulness, socialization, and physical activity.

2.2 Self-efficacy

Self-efficacy refers to an individual's belief in their capacity to execute behaviors necessary to produce specific performance attainments [3]. Self-efficacy reflects confidence in the ability to exert control over one's own motivation, behavior, and social environment [23]. Self-efficacy differs from mere confidence as it is a judgment of one's capabilities to organize and execute a range of actions required to manage prospective situations. Bandura's social cognitive theory [3] provides a framework for understanding the influence of self-efficacy beliefs on cognitive, motivational, affective, and selection processes in human beings, explaining that individuals gain information about self-efficacy from four sources: mastery experiences, social modeling, social persuasion, and physiological and emotional states. People who have a strong sense of efficacy approach difficult tasks as challenges to be mastered rather than as threats to be avoided [24]. For instance, a strong sense of efficacy enhances human accomplishment and personal well-being in many ways [25]. In contrast, individuals with low self-efficacy may believe that things are tougher than they really are, which fosters stress, a low sense of well-being, and a narrow vision of how best to solve a problem [26]. Some individuals exhibit low self-efficacy in sports, leading to a lack of confidence in their performance outcomes, diminishing their motivation to participate in sports activities [27]. Also, self-efficacy has been reported to have a mediating effect in various studies. For instance, Green [28] demonstrated that well-being mediates the relationship between generalized self-efficacy and vocational identity development, suggesting that self-efficacy influences vocational outcomes through its impact on well-being. Similarly, Li et al. [29] found that self-efficacy mediates the relationship between proactive personality and job satisfaction among teachers, indicating that higher self-efficacy enhances job satisfaction by fostering proactive behaviors and work engagement. Moreover, Hsieh, Hsieh, and Huang [30] reported that self-efficacy acts as both a mediator and moderator between emotional labor and job

satisfaction in public service employees in Taiwan. As a consequence, previous studies collectively underscore the critical role of self-efficacy in mediating various psychological and occupational outcomes, highlighting its significance in enhancing well-being, job satisfaction, and vocational identity. Therefore, self-efficacy serves as a vital construct in understanding and improving various aspects of personal and professional life.

2.3 Life Satisfaction

Life satisfaction can be defined as a cognitive evaluation of one's life as a whole and/or of specific life domains, reflecting an individual's overall assessment of their quality of life and well-being [31]. According to Neugarten, Havighurst, and Tobin [32], life satisfaction was theoretically established as the daily construction of life that yields joy, fosters a positive self-concept, endorses one's self-worth, and maintains an optimistic attitude and outlook. Also, Medley [33] argued that life satisfaction significantly influences an individual's mental health. He posited that expectations, formed through interactions with others, serve as a basis for self-evaluation through comparison with others. Such benchmarks of self-assessment are crucial in appraising one's state of contentment. Additionally, Campbell [34] defined life satisfaction in terms of subjective emotions associated with the achievement of personal goals or needs. In essence, it is the resultant state experienced when emotions felt within daily life are fulfilled. From this perspective, life satisfaction can be interpreted as closely related to one's expectations, drawing parallels to the concept of happiness [35]. However, there is a distinction to be made between happiness and life satisfaction [36]. While happiness can be delineated by the frequency and intensity of positive versus negative affect, life satisfaction is not a direct measure of emotion per se, but rather an overarching evaluative judgment that encompasses various aspects of life [37]. Despite these conceptual differences, life satisfaction is generally understood to encompass a range of factors including family relationships, communication, socio-economic status, leisure, self-actualization, values, living environment, health, and parental relations. These components are considered integral to constructing one's experience of life satisfaction [38]. Participation in recreational activities has a significant effect on the perception of life satisfaction in residential settings [39]. Thus, participation intention can affect life satisfaction.

2.4 Hypothesis Development and Research Model

Motivation, such as participation intention, can act as a precursor in determining the direction, intensity, satisfaction, and persistence of specific behaviors [41]. Also, based on the previous studies, it can be hypothesized that there is a significant relationship between participation intention and life satisfaction [22, 39]. Self-efficacy, being the expectation of one's ability to perform a particular behavior, is presumed to vary with the intent to participate in leisure sports [3]. Furthermore, high perceived self-efficacy can lead to a proactive and active approach to specific situations, whereas low self-efficacy is generally associated with feelings of helplessness and difficulties in adapting to the environment [4]. Thus, it is postulated that a significant relationship exists between self-efficacy and life satisfaction. Moreover, it is proposed that self-efficacy has a meaningful mediating effect between sports participation and life satisfaction [42]. Based on this theoretical rationale and previous research findings, the following research hypotheses were established:

Hypothesis 1. The intention to participate in indoor virtual golf has a positive effect on self-efficacy.

Hypothesis 2. The intention to participate in indoor virtual golf has a positive effect on life satisfaction.

Hypothesis 3. Self-efficacy of indoor virtual golf users mediates the relationship between participation intention and life satisfaction.

Additionally, this study introduces the proposed research model depicted in Figure 1. According to the model, participation intentions influence both self-efficacy and life satisfaction, while self-efficacy also affects life satisfaction and mediates the relationship between participation intention and life satisfaction.

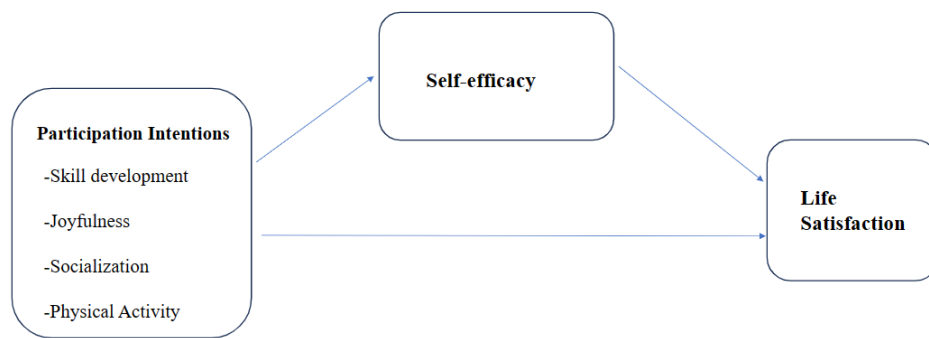


Figure 1. Proposed Research Model

2.5 Research Instruments

Table 1 outlines the composition and the sources of the research instruments utilized in the study. Participation intention consists of 16 items, which includes skill development, joyfulness, socialization, and physical activity [17-19]. Self-efficacy also consists of four items [42, 43]. Furthermore, life satisfaction is assessed through five items [44]. Lastly, the survey instrument consists of a total of 29 questions, including 4 items asking about general characteristics.

Table 1. Composition of research instrument

Variables		Number of Items	Sources
Participation intention	Skill development	4	Atkins et al. (2015), Dowling (2006), Weiss (2019)
	Joyfulness	4	
	Socialization	4	
	Physical Activity	4	
Self-efficacy		4	Sherer et al.(1982), Astaficevs et al. (2020)
Life satisfaction		5	Yazicioglu et al. (2012)
General characteristics		4	(-)
Total		29	

2.6 Subjects and Data Collection

The present study was conducted through a survey targeting adult male and female users of indoor virtual golf (screen golf) in South Korea. Data collection was carried out using a convenience sampling method from March 1 to March 15, 2024. The survey was done using a self-administered questionnaire and an online survey method. This study was ethically conducted in accordance with the Declaration of Helsinki. All respondents were provided with a written explanation of the purpose of the questionnaire and consent was obtained prior to conducting the survey.

2.7 Data Analysis

The collected data were statistically analyzed using the IBM SPSS 22.0 program (IBMCorp., Armonk, NY,USA). First, frequency analysis and descriptive statistics were conducted to understand the general characteristics of the respondents. Second, exploratory factor analysis and the calculation of Cronbach's α coefficient were performed to verify the validity and reliability of the research instruments. Third, correlation analysis was employed to explore the relationships between variables. Fourth, multiple regression analysis was utilized for hypothesis testing. Lastly, the significance level for the analysis was set at $\alpha=.05$.

3. Results and discussion

3.1 General characteristics

Table 2 outlines the demographic characteristics of indoor virtual golf players. In terms of gender distribution, males represent 58.4% with 124 subjects, while females make up 41.6% with 88 subjects. Also, the largest group is those aged 30-39, accounting for 36.7% with 78 subjects. This is followed by the 40-49 age group at 29.7% with 63 subjects, and the ≥ 50 age group at 22.1% with 47 subjects. The 20-29 age group has the smallest representation at 11.3% with 24 subjects. In terms of monthly income, the majority fall within the 2,000-4,000 dollars range, representing 47.6% with 101 subjects. Those earning more than 4,000 dollars per month make up

36.7% with 78 subjects, and those earning less than or equal to 2,000 dollars are the smallest group, at 15.5% with 33 subjects.

Table 2. Demographic Characteristics

Category		Frequency	Percent
Gender	Male	124	58.4
	Female	88	41.6
Age(Year)	20-29	24	11.3
	30-39	78	36.7
	40-49	63	29.7
	≥50	47	22.1
Monthly Income (Dollars)	≤ 2000	33	15.5
	2000-4000	101	47.6
	>4000	78	36.7
Total		212	100

Table 3 provides descriptive statistics for participant responses to items across five categories related to the experience of playing indoor virtual golf. For skill development ($4.018 \pm .638$), the items suggest that participants find it enjoyable and fulfilling to learn and develop new skills through indoor virtual golf, with mean scores ranging from 3.928 to 4.081. Joyfulness ($4.139 \pm .618$) has high mean scores indicating that participants derive fun and a sense of accomplishment from playing indoor virtual golf. Socialization ($4.145 \pm .796$) is also rated highly, reflecting that indoor virtual golf is perceived as a social activity, allowing for interaction with friends and colleagues, though with slightly more variability as indicated by the higher standard deviation. Physical activity ($2.919 \pm .578$) shows a more moderate agreement that indoor virtual golf contributes to physical fitness and weight management, with mean scores lower than the other categories. Finally, self-efficacy ($3.855 \pm .577$) and life satisfaction ($3.902 \pm .601$) contain items assessing confidence in achieving goals and general contentment with various aspects of life. The means and standard deviations indicate that while indoor virtual golf is viewed positively for skill development, joy, and socializing, its contributions to physical activity are less pronounced, and there is a wide range of satisfaction in personal life aspects.

Table 3. Descriptive Statistics

Category	Items	Mean \pm Standard Deviation
Skill development (4.018 \pm .638)	I participate in indoor virtual golf because it is fun to learn new exercise methods.	3.987 \pm .593
	I find it enjoyable to master the difficult moves in indoor virtual golf.	3.928 \pm .654
	I feel happy as my skills gradually develop in indoor virtual golf.	4.081 \pm .652
	I like to learn new skills in indoor virtual golf.	4.077 \pm .649
Joyfulness (4.139 \pm .618)	I think indoor virtual golf is fun.	4.248 \pm .441
	I feel a sense of accomplishment from indoor virtual golf.	4.389 \pm .482
	I can become engrossed in indoor virtual golf.	3.918 \pm .648
	I feel energized when playing indoor virtual golf.	4.001 \pm .827
Socialization (4.145 \pm .796)	I socialize with friends and colleagues while participating in indoor virtual golf.	4.252 \pm .732
	I comfortably mingle with others while engaging in indoor virtual golf.	4.331 \pm .759
	I use indoor virtual golf as an opportunity to socialize with other people.	4.249 \pm .733
	After playing indoor virtual golf, I often have social gatherings with people.	3.747 \pm .941
Physical activity (2.919 \pm .578)	I believe indoor virtual golf can help with weight management.	2.834 \pm .462
	I think I can build a great body through indoor virtual golf.	2.751 \pm .578
	I can exercise regularly through indoor virtual golf.	2.843 \pm .629
	I believe that indoor virtual golf can contribute to enhancing physical fitness.	3.246 \pm .627
Self-efficacy (3.855 \pm .577)	In the process of learning new skills, I don't give up even if I don't succeed at first.	3.837 \pm .635
	When I set a plan, I am confident that I can achieve it.	3.832 \pm .572
	If I fail to reach my goals, I work even harder.	3.917 \pm .467
	When I decide to do something, I put it into action immediately.	3.833 \pm .618
Life satisfaction (3.902 \pm .601)	I am mostly satisfied with my family relationships.	4.001 \pm .613
	I am mostly satisfied with my friendships	3.998 \pm .532
	I am mostly satisfied with my living environment.	4.167 \pm .674
	I am mostly satisfied with my health status.	3.674 \pm .685
	I am mostly satisfied with my leisure activities.	3.668 \pm .473

3.2 Analysis of Reliability and Validity

Table 4 presents the results of an exploratory factor analysis on the participation intentions of respondents. The skill development (SD) is strongly represented in Factor 1, suggesting that the development of golfing skills is

a primary component influencing participants' intention to engage in indoor virtual golf. This is supported by high factor loadings ranging from 0.763 to 0.832 for items SD1 through SD4. Joyfulness (J) loaded most heavily on Factor 2, with values between 0.617 and 0.832 across items J1 to J4, indicating that the enjoyment derived from the activity is a significant predictor of participants' intention to use indoor golf simulators. Socialization (S) emerged as Factor 3 with the highest loadings, demonstrating that the social aspect of participating in indoor golf is a distinct motivational driver. Items S1 to S4 showed a strong association, with factor loadings from 0.769 to 0.892. Physical activity (PA) constituted Factor 4, where the items PA1 to PA4 had high loadings, ranging from 0.757 to 0.826, underscoring the importance of physical engagement in influencing participation intention. The analysis resulted in a cumulative variance explanation of 61.581%. Also, the Kaiser-Meyer-Olkin measure verified the sampling adequacy for the analysis, KMO = 0.827, and Bartlett's test of sphericity was significant ($p < .001$), indicating that the correlation structure was suitable for factor analysis. Furthermore, the reliability of each factor, measured by Cronbach's alpha, ranged from 0.711 to 0.841, indicating satisfactory to good internal consistency.

Table 4. Exploratory factor analysis on participation intention

Factors	Items	Rotated component matrix (Varimax)			
		Factor 1	Factor 2	Factor 3	Factor 4
Skill Development (SD)	SD1	.763	.257	.301	.103
	SD2	.821	.314	.248	.149
	SD3	.786	.143	.161	.291
	SD4	.832	.286	.329	.138
Joyfulness (J)	J1	.203	.617	.189	.098
	J2	.177	.752	.352	.149
	J3	.216	.789	.293	.193
	J4	.113	.832	.119	.287
Socialization(S)	S1	.324	.348	.784	.141
	S2	.387	.167	.892	.112
	S3	.151	.178	.769	.328
	S4	.292	.201	.853	.383
Physical Activity (PA)	PA1	.144	.162	.285	.809
	PA2	.292	.311	.272	.811
	PA3	.137	.207	.337	.826
	PA4	.178	.296	.128	.757
Eigenvalues		3.811	2.394	1.953	1.424
% of variance		26.435	13.768	11.402	9.976
Accumulated %		26.435	40.203	51.605	61.581
Cronbach's α		.752	.711	.836	.841
Kaiser-Meyer-Olkin test = 0.827, Bartlett's test = 829.714 ($p < .001$)					

Table 5 presents an exploratory factor analysis assessing the constructs of self-efficacy and life satisfaction. Two distinct factors emerged, demonstrating the multidimensionality of the concepts measured in the context of users' experiences with indoor golf simulators. Factor 1 is strongly loaded with self-efficacy items, with factor loadings ranging from .811 to .836. This consistency in high loadings across all self-efficacy items—SE1 through SE4—indicates that self-efficacy is a robust and distinct factor influencing the beliefs of subjects about their ability to execute actions related to indoor golf simulation. Factor 2 predominantly represents life satisfaction, where items LS1 through LS5 show significant loadings from .765 to .833. This suggests that users' contentment with life is a separate influential factor, capturing their overall well-being and satisfaction, which might affect their intention to participate in activities like indoor golf. The analysis elucidated that self-efficacy accounts for 42.632% of the variance while life satisfaction contributes to 23.784%, cumulatively explaining 66.416% of the total variance. The reliability of the scales is high, with Cronbach's alpha coefficients of .838 for self-efficacy and .817 for life satisfaction, indicating good internal consistency within each factor. The Kaiser-Meyer-Olkin measure of sampling adequacy was .815, suggesting that the sample size was suitable for the analysis. Bartlett's test of sphericity had a value of 329.549, significant at $p < .001$, confirming the factors' intercorrelations and the appropriateness of conducting a factor analysis. These statistical measures validate the factor structure of the constructs and underscore the relevance of both self-efficacy and life satisfaction in the study of participation intentions.

Table 5. Exploratory factor analysis on self-efficacy and life satisfaction

Factors	Items	Rotated component matrix (Varimax)	
		Factor 1	Factor 2
Self-efficacy (SE)	SE1	.811	.113
	SE2	.823	.148

Life Satisfaction (LS)	SE3	.826	.193
	SE4	.836	.238
	LS	.188	.782
	LS2	.367	.833
	LS3	.285	.773
	LS4	.267	.765
	LS5	.383	.828
Eigenvalues		3.953	2.567
% of variance		42.632	23.784
Accumulated %		42.632	66.416
Cronbach's α		.838	.817
Kaiser-Meyer-Olkin test = 0.815, Bartlett's test = 329.549 ($p < .001$)			

3.3 Correlation Analysis

Table 6 presents a correlation analysis of variables. Skill development shows a strong and positive correlation with Joyfulness ($r = .832$, $p < .001$), indicating that as skill development increases, joyfulness tends to increase as well. Joyfulness is also significantly correlated with socialization ($r = .689$, $p < .001$), suggesting that higher levels of joy are associated with better socialization. There is a moderate positive correlation between socialization and physical activity ($r = .504$, $p < .01$). Skill development and self-efficacy have a strong positive relationship ($r = .702$, $p < .001$), which implies that subjects who report higher skill development also tend to report higher self-efficacy. A significant correlation is noted between joyfulness and self-efficacy ($r = .713$, $p < .001$), which could suggest that more joyful subjects feel more capable and confident. Life satisfaction correlates moderately with skill development ($r = .501$, $p < .01$) and strongly with joyfulness ($r = .653$, $p < .001$). Life satisfaction also has a significant but weaker relationship with socialization ($r = .373$, $p < .05$). Lastly, life satisfaction shows a strong correlation with self-efficacy ($r = .611$, $p < .001$), indicating that subjects with higher self-efficacy are likely to be more satisfied with their lives.

Table 6. Correlation analysis of variables

	1	2	3	4	5	6
1.Skill development	1					
2.Joyfulness	.832***	1				
3.Socialization	.548***	.689***	1			
4.Physical activity	.581***	.672***	.504**	1		
5.Self-efficacy	.702***	.713***	.692***	.222	1	
6.Life satisfaction	.501**	.653***	.373*	.172	.611***	1

* $p < .05$, ** $p < .01$, *** $p < .001$

3.4 Verification of Hypotheses

This study examines the influence of participation intention on self-efficacy and life satisfaction among users of an indoor golf simulator. Table 7 shows the regression analysis on the effect of participation intention on self-efficacy, with their associated unstandardized (B) and standardized (β) coefficients, standard errors (SE), t-values, p-values, tolerance, and variance inflation factors (VIFs). Skill development is a significant predictor of self-efficacy with a B of .518, and a relatively high β of .601 ($p < .001$). Joyfulness, with a B of .233 and a β of .239, does not significantly predict self-efficacy ($p = .166$). Socialization is another significant variable (B = .401, $\beta = .463$, and $p < .001$). Physical activity, interestingly, negatively predicts self-efficacy (B = -.342, $\beta = -.523$, and $p < .001$), indicating that as participation in physical activity increases, self-efficacy decreases. The regression model explains that a significant proportion of variance in self-efficacy ($R^2 = .811$, Adjusted $R^2 = .802$) is statistically significant (F-value = 35.737, $p < .001$), showing no concerning multicollinearity (as indicated by tolerance and VIF values). The Durbin-Watson statistic of 1.831 suggests the residuals are independent, with no autocorrelation. This analysis implies that certain aspects of participation intention, such as skill development and socialization, can significantly enhance a player's belief in their capabilities, while increased physical activity may relate to lower self-efficacy within the context of indoor golf simulation. Therefore, Hypothesis 1 is partially accepted in that among the participation intentions for indoor virtual golf, skill development, socialization, and physical activity have a significant positive effect on self-efficacy.

Table 7. Effect of participation intention on self-efficacy

Variables	Self-efficacy					Tolerance	VIF
	Unstandardized coefficient (B)	Standardized coefficient (β)	Standard error (SE)	t	p		
(Constant)	.161		.332	.491	.637		

Skill development	.518	.601	.122	4.336	<.001	.824	1.514
Joyfulness	.233	.239	.159	1.424	.166	.831	1.385
Socialization	.401	.463	.092	4.368	<.001	.742	1.334
Physical activity	-.342	-.523	.074	-5.049	<.001	.785	1.328
R ² =.811, Adjusted R ² =.802, Durbin-Watson=1.831, F-value=35.737, p-value<.001							

Note: VIF=Variance inflation factor

Table 8 presents the results of a regression analysis examining the effect of participation intention on life satisfaction. Skill development has a slightly negative but not statistically significant association with life satisfaction ($B = -.144$, $p = .521$). Joyfulness, on the other hand, has a strong and statistically significant positive effect on life satisfaction ($B = 1.259$, $\beta = 1.161$), showing a high level of impact on the dependent variable ($p < .001$). Socialization shows a negative association with life satisfaction, but this is not statistically significant ($p = .481$). Physical activity has a negative effect on life satisfaction ($B = -.353$, $\beta = -.463$, $p = .007$), suggesting that higher levels of physical activity are associated with lower life satisfaction among the participants in this sample. The R^2 of .523 indicates that approximately 52.3% of the variance in life satisfaction is explained by the model. The Adjusted R^2 is .511, which takes into account the number of predictors and the sample size, confirming that the model has a good fit. The Durbin-Watson statistic of 1.822 suggests there is no significant autocorrelation in the residuals. The F-value is 10.134, indicating that the regression model is statistically significant ($p < .001$). The tolerance and VIF values indicate that multicollinearity is not a concern for this model. These findings suggest that joyfulness is a key contributor to life satisfaction in the context of indoor golf simulator users, while skill development and socialization have less influence, and physical activity may actually detract from life satisfaction. Therefore, Hypothesis 2 is partially accepted in that in participation intention for indoor virtual golf, only joyfulness has a significant positive effect on life satisfaction.

Table 8. Effect of participation intention on life satisfaction

Variables	Life satisfaction					Tolerance	VIF
	Unstandardized coefficient (B)	Standardized coefficient (β)	Standard error (SE)	t	p		
(Constant)	.772		.583	1.308	.198		
Skill development	-.144	-.139	.207	-.649	.521	.784	1.489
Joyfulness	1.259	1.161	.276	4.423	<.001	.736	1.634
Socialization	-.121	-.118	.159	-.708	.481	.743	1.493
Physical activity	-.353	-.463	.124	-2.883	.007	.778	1.885
R ² =.523, Adjusted R ² =.511, Durbin-Watson=1.822, F-value=10.134, p-value<.001							

Note: VIF=Variance inflation factor

Table 9 provides the mediating effect of self-efficacy in the relationship between participation intention and life satisfaction. In Step 1 of the mediation analysis, participation intention significantly predicts self-efficacy ($\beta = .662$, $t = 5.149$, $p = .001$). The R of .443 suggests that participation intention accounts for 44.3% of the variance in self-efficacy, and the F-value of 26.548, significant at the .001 level, further confirms the model's goodness of fit. As the analysis progresses to Step 2, participation intention also significantly predicts life satisfaction ($\beta = .473$, $t = 3.114$, $p < .01$), although the R^2 drops to .218, indicating that participation intention explains 21.8% of the variance in life satisfaction ($F = 9.653$, $p = .01$). However, in Step 3, when both self-efficacy and participation intention are included in the model as predictors of life satisfaction, the direct effect of participation intention on life satisfaction becomes non-significant ($\beta = .121$, $t = .648$, $p > .05$), while self-efficacy maintains a strong and significant effect ($\beta = .534$, $t = 2.922$, $p < .01$). This is a critical observation as it indicates that self-efficacy fully mediates the relationship between participation intention and life satisfaction. The non-significant path from participation intention to life satisfaction, when controlling for self-efficacy, suggests that it is not the mere intention to participate that improves life satisfaction, but rather the sense of efficacy one derives from those intentions. The R-squared value in the third step remains at .212, implying that 21.2% of the variance in life satisfaction is accounted for when considering both participation intention and self-efficacy together. Despite the slight drop from Step 2, the F-value at 2.993, significant at the .01 level, indicates that self-efficacy is a vital factor in the model. Therefore, Hypothesis 3 is accepted in that the self-efficacy of indoor virtual golf users has a complete mediating effect between participation intention and life satisfaction.

Table 9. The mediating effect of self-efficacy in the relationship between participation intention and life satisfaction

Category	Independent Variables	Dependent Variables	B	β	t	R ²	F
Step 1	Participation intention	Self-Efficacy	.651	.662	5.149***	.443	26.548***
Step 2	Participation intention	Life satisfaction	.522	.473	3.114**	.218	9.653**
Step 3	Participation intention	Life satisfaction	.133	.121	.648	.212	2.993**
	Self-efficacy	Life satisfaction	.602	.534	2.922**		

* $p < .05$, ** $p < .01$, *** $p < .001$

3.5 Discussion

This study evaluated the influence of participation intention on self-efficacy and life satisfaction among Korean users of an indoor golf simulator. Since its introduction, indoor virtual golf has gained popularity due to its affordability and cost-effectiveness compared to traditional golf courses [45, 46]. This study found that skill development significantly enhances self-efficacy among indoor virtual golf users, with a considerable positive effect ($B = .518$, $\beta = .601$, $p < .001$). Socialization also contributes positively to self-efficacy ($B = .401$, $\beta = .463$, $p < .001$). However, increased physical activity is associated with a decrease in self-efficacy ($B = -.342$, $\beta = -.523$, $p < .001$). Also, joyfulness emerged as a significant positive predictor of life satisfaction ($B = 1.259$, $\beta = 1.161$, $p < .001$), while skill development and socialization had no significant impact. Thus, our findings support the research by Biscaia et al. [20], which reported that the emotion of joy had a direct positive effect on satisfaction. Conversely, physical activity had a negative influence on life satisfaction ($B = -.353$, $\beta = -.463$, $p = .007$). Furthermore, self-efficacy fully mediates the relationship between participation intention and life satisfaction. While participation intention alone did not significantly improve life satisfaction, the strong effect of self-efficacy on life satisfaction was observed ($\beta = .534$, $p < .01$) when it was selected as a mediator. Thus, self-efficacy could be considered as a mediator between participation intention and life satisfaction. Lee and Kwon [1] supported our findings on the psychological benefits of virtual golf participation. Bum et al. [2] differentiated between actual and virtual golf experiences, highlighting that both forms offer physical and social benefits, which is partially consistent with our findings on the positive effects of skill development and socialization. Our findings indirectly support the research by Han et al. [47], which suggested that the psychological and social factors could influence recreation consumers to choose a 'virtual' rather than 'real' leisure activity. Comparing with Ouyang et al. [13] and Yu et al. [14], our study's findings on the negative correlation between physical activity and self-efficacy are unexpected. Typically, physical activity is associated with positive psychological outcomes. The discrepancy may be due to the nature of virtual sports versus traditional physical activities, warranting further investigation into how virtual physical activities influence psychological constructs differently. Additionally, Fernández-Ballesteros et al. [9] emphasized the importance of social and demographic factors in life satisfaction, aligning with our findings that socialization positively influences self-efficacy. However, our study diverges from their conclusions by finding no significant impact of socialization on life satisfaction, suggesting that the virtual context may alter these dynamics. Also, Collins et al. [6] indicated that early sports participation enhances self-esteem and happiness, resonating with our findings that skill development boosts self-efficacy. However, the lack of impact on life satisfaction from skill development in our study suggests that while self-efficacy is critical, other factors in the virtual golf environment may modulate its influence on broader life satisfaction. In summary, this study offers valuable insights into how participation intention in indoor virtual golf influences self-efficacy and life satisfaction among South Korean users. Key findings include the significant enhancement of self-efficacy through skill development and the notable positive impact of joyfulness on life satisfaction, highlighting the psychological benefits of indoor virtual golf. Self-efficacy is also shown to be a crucial mediator between participation intention and life satisfaction, underscoring the importance of self-belief in improving personal well-being for the players. However, this study also uncovers limitations that should be addressed in future research. The negative correlation between physical activity and both self-efficacy and life satisfaction was unexpected and suggests that physical engagement in virtual golf may not meet participants' anticipations, warranting further exploration. Our study's generalizability is constrained to South Korean indoor virtual golf users, suggesting a need to examine these dynamics in broader populations and other virtual sports contexts. Moreover, reliance on self-reported data could introduce response biases, potentially affecting the validity of the findings. These limitations highlight areas for improvement in

understanding the complex interactions in virtual sports participation.

4. Conclusion and future scope

This study found a significant positive impact of skill development on self-efficacy among indoor virtual golf users, supporting the hypothesis that participation in indoor virtual golf increases self-efficacy. Socialization positively influenced self-efficacy, whereas increased physical activity was associated with decreased self-efficacy. Joyfulness was identified as a significant positive predictor of life satisfaction. Skill development and socialization did not significantly impact life satisfaction, and physical activity had a negative influence. This study confirmed that self-efficacy fully mediates the relationship between participation intention and life satisfaction, emphasizing the importance of self-belief derived from participation intentions in enhancing life satisfaction. This study delved into the effects of participation in indoor virtual golf on self-efficacy and life satisfaction among Korean adults, uncovering several key insights. Notably, the process of developing skills within a virtual environment was observed to bolster participants' confidence in their abilities, underscoring the potential of virtual simulations to enhance perceived self-efficacy. Moreover, the social dynamics present within the virtual sports context appeared to positively influence users' self-belief, pointing to the value of interactive and communal aspects in such settings. Additionally, emotional experiences derived from the activity, particularly joyfulness, were found to be integral to the participants' overall life satisfaction, highlighting the significance of affective outcomes in leisure activities. However, the study's findings are subject to certain limitations that should be acknowledged. The use of convenience sampling raises concerns regarding the representativeness of the sample, suggesting that the results may not generalize across the broader population of indoor virtual golf enthusiasts. The cross-sectional research design also constrains the ability to infer causation from the observed relationships. Additionally, the unexpected negative correlation between physical activity and self-efficacy suggests complexity that warrants further qualitative research to unravel the factors contributing to this association. This study presents intriguing evidence on the psychological benefits of virtual sports participation but also emphasizes the necessity for more nuanced and comprehensive future studies. Subsequent research could benefit from employing a broader, more representative sampling strategy, a longitudinal approach to establish causality, and an in-depth exploration of the factors influencing the relationship between physical activity and self-efficacy in virtual sports settings.

Reference

- [1] Lee, J.R. & Kwon, K.N. Popularity of screen golf in Korea and its sociocultural meaning. *Int. J. Environ. Res. Public Health* 2021; 18:13178. <https://doi.org/10.3390/ijerph182413178>
- [2] Bum, C.H., Yang, J.H. & Choi, C. Leisure benefits, flow experience, and life satisfaction comparison between players of actual and virtual golf. *Soc. Behav. Pers.* 2022;50(5):1-12. <https://doi.org/10.2224/sbp.10657>
- [3] Bandura, A. Self-efficacy: Toward a unifying theory of behavioral change. *Psychol. Rev.* 1977; 84: 191-215. <https://doi.org/10.1037/0033-295X.84.2.191>
- [4] Fishbein, M. & Ajzen, I. Belief, attitude, intention, and behavior: An introduction to theory and research. 1975.
- [5] Anderson, E.S., Wojcik, J.R., Winett, R.A., & Williams, D.M. Social-cognitive determinants of physical activity: The influence of social support, self-efficacy, outcome expectations, and self-regulation among participants in a church-based health promotion study. *Health Psychol.* 2006; 25(4): 510–520. <https://doi.org/10.1037/0278-6133.25.4.510>
- [6] Collins, N.M., Cromartie, F., Butler, S., & Bae, J. Effects of early sport participation on self-esteem and happiness. *Sport J.* 2018; 20: 1–20. <http://doi.org/>
- [7] Orth, U. & Robins, R.W. The development of self-esteem. *Curr. Dir. Psychol. Sci.* 2014; 23(5): 381–387. <https://doi.org/10.1177/0963721414547414>
- [8] Dewar, A.J. & Kavussanu, M. Achievement goals and emotions in golf: The mediating and moderating role of perceived performance. *Psychol. Sport Exerc.* 2011; 12: 525–532. <https://doi.org/10.1016/j.psychsport.2011.05.004>
- [9] Fernández-Ballesteros, R.; Zamarrón, M.D.; Ruiz, M.A. The contribution of socio-demographic and psychosocial factors to life satisfaction. *Ageing Soc.* 2001; 21: 25-43. <https://doi.org/10.1017/S0144686X01008120>
- [10] Pavot, W. & Diener, E. The satisfaction with life scale and the emerging construct of life satisfaction. *J. Posit. Psychol.* 2008; 3(2): 137-152. <https://doi.org/10.1080/17439760701756946>
- [11] Kwon, Y.H., Cheung, Y.K. & Ahn, B.W. Effect of outdoor sports participants on leisure facilitation, recreation specialization, and leisure satisfaction: yacht and golf participants. *Int. J. Environ. Res. Public Health* 2021; 18(24): 8128. <https://doi.org/10.3390/ijerph18158128>
- [12] Park, K. & Lim, S. An indoor golf simulator for continuous golf games. *Int J Smart Home.* 2013; 7: 75-84.
- [13] Ouyang, Y., Wang, K., Zhang, T., Peng, L., Song, G., & Luo, J. The influence of sports participation on body image, self-efficacy, and self-esteem in college students. *Front. Psychol.* 2020; 10: 499087.

<https://doi.org/10.3389/fpsyg.2020.499087>

- [14] Yu, G. & Song, Y. What affects sports participation and life satisfaction among urban residents? The role of self-efficacy and motivation. *Front. Psychol.* 2022; 13: 884953. <https://doi.org/10.3389/fpsyg.2022.884953>
- [15] Creyer, E., Ross, W., & Evers, D. Risky recreation: An exploration of factors influencing the likelihood of participation and the effects of experience. *Leis. Stud.* 2003; 22: 239-253. <https://doi.org/10.1080/026143603200075490>
- [16] Jones, M.I. & Lavalley, D. Exploring perceived life skills development and participation in sport. *Qual. Res. Sport Exerc.* 2009; 1: 36-50. <https://doi.org/10.1080/19398440802567931>
- [17] Atkins, M.R., Johnson, D.M., Force, E.C., & Petrie, T.A. Peers, parents, and coaches, oh my! The relation of the motivational climate to boys' intention to continue in sport. *Psychol. Sport Exerc.* 2015; 16: 170-180. <https://doi.org/10.1016/j.psychsport.2014.10.008>
- [18] Weiss, M.R. Youth sport motivation and participation: Paradigms, perspectives, and practicalities. *Kinesiol. Rev.* 2019; 8(3): 162-170. <https://doi.org/10.1123/kr.2019-0024>
- [19] Dowling, F. Physical education teacher educators' professional identities, continuing professional development and the issue of gender equality. *Phys. Educ. Sport Pedagogy.* 2006; 11(3): 247-263. <https://doi.org/10.1080/17408980600708346>
- [20] Biscaia, R., Correia, A., Rosado, A., Maroco, J., & Ross, S. The effects of emotions on football spectators' satisfaction and behavioural intentions. *ESMQ*, 2012; 12: 227-242. <https://doi.org/10.1080/16184742.2011.635505>
- [21] Stevenson, C. L. Socialization effects of participation in sport: A critical review of the research. *Research Quarterly. American Alliance for Health, Phys. Educ. Recreat.*, 1975; 46: 287-301.
- [22] Sato, M., Jordan, J.S., & Funk, D.C. A distance-running event and life satisfaction: The mediating roles of involvement. *Sport Manag. Rev.* 2016; 19: 536-549. <https://doi.org/10.1016/j.smr.2016.03.004>
- [23] Schunk, D.H. Self-efficacy and achievement behaviors. *Educ. Psychol. Rev.* 1989; 1: 173-208. <https://doi.org/10.1007/BF01320134>
- [24] Bandura, A. Self-Efficacy: The Foundation of Agency. *Psychol. Press.* 2013; 16-30.
- [25] Stiggins, R. Assessment for learning in upper elementary grades. *Phi Delta Kappan* 2009; 90: 419-421. <https://doi.org/10.1177/003172170909000603>
- [26] Pajares, F. Current directions in self-efficacy research. *Adv. Motiv. Achiev.* 1997; 10: 1-49.
- [27] Lim, K. C. University students' attitude, self-efficacy and motivation regarding leisure time physical participation. *J. Pendidik Dan Pendidikan.* 2009; 24: 1-15.
- [28] Green, Z.A. The mediating effect of well-being between generalized self-efficacy and vocational identity development. *Int. J. Educ. Vocat. Guid.* 2020; 20: 215-241. <https://doi.org/10.1007/s10775-019-09396-z>
- [29] Li, M., Wang, Z., Gao, J. & You, X. Proactive personality and job satisfaction: The mediating effects of self-efficacy and work engagement in teachers. *Curr. Psychol.* 2017; 36: 48-55. <https://doi.org/10.1007/s12144-015-9383-1>
- [30] Hsieh, C.W., Hsieh, J.Y., & Huang, I.Y.F. Self-efficacy as a mediator and moderator between emotional labor and job satisfaction: A case study of public service employees in Taiwan. *Public Perform. Manag. Rev.* 2016; 40: 71-96. <https://doi.org/10.1080/15309576.2016.1177553>
- [31] Oladipo, S.E.; Adenaike, F.A.; Adejumo, A.O.; Ojewumi, K.O. Psychological predictors of life satisfaction among undergraduates. *Procedia Soc. Behav. Sci.* 2013; 82: 292-297.
- [32] <https://doi.org/10.1016/j.sbspro.2013.06.261>
- [33] Neugarten, B.L.; Havighurst, R.J.; Tobin, S.S. The Measurement of Life Satisfaction. *J. Gerontol.* 1961; 16: 134-14. <https://doi.org/10.1093/geronj/16.2.134>
- [34] Medley, M.L. Satisfaction with life among persons sixty-five years and older: a casual model. *J. Gerontol.* 1976; 31: 448-455. <https://doi.org/10.1093/geronj/31.4.448>
- [35] Campbell, A. Subjective measures of well-being. *Am. Psychol.* 1976; 31: 117-124. <https://doi.org/10.1037/0003-066X.31.2.117>
- [36] Cotton Bronk, K.; Hill, P.L.; Lapsley, D.K.; Talib, T.L.; Finch, H. Purpose, hope, and life satisfaction in three age groups. *J. Posit. Psychol.* 2009; 4: 500-510. <https://doi.org/10.1080/17439760903271439>
- [37] Veenhoven, R. Happiness: Also known as "life satisfaction" and "subjective well-being". In *Handbook of Social Indicators and Quality of Life Research*; Springer Netherlands: Dordrecht, 2011; pp. 63-77. https://doi.org/10.1007/978-94-007-2421-1_3
- [38] Diener, E.D.; Emmons, R.A.; Larsen, R.J.; Griffin, S. The satisfaction with life scale. *J. Pers. Assess.* 1985; 49(1): 71-75. https://doi.org/10.1207/s15327752jpa4901_13
- [39] Tan, S.J.; Tambyah, S.K. Shifting values and life satisfaction: A sequential cross-sectional study of the influence of values on subjective wellbeing in Singapore. *Soc. Indic. Res.* 2016; 127: 1391-1416. <https://doi.org/10.1007/s11205-015-1008-1>
- [40] McGuinn, K.K.; Mosher-Ashley, P.M. Participation in recreational activities and its effect on perception of life satisfaction in residential settings. *Act. Adapt. Aging* 2001; 25: 77-86. https://doi.org/10.1300/J016v25n04_05
- [41] Cook, D.A.; Artino Jr, A.R. Motivation to learn: an overview of contemporary theories. *Med. Educ.* 2016; 50(1): 997-1014. <https://doi.org/10.1111/medu.13074>
- [42] Kan, B.; Xie, Y. Impact of sports participation on life satisfaction among internal migrants in China: The chain

mediating effect of social interaction and self-efficacy. *Acta Psychol.* 2024; 243: 104139.

<https://doi.org/10.1016/j.actpsy.2023.104139>

- [43] Astaficevs, A.; Vazne, Z.; Fernate, A. Adaptation of questionnaires on psychological performance, sports mental toughness and general self-efficacy. *LASE J. Sport Sci.* 2020; 11(1): 3-17. <https://doi.org/10.2478/ljss-2020-0001>
- [44] Sherer, M.; Maddux, J.E.; Mercandante, B.; Prentice-Dunn, S.; Jacobs, B.; Rogers, R.W. The self-efficacy scale: Construction and validation. *Psychol. Rep.* 1982; 51: 663-671. <https://doi.org/10.2466/pr0.1982.51.2.663>
- [45] Yazicioglu, K.; Yavuz, F.; Goktepe, A.S.; Tan, A.K. Influence of adapted sports on quality of life and life satisfaction in sport participants and non-sport participants with physical disabilities. *Disabil. Health J.* 2012; 5: 249-253. <https://doi.org/10.1016/j.dhjo.2012.05.003>
- [46] Hwang, C.-S. The effect of user satisfaction on reuse intention of screen golf products by lifestyle of customers in screen golf clubs. *Korean J. Sports Sci.* 2017; 26: 273–283.
- [47] Seong, B.H. & Hong, C.Y. Corroborating the effect of positive technology readiness on the intention to use the virtual reality sports game “Screen Golf”: Focusing on the technology readiness and acceptance model. *Inf. Process. Manag.* 2022; 59: 102994. <https://doi.org/10.1016/j.ipm.2022.102994>
- [48] Han, H., Hwang, J., & Woods, D.P. Choosing virtual–rather than real–leisure activities: An examination of the decision–making process in screen-golf participants. *Asia Pac. J. Tour. Res.* 2014; 19: 428-450. <https://doi.org/10.1080/10941665.2013.869805>