

# Uncovering the dynamic relationship between intrinsic motivation and basic softball skills: An exploratory analysis

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## ABSTRACT

Physical education (PE) is a pivotal domain, offering students valuable opportunities for excelling in multiple sports performances when harmonized with contemporary curricula that emphasize cognitive engagement through intrinsic motivation. This blend has the potential to enhance not only softball skills but also performance across various sports. This study investigated the relationship between intrinsic motivation (interest, enjoyment, and personal challenge) and fundamental softball performance skills among 30 active students ( $F = 15$ ;  $M = 15$ ) enrolled in the Indonesian University of Education's physical education program. It employed an ex post facto research design and quantitative method, utilizing the Sport Motivation Scale (SMS) ( $0.779 > 0.05$ ) and O'Donnell Softball Test ( $0.701 > 0.05$ ), both instruments demonstrated good reliability and validity. Results from data analysis in IBM SPSS 25.0, reveal that interest and enjoyment moderately correlate but lack of significant impact softball skills. However, personal challenge shows a strong positive correlation with interest and enjoyment. Although personal challenge does not directly influence softball skills, it plays a crucial role in fostering interest and enjoyment in sports. Understanding intrinsic motivation's impact on skill development can inform effective teaching methods and encourage greater engagement in physical activities for improved overall well-being. This research provides insights for educators and coaches to design learning experiences that incorporate challenges and promote intrinsic motivation, enhancing students' engagement and skill development in physical education activities. Future research could explore intrinsic motivation's impact on softball skills across diverse skill levels, considering factors like the learning environment, individual differences, and coaching styles for optimized skill development.

**Keywords:** Intrinsic motivation; softball skills; physical education

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## INTRODUCTION

Physical education (PE) learning serves as a vital domain for students to acquire and enhance motor skills and physical fitness (Behzadnia et al., 2019; Sun et al., 2017). Research indicates that active learning in PE yields positive outcomes in terms of skill acquisition, motor development, physical fitness, and overall well-being (Chen et al., 2016; Lopes et al., 2017; Norris et al., 2020; Spittle, 2021; Tomporowski & Pesce, 2019). The current design and implementation of PE curricula emphasize the active engagement of cognitive functions in the learning process (Rahmadayanti & Hartoyo, 2022; Winarni et al., 2023). By incorporating cognitive function values within sports, particularly within the context of PE, there is significant potential for fostering expertise development in specific sports (Koh et al., 2016; Pesce et al., 2021). Notably, when individuals undergo more complex training, their physical activity positively influences skill acquisition (Cooper et al., 2018).

A recent study by Alvarez-Bueno et al. (2017), Bustamante et al. (2016), and Pesce et al. (2021) showed that cognitive function is important in many areas, such as academics, sports, and overall health. It also shows a strong relationship with motor skills and physical performance, which suggests that children could benefit greatly from physical activity programmes that improve their cognitive function and academic performance. Moreover, the fulfilment of psychological needs, such as intrinsic motivation, has been found to exert a positive influence on cognitive function (Deci & Ryan, 2016; Hutmacher et al., 2020), thereby impacting sports skill performance. This observation aligns with the findings of Wulf and Lewthwaite (2016) say about how important it is to encourage intrinsic motivation, which is driven by satisfaction rather than external pressures, in order to improve performance and long-term engagement. They say this is because extrinsic rewards can weaken intrinsic drive when they are introduced and then taken away. The interplay between cognitive function, intrinsic motivation, and sports skills, exemplified by softball as a specific branch of sports, bears significant implications for the process of learning and teaching in PE. In fact, an examination of intrinsic motivation within the realm of PE reveals notable enhancements in student learning and the development of skill performance within the fitness context (Wollesen et al., 2022).

Intrinsic motivation, characterized as an internal drive for engaging in an activity for its inherent value, has been widely recognized for its positive impact, particularly in fostering intrinsic motivation and proficiency in fundamental skills across various sports, including softball (Appelbaum et al., 2016; Negara et al., 2021; Ryan & Deci, 2020). Multiple studies have demonstrated that intrinsically motivated individuals exhibit greater active participation in PE learning (Moy et al., 2016). Notably, the effect of high intrinsic motivation on learning outcomes appears to be more pronounced among male students compared to their female counterparts (Baena-Extremera et al., 2014).

Furthermore, softball is a sport that demands cognitive functioning, underpinned by high levels of intrinsic motivation and fundamental skill abilities, as substantiated by various studies (Appelbaum et al., 2016; Furley et al., 2015; Menescardi et al., 2022; Negara et al., 2021). These studies highlight the interconnectedness of intrinsic motivation with cognitive factors such as beliefs, expectations, and students' needs, which in turn influence their level of comfort, predictability, and understanding, aligning with cognitive theories of motivation (Gottfried, 2019; Grant Jr & Hill, 2020; McCombs, 2013; Wiseman & Hunt, 2013). Moreover, these investigations often delve into the intrinsic aspects of motivation, such as interest, enjoyment, and personal challenge, rather than external rewards or pressures. Consequently, individuals who are intrinsically motivated to engage in sports, like softball, are more likely to exhibit enhanced skill performance compared to those who are extrinsically motivated (Deci & Ryan, 2013). This connection underscores the vital role of intrinsic motivation in both sports and academic contexts.

Understanding motivation in sports is crucial to the development of fundamental skills and the impact of intrinsic motivation on skill performance in sports can vary (Badarnee et al., 2020). As evidenced by studies conducted by Gil-Arias et al. (2017), Sun et al. (2017), and Wallhead et al. (2014), it becomes clear that interest and enjoyment significantly contribute to skill performance in the learning process, whereas the impact of personal challenge on such performance may not exhibit a similar effect. However, other research indicates a positive correlation between intrinsic motivation, particularly personal challenge, and skill performance in certain sports (Huéscar Hernández et al., 2020). Similarly, enjoyment has been shown to be significantly

related to sports skill performance (Bidzan-Bluma & Lipowska, 2018; Trecroci et al., 2021). Moreover, diverse research has shown different outcomes (Beni et al., 2017; Bernacki & Walkington, 2018; White et al., 2021) for the three dimensions of intrinsic motivation-interest (Alesi et al., 2019), enjoyment (Gil-Arias et al., 2017; Sun et al., 2017), and personal challenge (Hamari et al., 2016). Overall, personal challenge may be the most influential type of intrinsic motivation for enhancing cognitive and overall performance in sports.

While some studies have investigated the effects of different types of intrinsic motivation, such as interest, enjoyment, and personal challenge, on sports skills. Research specifically examining the impact of intrinsic motivation on softball skills remains relatively limited. Softball is a sport that entails moderate to high levels of physical and cognitive demands (Negara et al., 2021), requiring proficiency in fundamental technical skills. When individuals derive enjoyment and interest from their experiences, they are motivated to pursue skill mastery. Moreover, participation in physical education activities, such as a softball game, can generate positive feelings of enjoyment and attraction (An, 2019; Diener, 2013). Interest, as a component of intrinsic motivation, serves as a foundation for learning (Amabile, 2018; Plass et al., 2015). If intrinsic motivation, including interest, supports sustained involvement and interest in physical education, it can have a considerable impact. The challenges inherent in learning softball can heighten students' interest and enjoyment, leading to anticipated skill improvements. Therefore, this research aims to address these gaps and provide a comprehensive understanding of the relationship between various aspects of intrinsic motivation (interest, enjoyment, and personal challenge) and fundamental softball skills. Given the aforementioned knowledge gaps, the researcher is motivated to investigate the connection between different forms of intrinsic motivation and basic softball skills in the learning process.

## METHOD

The research employed a correlational and differentiating research design using ex post facto research and quantitative methods. The primary objective was to investigate the relationship between various dimensions of intrinsic motivations, namely interest (X1), enjoyment (X2), and personal challenge (X3) and softball skills (Y) following the completion of the learning process. Additionally, the study aimed to determine which dimension exhibited the greatest motivational value.

### Population and Sample

The population and sample for this study consisted of 30 active students (F = 15; M = 15) from the physical education study program at the Faculty of Education Sport and Health, Indonesian University of Education. The sampling technique employed was systematic random sampling, with the following criteria: (1) students enrolled in softball courses, (2) students from the class of 2020, and (3) students who willingly participated in the research tests.

### Instrument

The Sport Motivation Scale (SMS), developed by Pelletier et al. (2013), was used as the instrument to measure intrinsic motivation. The scale comprises 28 items distributed across three dimensions: (1) interest, (2) enjoyment, and (3) personal challenge. Furthermore, the O'Donnell Softball Test (Fufu et al., 2021) instrument was utilized to assess softball skills, encompassing five items encompassing three aspects of the test: (1) throwing, (2) catching, and (3) hitting. Both instruments have been validated and deemed reliable through testing using IBM SPSS 25.0, yielding Cronbach's alpha values of 0.779 (> 0.05) for the SMS and 0.701 (> 0.05) for the O'Donnell test.

### Statistical Analysis

Data analysis was performed using IBM SPSS 25.0 to examine the relationship between interest and softball skills, enjoyment and softball skills, and personal challenge and softball skills. The strongest dimension of intrinsic motivation was also determined. The SMS data obtained through the questionnaires were processed using a Likert scale (1-7), while the O'Donnell test data were analyzed with a significance level set at p-value of 0.05 (5%). The analytical steps involved assessing instrument validity and reliability,

conducting normality tests, performing linear tests, conducting correlation analyses, and performing independent variable comparison tests.

## RESULTS AND DISCUSSION

The data used in this study were obtained from the research instruments. Data analysis was conducted using IBM SPSS version 25.

**Table 1. Results of the Normality Test**

Tests of Normality					
	Shapiro-Wilk			Explanation	Status
	Statistics	df	Sig.		
Softball Skills	0.923	30	0.032	$P < 0.05$	Abnormal
Interest	0.944	30	0.115	$P > 0.05$	Normal
Enjoyment	0.954	30	0.220	$P > 0.05$	Normal
Personal Challenge	0.976	30	0.705	$P > 0.05$	Normal

Based on the table above one of the variables shows non-normally distribution (softball skills), while the other three variables (interest, enjoyment, personal challenge) exhibit normal distribution. The significance value (Sig. or P-value) for the softball skills Sig. (P) = 0.032 < 0.05, indicates non-normally distribution, potentially violating the normality assumption for that variable.

**Table 2. Linearity Test**

Tests of Normality			
	Sig.	Explanation	Status
Softball Skills - Interest	0.062	$P > 0.05$	Normal
Softball Skills - Enjoyment	0.525	$P > 0.05$	Normal
Softball Skills - Personal Challenge	0.078	$P > 0.05$	Normal

Table 2 shows a linear relationship between the independent variables (interest, enjoyment, personal challenge) and the dependent variable (softball skills) based on the significance values (Sig. or P-values) (> 0.05), satisfy the linearity assumption. However, normality test results indicate non-normal distribution, necessitating the use of non-parametric tests for further analysis.

**Table 3. Rank Spearman Correlation Test Results**

Correlations						
		Interest	Enjoyment	Personal Challenge	Softball skills	
Spearman's rho	Interest	Correlation Coefficient	1.000	0.352	0.497	-0.044
		Sig. (2-tailed)		0.056	0.005	0.816
		N	30	30	30	30
	Enjoyment	Correlation Coefficient	0.352	1.000	0.836	0.105
		Sig. (2-tailed)	0.056		0.000	0.581
		N	30	30	30	30
	Personal Challenge	Correlation Coefficient	.497	.836	1.000	0.066
		Sig. (2-tailed)	0.005	0.000		0.730
		N	30	30	30	30
	Softball skills	Correlation Coefficient	-0.044	0.105	0.066	1.000
		Sig. (2-tailed)	0.816	0.581	0.730	
		N	30	30	30	30

Table 3 presents the results of the relationship between the variables using the rank Spearman correlation (Sig. (P) < 0.05), a non-parametric test. Upon examining the data, all Sig. (P) values between the independent variables (interest (X1), enjoyment (X2), and personal challenge (X3) and softball skills (Y) as the depend variable are greater than 0.05, indicating no significant correlation. The insignificant correlations suggest that interest (Sig. (P) = 0.816,  $r = -0.044$ ), enjoyment (Sig. (P) = 0.581,  $r = 0.105$ ), and personal challenge (Sig. (P) = 0.730,  $r = 0.066$ ) do not significantly influence softball skill development in the context of physical education learning.

The analysis reveals that there is no significant correlation between interest in softball and actual skills, indicating a very weak and insignificant negative correlation ( $r = -0.044$ ). This implies that a strong liking for softball does not necessarily translate into proficiency in the sport. To improve sports skills, especially in activities like softball, it becomes crucial to tailor learning experiences according to students' preferences, recognising that not all students are inherently motivated or interested in every sporting activity (Sun et al., 2017). It is essential to grasp students' perspectives and address any negative sentiments associated with uninteresting sports activities. According to Schunk (2013), this strategy is also essential for fostering motivation and skill development.

Similarly, the examination of the relationship between enjoyment and softball skills produces an insignificant result ( $r = 0.105$ ), suggesting that lower levels of enjoyment do not significantly hinder the improvement of softball skills. These finding challenges previous research suggesting that enjoyment and intrinsic motivations, when supported by peers and teachers, can positively influence physical activity intentions (White et al., 2021), especially in the context of physical education where basic skill ability is emphasized. Interestingly, individuals with higher skill levels may derive greater enjoyment from the sport. The unidirectional and insignificant correlation between enjoyment and softball skills in the context of physical education may be attributed to the low self-competence of the sample population (Jaakkola et al., 2016). These triggers can create a motivational climate that promotes enjoyment (Warburton, 2017). Furthermore, age-related changes in enjoyment, self-competence, and the learning environment could potentially have an impact on the lack of a significant relationship between enjoyment and skill outcomes (Atkins et al., 2015; Gil-Arias et al., 2020; Perlman, 2013; Timo et al., 2016). Overall, these findings underscore the importance of understanding and catering to individual preferences and motivations when designing sports education programmes.

The correlation between personal challenge and softball skills also resulted in an insignificant outcome ( $r = 0.066$ ), indicating that lower levels of personal challenge are not significantly associated with lower levels of softball skills. The study's results align more with the profile of amotivation/controlling motivation, which implies low personal challenge and effort (Buišić & Đorđić, 2019). The lack insignificance may be due to the unattractiveness attributed to the early learning process's (Bailey, 2018), which was not investigated where personal challenge might not play a prominent role. Personal challenge in students extends beyond playing games, focusing more on learning and fun experiences to avoid boredom (Beni et al., 2017; Dichev et al., 2014; Magolda, 2014; Siedentop et al., 2019; Sulea et al., 2015).

Furthermore, the correlations between interest and enjoyment were found to be insignificant (Sig. (P) = 0.056),  $r = 0.352$ , suggesting that higher levels of interest are not significantly related to higher levels of enjoyment. However, there was a significant positive correlation between personal challenge and both interest (Sig. (P) = 0.005),  $r = 0.497$ , and enjoyment (Sig. (P) = 0.000),  $r = 0.836$ , indicating that higher levels of personal challenge are significantly associated with higher levels of interest and enjoyment. These findings are consistent with research (Smith & Hardin, 2018; Weinberg & Gould, 2023), showing that some students seek greater challenges and associate them with enjoyment and fun even to improving competitive skills (Siedentop et al., 2019; Jakobsson, 2014). Overall, this study highlights the limited impact of intrinsic motivation factors, such as interest, enjoyment, and personal challenge, on softball skill development within the physical education learning context. Further investigation into the learning process and students' perspectives may provide valuable insights to enhance sports skill development in physical education.

**Table 4. Non-Parametric Difference Test using the Kruskal Wallis Test**

Intrinsic Motivation	N	Mean Ranking	Asymp. Sig.	Kruskal-Wallis H
Interest	30	21.70	0.000	45.418
Enjoyment	30	47.87		
Personal Challenge	30	66.93		

Table 4 reveals result, it can be observed that Asymp. Sig. (P-Value) = 0.000 < 0.05, indicating significant differences in intrinsic motivation related to interest, enjoyment, and personal challenge. The greatest level of intrinsic motivation is found in the personal challenge dimension. In line with Self-Determination Theory (Buišić & Đorđić, 2019; Ryan & Deci, 2020), the fulfilment of three psychological needs is used as a determinant in designing learning activities based on interest, enjoyment, and personal challenge. The research findings highlight the importance of personal challenge as the strongest dimension of the three intrinsic motivation dimensions.

However, despite the strong relationship between these dimensions, there was no significant association with softball skills that demands a high level of cognitive ability (Negara et al., 2021), particularly with the personal challenge dimension was just related to interest and enjoyment. This insignificance might be attributed to the participants' maturity level (upper 21 years as junior year university students) and the learning environment provided during the process. Not measuring participants' self-competence skills and motor educabilities could also have overlooked other aspects of their performance. The learning model and environment provided during the learning process also warrant consideration when interpreting the data.

## CONCLUSION

This research explored the relationship between intrinsic motivation and fundamental softball performance skills in the context of physical education learning. The findings highlight the importance of intrinsic motivation, particularly personal challenge, in fostering interest, enjoyment, and skill development in sports, contributing to students' overall well-being. The study revealed that interest and enjoyment showed a moderate correlation but did not significantly impact softball skills. However, personal challenge displayed a strong positive correlation with interest and enjoyment, indicating that higher levels of personal challenge can lead to increased interest and enjoyment in the sport. Despite this significant correlation with intrinsic motivation, personal challenge did not directly influence softball skills, potentially due to the specific cognitive demands of softball and the maturity level of the participants.

It is essential for educators and coaches to recognize the significance of personal challenge in enhancing students' interest and enjoyment in sports. By designing learning experiences that incorporate challenges and foster intrinsic motivation, educators can potentially improve skill development and overall engagement in physical education activities. However, it is also important to acknowledge that not all intrinsic motivation dimensions had a significant impact on softball skills. This highlights the complexity of the relationship between intrinsic motivation and skill performance, which may vary depending on the individual and the specific sport being studied.

For future research, it would be valuable to investigate intrinsic motivation and its impact on softball skills across a larger and more diverse sample, including individuals at different stages of skill development. Additionally, exploring the role of the learning environment, coaching styles, and individual differences in intrinsic motivation can provide further insights into optimizing skill development in sports. In conclusion, this study contributes to the understanding of how intrinsic motivation, particularly personal challenge, can influence interest, enjoyment, and fundamental softball skills in physical education. By fostering students' intrinsic motivation through appropriate challenges and learning experiences, educators can create a positive and supportive environment for skill development, promoting overall well-being and physical fitness among students.

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## CONFLICT OF INTEREST

There is no conflict interest whatsoever in this research.

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