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PHYSICAL ACTIVITY

Athletic Identity: An Observational Assessment of Physical Activity Motivation and Potential Implications for Educators

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Abstract

Identifying as an athlete can shape how one perceives themselves and affects their motivation to be physically active. The purpose of this study was to examine the motivational relationship between athletic identity and physical activity motivation among college students. This study recruited 343 (65.6%, Female) undergraduate college students from a midsized midwestern university. A cross-sectional design was used to examine several types of variables related to athletic identity, motivation, and physical activity. Correlations and ANOVA analyses were used to assess associations and variable differences. While athletes reported significant relationships between all the constructs of athletic identity, non-athletes reported significantly higher athletic identity motivational constructs. Athlete identification can be used as an impacting factor of health behaviors directly influencing the prediction

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of future health behaviors. College campuses accommodate students through intramurals, but a larger exploration should be completed as more people reclaim the term "athlete." By incorporating elements of athletic identity within the health and/or a physical education curriculum, teachers could create an additional pathway to connect with students and potentially motivate them to adopt and maintain physically active lifestyles, all while mitigating the negative consequences associated with athletic identity loss.

Introduction

Today, athletes are traditionally referred to as individuals who participate in an organized team or individual sport competition, which is normally sanctioned by an overarching body to properly recognize achievement in the sport (Maron & Zipes, 2005; McKinney et al., 2019). Participating in physical activity (PA) through sport (athletics) has been found to be associated with physical and mental health status (Malm et al., 2019). However, losing the ability to adequately participate through these avenues (losing one's athletic identity) can have negative effects to physiological and psychological aspects of health commonly due to associated physical inactivity across younger and older age groups which can lead to the onset of chronic diseases as well as mental health issues (Ba et al., 2024; Booth et al., 2012; Edison et al., 2021; Giannone et al., 2017; Lamont-Mills & Christensen, 2006; Paffenbarger et al., 1994).

While it is relatively easy to participate and identify with the traditional definition of an athlete among adolescents, continuing to maintain this type of athletic identity becomes increasingly difficult as the number of athletes who can pursue higher levels of competition dramatically decrease post-secondary education. The loss of athletic identity may be a prevalent cause in explaining changes in behavioral motivation which result from physical inactivity during the college years of students (Caspersen et al., 2000; Kwan et al., 2012).

As many traditional athletes begin to transition away from athletic identity during their secondary education, physical and health educators could play an important role in teaching students how to properly make the transition from traditional athlete to recreational athlete. This proper transition may help to limit the observed adoption of physical inactivity, which results in decreased quality of life

via physiological and psychological pathologies. Furthermore, understanding athletic identity may allow health and physical educators to better relate to their students, and assist in educating athletes for lifelong health-enhancing habits. Continuously, understanding how athletic identity and PA motivation are associated may also lead to better behavioral interventions seeking to improve health related behaviors such as PA. To gain further insight, the present study sets out to explore the relationship between athletic identity and the related motivation to participate in PA of undergraduate students attending a university in both athlete and non-athlete populations.

A Physically Active Lifestyle

Participation in regular PA is reported to improve both physical and mental health (Centers for Disease Control and Prevention, 2023). Even though partaking in regular PA can result in health benefits, many individuals face challenges and fail to meet the minimum recommendations, which include aerobics 150 mins/week and resistance 2 days/week (Bull et al., 2020; Piercy et al., 2018). This epidemic of physical inactivity has been shown to be a concern as only 22.9% of adults meet minimum requirements for both aerobic and strength-based activity, with 32.4% only meeting either minimum aerobic (53.3%) or resistance-based activity levels (46.7%) (Blackwell & Clarke, 2018).

Physical inactivity and sedentary behavior have been demonstrated to have detrimental effects on several aspects of one's health, resulting in increased chances of over 35 chronic diseases and mortality rates (Booth et al., 2012; Carlson et al., 2018; Lavie et al., 2019; Minihan et al., 2022; Ussery et al., 2021). Physical activity is a complex behavior that drastically influences an individual's quality of life and has been defined as body actions produced by skeletal muscles that expend energy past normal physiological requirements needed at rest and is integrated in formalized and nontraditional activities (Caspersen et al., 1985). While this epidemic of inactivity continues to have impactful consequences on the population (Blair, 2009; Strain et al., 2024), gaps still exist in explaining potential influencing factors of adulthood PA. Identifying these factors could increase the likelihood of maintaining adequate PA levels and prove vital in improving overall physiological and psychological health.

Athletic Identity's Role in Physical Activity

The term *athlete* can be confusing and loaded with stereotypes; however, the term has become increasingly popular among adults attempting to rekindle or maintain their physical fitness. Previous findings have postulated that while motivation to participate in PA is fluid throughout different stages of adulthood, adults of all age categories tend to be more heavily enticed to maintain PA when participating in group activity than individual activity (Molanorouzi et al., 2015). This relationship between willingness to participate in PA and type of social setting hints at a possible dynamic of individuals drawing motivation from the perception of being a team with a common goal and function (Anderson-Hanley et al., 2011; Edwards et al., 2018; Rhea et al., 2003; Zajonc & Sales, 1966), similar to what is seen in the traditional athletic communities and events they once experienced in high school, physical education class, or club sport activities.

Identifying as an athlete can play an important role in how someone perceives themselves and can serve as an important factor in an individual's self-efficacy to be physically active (Helms & Morris, 2020; Mathisen et al., 2023; Shapiro & Martin, 2010). Unfortunately, as an individual ages it becomes exponentially more difficult to identify with the traditional definition of an "athlete." As previously discussed, traditional athletic identity becomes harder to maintain as few individuals are able to progress to more elite spaces. However, with age also brings extra complexities of life such as work and family obligations which can limit opportunities for those who passed their sporting careers to rekindle their athletic identity. Not only could loss of athletic identity result in physical inactivity, which as outlined above is a primary contributor to chronic disease, but once lost it may be exponentially more difficult to regain.

Past studies have shown significant positive correlations between athletic identity and rehabilitation over-adherence among injured athletes (Choudhury et al., 2024; Edison et al., 2021; Hilliard et al., 2017; McGinley et al., 2022; Ohji et al., 2021; Renton et al., 2021). This demonstrates the link between how an individual identifies their self and motivation to take actions aimed at reinforcing their self-perceived identity (Festinger, 1957; Stryker, 1968). Research on this self-identity reinforcing drive has been primarily conducted in

athlete populations; however, a community-based running intervention conducted by Bowness et al. (2021) found similar motivational patterns where residents from the studied population reported increasing their leisure-based PA in order to help reinforce their identity as a running athlete. More work is needed to understand these connections, but there is a clear potential for athletic identity to be harnessed as a tool for multiple populations.

The relationship between athletic identity and motivation is not a mentality reserved for elite competitors but is likely a self-perception speculated to be found across all humans (Bifulco & Tirino, 2018; Jung, 1959). While traditional athletic roles may improve one's expression of this archetypal behavior, everyone may have the ability to tap into this subconscious motivation through self-identity and behavioral modification. Limited research exists examining how adults identify themselves, as it pertains to identifying as an athlete, in relation to current identity motivation and PA need satisfaction. Filling this gap in research allows for a better understanding of how to engrain daily healthy behaviors in an individual's life and could lead to more effective intervention techniques. Furthermore, it is vital to help traditional athletes avoid this identity loss as well as help nontraditional athletes adopt a proper athletic identity to help encourage a physically active lifestyle and in turn prevent the onset of multiple chronic diseases. Bridging this gap could also equip health and physical educators with a deeper understanding of athletic identity's potential to motivate students and cultivate lifelong habits that promote health and well-being.

Theoretical Framework

The notion of motivation includes the direction and intention of engaging in certain behavior. Motivation is a psychological construct which gravitates an individual toward a desired goal and is considered a psychological force that can fortify action (Cook & Artino, 2016). Through this interplay of psychological phenomena this is a guiding force which reinforces intentions toward goals and behaviors: self-identity[Au2.1] (Hagger et al., 2007; Rise et al., 2010; Simons, 2021; Wierts et al., 2024).

Self-identity is comprised of a series of enduring "self-images" related to intrapersonal and interpersonal experiences (Berkman et al., 2017; Cheek & Briggs, 1982; Tajfel, 1978). Commonly, the social

roles that one takes in their community ultimately become the primary component of self-identity (Berkman et al., 2017; Oyserman & Destin, 2010; Tajfel, 1978). While some view self-identity as a minor contributor to behavior (Ajzen, 1985; Berzonsky, 2011), others believe it is a key aspect of one's implicit drive to pursue or avoid action (Conner & Abraham, 2001; Devos & Banaji, 2003). In fact, recent reviews have highlighted the importance of self-identity's role in maintaining physical activity behaviors (Caldwell et al., 2018; Kwasnicka et al., 2016; Rhodes et al., 2016; Rhodes & Sui, 2021).

The self-determination theory (SDT) brings these conversations a step further, describing how an individual's self-identity or self-concept is only truly expressed when their basic needs are met, i.e., autonomy, competence, and relatedness (Deci & Ryan, 2000, 2008; La Guardia, 2009; Reifsteck et al., 2016; Soenens & Vansteenkiste, 2011). The effects of satisfying these basic psychological needs are universal and environments nourishing these feelings promote well-being (Ryan & Deci, 2017; Sheldon et al., 2003). In other words, when these basic needs are met in relation to a behavior, an individual can operate in an intrinsically motivated fashion, while the inability to fulfill basic needs would be characterized by extrinsic motivation (Deci & Ryan, 1985).

Those who are driven intrinsically typically are more likely to maintain their behaviors compared to their extrinsically motivated counterparts (Farholm et al., 2017; Geller et al., 2018; Huéscar et al., 2019; Morris et al., 2022; Teixeira et al., 2012). This has been found to be true for whether athletes maintain their physical activity levels post sports participation or not (Almagro et al., 2020). In the case of the present study, viewing self-identity though the lens of SDT provides an interesting framework to how motivation in relation to PA may be observed between athletes and non-athletes.

In order to quantify these ideals of optimal self-identification among athletes and physical activity motivation, Anderson (2004) developed and validated the Athletic Identity Questionnaire (AIQ) which proposes four constructs of athletic identity motivation: appearance, importance, competence, and encouragement. Each of these constructs describes the interconnection between one's physical activity motivation and athletic identity. Furthermore, these constructs also seem to mirror the different dimensions of motivation

(intrinsic/extrinsic) proposed by SDT (Reifsteck et al., 2016). For instance, someone who draws their athletic identity and motivation to be physically active to improve physical looks (appearance) or due to another's wishes (encouragement) would be characterized by an extrinsic style of motivation while an individual who uses their identity to foster their belief of being able to excel at being active (competence) and values the behavior (importance) would be considered more intrinsically motivated. The ability to channel intrinsic motivation is clearly an important aspect of the adoption and adherence to PA behaviors (Morris et al., 2022), however, it is presently unclear how these concepts differ between traditional athlete and nonathlete populations. The present study seeks to explore this idea in terms of how the athletic identity mindset influences motivation to participate in physical activity.

Purpose

The purpose of the present study was to examine athletic identity and PA motivation among college students. This work serves to address the present gap in literature where, to our team's knowledge, no previous study has thus far sought to observe athletic identity among both athletic and nonathletic populations. The relationship between PA motivation and athletic identity could be a prevalent tool for physical and health education professionals to use in their practice and PA based interventions.

Materials and Methods

Participants

Freshman through senior students who attended a midsized Midwest university were solicited to participate in the study after the project was reviewed by the primary author's Institutional Review Board. A census email recruitment message was sent through an online learning platform (Canvas) to all students. Each student attending the university had access to this platform, thus all students received the emailed solicitation. The university undergraduate population census in 2022 was 4,764. A total of 343 students (male= 118, female= 225) completed the study yielding a 7.2% response rate (University of Nebraska-Kearney, 2024). The ethnicity of partici-

pants included Caucasian (87.2%), and Hispanic populations (5.2%) (See: Table 1).

Table 1
Gender and Ethnicity

		n	Percent
Gender			
	Male	118	34.4
	Female	225	65.6
Ethnicity			
	African American	3	0.9
	Asian	7	2
	White	299	87.2
	American Indian	1	0.3
	Spanish, Hispanic, Latino	18	5.2
	Two or more ethnicities	14	4.1
	Missing	1	0.3

Protocol and Measures

The email students received provided an overview of the research study, the definition of an athlete, and an invitation to participate. A weblink was embedded into the email which transferred the student to an online consent form that the student had to complete prior to gaining access to the survey hosted in Qualtrics. The survey included 25 questions including The Athlete Identification Questionnaire (AIQ) and a variety of sociodemographic questions. The survey was available for 2 weeks, with a follow-up reminder to invite students to participate.

Athletic Identity Questionnaire

The AIQ was developed and established a rating of how individuals identify themselves in relation to being an athlete (Anderson, 2004). The AIQ has been validated and found to be a reliable tool (Pierre-Luc et al., 2018). Additionally, the AIQ has helped past researchers further understand how athletic identity affects injury re-

covery (Podlog et al., 2013), student athlete mental health (Antoniak et al., 2022), academic identity (van Rens et al., 2019), and PA participation post-colligate athlete career (Reifsteck et al., 2014). This measure will help identify to what degree participants feel a level of athletic mindset as well as finding what aspects of athletic identity participants specifically identify via several constructs: appearance, importance, competence, encouragement. Finally, the average of these constructs will be presented as "total athletic identification."

Demographics

The demographic section of the survey consisted of questions asking the participants to denote gender, age, race, income status, educational background, employment status, and sporting history. Chiefly, the section included one item where respondents indicated whether they were presently a collegiate athlete at the university in a traditional context.

Data Analysis

At the completion of the 2-week time frame, data was transferred and stored electronically in an Excel file which could only be accessed by the investigators. Data was transformed, entered into SPSSv22, and analyzed for statistical purposes. Pearson correlations were used to assess the relationship between athletic identity constructs and both athletic status and gender. One-Way Analysis of Variance (ANOVAs) was used to assess group differences between athletic status and reported scores from the Athletic Identity Questionnaire. Statistical significance was established at $p < 0.05$.

Results

This study looked to examine the relationship between athletic identity (appearance, importance, competence, encouragement) based on PA motivation and participant demographics through an exploratory approach. When examining athletic status, those who identified themselves as athletes reported significant relationships between all of the constructs of athletic identity: Appearance ($r = 0.163$, $p = 0.002$), Importance ($r = 0.113$, $p = 0.037$), Competence ($r = 0.132$, $p = 0.014$), Encouragement ($r = 0.135$, $p = 0.012$), and Total Athletic Identification ($r = 0.135$, $p = 0.012$). However, no significant

correlations were found between athletic identity constructs and gender (See Table 2).

Table 2
Athletic Identity Constructs among Athletes and Gender

	Athletes			Gender		
Athletic Identity Constructs	***r***	***p***	***n***	***r***	***p***	***n***
Appearance	0.163**	0.002	343	-0.053	0.332	343
Importance	0.113*	0.037	343	-0.065	0.227	343
Competence	0.132*	0.014	343	-0.042	0.441	343
Encouragement	0.135*	0.012	343	0.009	0.867	343
Total	0.153**	0.004	343	-0.047	0.39	343

* Denotes significance at $p < 0.01$

* Denotes significance at $p < 0.05$

When exploring group differences, non-athletes scored significantly higher on 10 out of 21 questions on the Athletic Identity Questionnaire than those in a collegiate sport: Athletic Self-Image [Q1] ($F = 7.116$, $p = 0.008$), Athletic Self-Image [Q2] ($F = 16.849$, $p = 0.0001$), Athletic Self-Image [Q3] ($F = 10.744$, $p = 0.001$), Athletic Self-Image [Q5] ($F = 8.222$, $p = 0.004$), Athletic Self-Image [Q6] ($F = 18.113$, $p = 0.0001$), Athletic Self-Efficacy [Q14] ($F = 5.128$, $p = 0.024$), Athletic Self-Efficacy [Q16] ($F = 7.779$, $p = 0.006$), Athletic Self-Efficacy [Q17] ($F = 9.947$, $p = 0.002$), Perceived Outside Encouragement [Q19] ($F = 8.139$, $p = 0.005$), Perceived Outside Encouragement [Q20] ($F = 7.796$, $p = 0.006$) (See Table 3). When scores were allocated to their respective subset, non-athletes reported significantly higher in all athletic identity constructs when compared to athletes: Appearance ($F = 9.309$, $p = 0.002$), Importance ($F = 4.378$, $p = 0.037$), Competence ($F = 6.06$, $p = 0.014$), Encouragement ($F = 6.346$, $p = 0.012$), Total Athletic Identity ($F = 8.187$, $p = 0.004$) (See Table 4).

Table 3

Differences in Athletic Identity Items Based on Athlete Identification

Athletic Identity Questionnaire	Identification	*n*	*M*	*SD*	*F*	*p*
Q1	Athlete	297	5.6162	0.89715	7.116	0.008*
I think I look athletic, like a person who exercises	Non-Athlete	38	6.0263	0.85383		
	Total	335	5.6627	0.90057		
Q2	Athlete	296	5.7297	0.97142	16.849	0.0001**
I look like I never workout	Non-Athlete	38	6.3947	0.63839		
	Total	334	5.8054	0.96228		
Q3	Athlete	297	5.3973	0.8682	10.744	0.001**
My body looks in shape	Non-Athlete	37	5.8919	0.84274		
	Total	334	5.4521	0.87805		
Q4	Athlete	295	5.4339	0.90438	0.335	0.563
My body looks well proportioned	Non-Athlete	38	5.5263	1.08396		
	Total	333	5.4444	0.92525		
Q5	Athlete	295	5.4712	0.91753	8.222	0.004**
I look like a person who is physically fit	Non-Athlete	38	5.9211	0.85049		
	Total	333	5.5225	0.92012		
Q6	Athlete	297	5.7003	1.0564	18.113	0.0001**
It's obvious to others that I'm that I am flabby and out of shape	Non-Athlete	37	6.4595	0.691		
	Total	334	5.7844	1.04907		
Q7	Athlete	297	5.9259	0.96976	3.002	0.084
I schedule time to exercise	Non-Athlete	38	6.2105	0.81067		
	Total	335	5.9582	0.95625		
Q8	Athlete	296	5.6689	0.90114	3.194	0.075
I don't let other things get in the way of my exercise/sport activity	Non-Athlete	38	5.9474	0.92845		
	Total	334	5.7006	0.90719		
Q9	Athlete	295	5.5661	0.99396	2.657	0.104
I use several specific strategies to help me maintain regular exercise	Non-Athlete	38	5.8421	0.88612		
	Total	333	5.5976	0.98494		
Q10	Athlete	297	5.7845	0.99697	0.628	0.429
After illness or injury, I begin exercise as soon as possible	Non-Athlete	38	5.9211	1.02355		
	Total	335	5.8	0.9994		
Q11	Athlete	296	5.7601	1.02506	2.831	0.093
I would be very irritated if something prevented me from participating in a session of exercise, I had planned to do	Non-Athlete	38	6.0526	0.86828		
	Total	334	5.7934	1.01156		
Q12	Athlete	297	5.6768	0.97774	0.946	0.331
I plan specific alternate times, places, and/or types of exercise to use if I miss an exercise session	Non-Athlete	38	5.8421	1.05334		
	Total	335	5.6955	0.98635		
Q13	Athlete	297	5.8418	0.89587	0.464	0.496
I could participate in several types of physical activity if I wanted to	Non-Athlete	38	5.9474	0.92845		
	Total	335	5.8537	0.89882		
Q14	Athlete	296	5.8142	0.95807	5.128	0.024*
I simply don't have much athletic ability	Non-Athlete	38	6.1842	0.86541		
	Total	334	5.8563	0.95405		
Q15	Athlete	295	5.6373	0.90387	3.2	0.075
In most physical activities, I feel I can become skilled with sufficient effort and practice	Non-Athlete	37	5.9189	0.89376		
	Total	332	5.6687	0.90576		
Q16	Athlete	295	5.7831	0.94781	7.779	0.006**
I'm not very good at athletic activities	Non-Athlete	38	6.2368	0.91339		
	Total	333	5.8348	0.95362		
Q17	Athlete	295	5.5593	0.91605	9.947	0.002**
I'm confident of my athletic skills	Non-Athlete	38	6.0526	0.83658		
	Total	333	5.6156	0.91966		
Q18	Athlete	296	5.4764	0.99462	0.583	0.446
I received encouragement from other for exercise	Non-Athlete	38	5.6053	0.85549		
	Total	334	5.491	0.97948		

Table 3 (cont.)

Q19 My family/closest friends are enthusiastic about any effort/progress I make concerning exercise/sport	Athlete	296	5.6318	1.02983	8.139	0.005**
	Non-Athlete	38	6.1316	0.90557		
	Total	334	5.6886	1.02757		
Q20 My family/ roommates/ companions are very willing to accommodate my involvement in exercise/sport	Athlete	296	5.4595	1.02761	7.796	0.006**
	Non-Athlete	38	5.9474	0.89887		
	Total	334	5.515	1.02437		
Q21 I get a lot of reinforcement from other regarding my physical activity	Athlete	295	5.33559	1.029788	2.42	0.121
	Non-Athlete	38	5.60526	0.789782		
	Total	333	5.36637	1.007955		

* Denotes significance at p <0.01
* Denotes significance at p <0.05

Table 4

Differences in Athletic Identity Constructs on Athlete Identification

Athletic Identity Questionnaire	Identification	*n*	*M*	*SD*	*F*	*p*
Appearance	Athlete	305	32.3836	6.91968	9.309	0.002**
	Non-Athlete	38	35.8947	4.36069		
	Total	343	32.7726	6.7703		
Importance	Athlete	305	33.4066	6.9641	4.378	0.037*
	Non-Athlete	38	35.8158	3.79085		
	Total	343	33.6735	6.72593		
Competence	Athlete	305	27.7541	5.95282	6.06	0.014*
	Non-Athlete	38	30.1842	3.50949		
	Total	343	28.0233	5.78054		
Encouragement	Athlete	305	21.2393	4.92761	6.346	0.012*
	Non-Athlete	38	23.2895	2.59842		
	Total	343	21.4665	4.76751		
Total (Combined)	Athlete	305	114.7836	22.08921	8.187	0.004**
	Non-Athlete	38	125.1842	10.27949		
	Total	343	115.9359	21.35036		

* Denotes significance at p <0.01
* Denotes significance at p <0.05

Discussion

The present study found positive correlations between athletic status and all examined athletic identity constructs: appearance, importance, competence, encouragement, and total athletic identity. While the present study appears to be the first study to explore correlations between motivation and athletic identity in both traditional and nontraditional populations, previous studies have reported traditional athletic identity to be a significant correlate of a variety of motivational constructs (Love & Rufer, 2021; Schutte & McNeil, 2015; Tušak et al., 2005; Uğraş et al., 2024). This suggests a fundamental association between traditional athletic identity and present constructs.

No significant relationships were found between athletic identity constructs and gender, when examining both athletes and non-athletes combined: pointing to the case that gender roles may not dramatically influence behavior in terms of motivation to be physically active. Similar results were also found in a group of traditional athletes where gender did not seem to be a correlation of motivation (Tušak et al., 2005). While little other research has looked at these relationships, Kontro et al. (2022) found motivation to participate in sports is significantly related to multiple factors such as age, competitive background, current training regiment, and nationality.

While the present study did not explore how other sociodemographic aspects influenced participants' motivation, both present and past data found no notable relationship between motivation and gender. These results further suggest motivation among athletes to participate in competitive based exercise is multifaceted and can also be influenced by components outside of purely athletic identity. However, gender does not seem to be a determining factor. The findings of no gender differences may be notable as other past studies have observed multiple gender differences among samples of solely non-athletes' motivation to participate in PA, which include men being more motivated by intrinsic factors such as becoming more fit or for social achievement and women having weight management and other extrinsic factors as their primarily motivators (Egli et al., 2011; Kilpatrick et al., 2005).

When combined with the present data's findings of no gender differences among a sample of both athletes and non-athletes, past studies may suggest non-athletes experience PA motivation in a more fluid manner and may be influenced by more factors such as gender (Egli et al., 2011; Kilpatrick et al., 2005). While more work is needed to understand how individual characteristics contribute to the athletic identity-motivation relationship, physical and health educators may leverage this information as they begin personalizing their curriculum to their students. The ability to modify curriculum to individual groups of students may become increasingly prevalent as researchers begin to explore youth athlete's relationship with athletic identity (Choudhury et al., 2024; Edison et al., 2021; McGinley et al., 2022), which presently appears to be non-differential with other age groups. Continuously, it is recognized that using students' inter-

est/characteristics is important for their learning processes (Solari et al., 2022), however, in order to do this with greater precision, more research is needed into moderating variables of athletic identity. Ultimately, interventions which target constructs which are equally effective among multiple populations in theory would further the goal of decreasing physical inactivity and associated chronic disease.

The present study also found that those who identified as non-athletes reported significantly higher ratings of each of the athletic identity constructs and 10/21 athletic identity areas when compared to the traditional athlete participants. The concept of nonathletes possessing higher ratings in different components of athletic identity may be useful in demonstrating how the concept of athletic identity is much more than a superficial trait associated with sport participation. Past studies have demonstrated the general population, non-athletes, are commonly motivated to participate in PA based on fitness and health goals, social popularity, individual self-efficacy, and reducing a broad range of maladaptive psychological issues (Ahmed et al., 2020; Bragg et al., 2009; Gavin, 2014). However, the present literature is unclear on why athletes specifically participate in their chosen sport.

Bragaru et al. (2015) suggests one of the primary reasons a specific sport is chosen is enjoyment of the activity. This paints a rather clear contrast to why athletes and non-athletes are motivated to be physically active. Non-athletes normally must be self-accountable for planning and carrying out exercise, which may explain their higher reported motivation scores and multitude of supporting reasons why they are physically active. On the other hand, athletes have their practice and workout times predetermined and enforced by their coaches, which may reduce their actual need to have high levels of motivation. This disparity between how individuals are motivated toward athletic identity may be best tackled by physical and health education professionals as not only could lessons be personalized to their specific student population as previously stated, but educators could begin to help students develop skills related to autonomy in order to avoid a collapse of PA post athletic career. The development of autonomy has been shown to increase PA behaviors among youth and adults (Huéscar et al., 2019; Teixeira et al., 2012), therefore future interventions by health education professionals may help stu-

dents adopt longer lasting PA leading to reduced odds of contracting forms of chronic diseases.

In summary, the present study's results and discussion illustrate a relationship between athletic identity and both personal/social development. While these novel results begin the conversation about how athletic identity functions in both traditional and non-traditional populations, findings continue to build upon previous research, which has also found proper development of athletic identity to lead to emotional satiability, social confidence, interpersonal relationship satisfaction, conflict resolution, personal agency/autonomy, work ethic, self-efficacy, and many other crucial developmental abilities (Chang et al., 2018; Chun et al., 2023; Shapiro & Martin, 2010). As outlined by the 2024 National Physical and Health Education Standards, it is vital for physical/health education curriculum to nurture and grow students' intra/interpersonal skills (Society of Health and Physical Educators, 2024a, 2024b).

It is widely accepted that these skills, when properly developed, result in successful maturation of students, ultimately leading to satisfying adult lives (Opstoel et al., 2020). In turn, neglect of these crucial skills leads to maladaptive implications for those students who are underdeveloped (Hoffman, 1977; Rego & Cunha, 2009). Similarly, when properly developed, athletic identity can lead to satisfying and successful adulthood maturation (Miller & Buttell, 2018; Stellefson et al., 2019; Warehime et al., 2017), but can easily become harmful to the individual when underdeveloped (Edison et al., 2021; Giannone et al., 2017; Haslam et al., 2021; Simon et al., 2021). If added alongside other crucial personal and social developmental tools, physical and health educators may be able to better prepare their students for their next steps following post-secondary education, while also promoting long lasting health related behaviors through the addition of athletic identity (Helms & Morris, 2020). These concepts, final conclusions, as well as other implications for physical and health educators will be further explored in the translation to educational practice section.

Limitations and Suggestions for Future Research

Certain aspects of the present study should be placed into consideration when reflecting on the presented results. This study is reliant on self-reported data pertaining to the domains of physical activity,

and both self-perceived motivation and athletic identity constructs. The present study operated as a cross-sectional observational study, therefore results only illiterate momentary relationships between athletic identity and PA motivation.

Results may have also been influenced due to the inaccurate conceptualization of these concepts by the participants. Furthermore, this survey was distributed close to the student's Spring Break, which may have impacted the response rate due to students not checking their school email. Finally, not only did the population lack diversity, with the majority of the population identifying as Caucasian (as commonly observed in rural areas of the Midwest), but the sample also contained a relatively low number of non-athletes compared to students who do compete on behalf of the university.

Future studies should seek to gain a greater number of non-traditional athlete participation, while also attempting to gain a better understanding of intramural categorized activities for individuals who do not currently compete collegiately but still self-identify as an athlete. Not only would an increase in the non-athlete population within the study expand the understanding of this topic; but further research into how intramural activity affects athletic identity could enhance individual's PA levels late into life, where traditional athletic identity is uncommon.

Translation to Educational Practice and Conclusion

We believe there is clearly significant value in researching this area of psychological states and traits of importance to mental and physical health, to which health and physical education professionals can play a crucial role. Through primary and secondary schooling, students participate in health and physical education classes which strive to develop the students' psychomotor, cognitive, and affective domains. In these classroom settings, students learn about the need to continue maintaining regular and consistent PA, due to the myriads of health and wellness benefits. However, as previously stated, many individuals fail to reach the minimum standards, thus becoming suspectable to a higher risk of chronic disease onset.

Future health/physical education centered interventions teaching about athletic identity may benefit by employing multiple types/designs of interventions in a time where little diversity in the methodology of studies on athletic identity exists. In the present literature,

experimental assessments of athletic identity commonly involve pre/post measurements of athletic identity associated with pre/post measurements of psychiatric symptoms (i.e., depression/anxiety) in traditional collegiate athletic populations before and after their retirement from sport. The present study not only showcases the need for nontraditional/noncollegiate athletes to be involved in these studies (either in secondary educational or recreational domains), but it also illustrates how motivation for PA may be another important variable to track in relation with lifetime events. Furthermore, studies/interventions which seek to build upon the present conversation may also want to find which constructs of PA motivation helps best preserve athletic identity over extended durations.

Post-secondary education can be a dead end for many athletic dreams of high school stars, so as they make a transition, are they able to find fitness and wellness? This loss of athletic identity can be helpful in explaining changes in behavioral motivation that result from physical inactivity during the college years of students who were previously perceived as athletic (Helms & Morris, 2020). Health education professionals have been called to help athletes learn how to maintain a healthy relationship with their athletic identity (Haslam et al., 2021; Stellefson et al., 2019). Furthermore, as the area of research grows, recent studies have also shown athletic identity issues are prevalent at the childhood level (Choudhury et al., 2024; Edison et al., 2021; McGinley et al., 2022), with one recent longitudinal study reporting athletic identity at young ages to be a significant predictor of adulthood leisure time PA (Mathisen et al., 2023). This is in direct alignment with the new Society of Health and Physical Education Health Standards which strives to use functional health information to support health and well-being of self and others (Society of Health and Physical Educators, 2024a, 2024b). Health education professionals cultivate [Au8.1]students and provide information relating to proper/safe dietary lifestyles, social relationships, and exercise habits to avoid maladaptive relationships (Menor-Rodriguez et al., 2022; Orr et al., 2022; Zhong et al., 2022), and in line with these goals, health educators may find teaching about proper athletic identity to benefit students as unregulated athletic identities are related worsened levels of physical and mental health (Edison et al., 2021; Giannone et al., 2017; Haslam et al., 2021; Shander & Petrie, 2021; Simon et al., 2021).

A properly aligned relationship with athletic identity is not only important at the student level, but also at the community level (Bowness et al., 2021). As sports continue to become more elite and expensive, the cost to a community of losing opportunities to develop a positive athletic identity should be further investigated. What are ways in which we can encourage a better mindset toward exercise and wellness for individuals who are wrestling with forming and/or maintaining their athletic identity? Future research should seek to answer this question through exploration of intermural activities within educational and community settings.

Physical and health education professionals may also play an important role in this journey as their expertise can be used to help and encourage community members, while assisting in building an environment utilizing all domains of learning. Understanding how these limitations of traditional athletic roles may prove vital in the pursuit of increasing PA engagement through the development of an athletic mindset in the future. The present study may serve as a base line to how traditional athletic identity and its associated motivational factors relate to nontraditional populations. With this in mind, as shown by the present study as well as past literature, future interventions targeting the associated relationship between PA motivation and athletic identity should be implemented not only in traditional/nontraditional athletic populations and across multiple age groups, but also in areas outside the typical scope of school-based interventions, such as the community at large.

The implementation of interventions in a dual synchronous fashion could not only enhance the relationship between athletic identity and PA motivation among recipients at both levels, but could also be useful for students as they make the transition between the two areas of life, creating a sense of familiarity and enjoyment for previous athletes now in the community level. Interventions implemented in this manner could help reduce onset of chronic diseases for younger generations as well as manage the impact on quality of life of community members in older generations who may already have some form of chronic disease. In combing school and community levels where athletic identity intervention is needed, health and physical education professionals are in an extraordinarily unique position to server as a bridge between traditional student athlete spaces and

non-traditional community athletic spaces. This bridge could be important as it would allow current athletes to transition out of typical sports settings to community/recreational settings without losing their athletic identity and PA behaviors.

"The need for programming inclusive activities with minimal constraints is widely supported by academic scholars" (Crawford et al., 1991, p. 136). These authors proposed three discrete models of constraints; intrapersonal, interpersonal, and structural in their earlier works and then integrated them in a manner that could show sequential ordering and influences. A hierarchy of importance has been proposed to help understand how constraints influence leisure participation or non-participation. Most importantly, the authors contend the insurmountable obstacles and barriers which previous generations of scholars should consider their alternative view of constraints proposes that leisure participation is not dependent on an absence of constraints; instead, leisure participation is dependent on successful negotiation of constraints as one finds balance between constraints and motivation.

It is important for recreation providers to identify constraints, or reasons people do not choose to actively engage in recreational activities. For the most community benefits to occur, it is essential for the benefits to be distributed to the most possible people through inclusive practices. Recreational satisfaction can provide many benefits for all people when managed correctly (Kelly, 2012). "Despite the growing prosperity of many sports organizations, recreational and sports programs have come under attack from a variety of sources" (Jamieson & Orr, 2009, p. 48).

This study provides support for programmers who are advocating for more diverse options and activities to better meet the fragmented but important wellness activities that inherently motivate certain people and groups to participate because of their backgrounds and passion in those specific activities. Evaluation of future interventions must be rooted in the perceptions of the educator's target population. While empirical quantitative evidence is an important indicator in the evaluation of interventions, the present study and current literature underline the idea that the influence of athletic identity on PA motivation/participation is based on reinforcing the perceived identity of the individual. Therefore, while quantitative evidence

should be in alignment, the ultimate goal of future interventions, and conjunctionally the evaluation criteria of said interventions, should be to find ways to create healthy athletic identities. Further, it is vital that interventions link identities with the PA in a manner where they strive to reinforce in a fashion which is perceived by the recipients in order to achieve a self-determined mindset toward their health-related behavior. As previously laid out, the improvement of these mindsets could play a vital role in the adoption of PA as well as improving the quality of life through increasing immunity against chronic diseases among those in the target population.

The application of the programmatic suggestions will help mitigate the negative results of a lifestyle that is likely to lead to a lack of wellness and little or no adherence toward an exercise regimen. Finally, communities as well as sport administrators and health professionals/coaches at every level must be reminded that sport must be completed in a fun environment and be a way to introduce positive health behaviors. The lifelong influence on each of these aspects has cannot be taken lightly when viewed through the perspectives and ideas found within this study. Indeed, it is a good reminder that participating in sports can transform the lives of people, their outlook on PA, and their athletic identity. There is extraordinary potential within sport to develop character, compete to win, and still have fun.

Declaration Funding and Interest Statement

To the research team's knowledge, there are no conflicts of interest connected to this publication, and there has been no significant financial aid given which may have influenced its outcome.

Data Availability

The data which support the findings of this study are openly available in the Open Science Framework data repository at https://osf.io/pa5yu/files/osfstorage?view_only= . For any further inquiries, please reach out to the corresponding author of this paper, Derek Elton.

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PHYSICAL ACTIVITY

Autonomous Motivation as a Mechanism of Change in a Gamified Digital Physical Activity Intervention: A Randomized Controlled Trial

Billy Jeen M. Martin

Abstract

University students have been noted to have a drop in their levels of physical activity due to their academic transitions. When it comes to moderate-to-vigorous physical activity (MVPA), digital methods have shown to work inconsistently. This randomized controlled trial aimed to find out if a digital intervention that is gamified promotes more behavioral and motivational changes than a digital intervention that is prompt-based and if statistically motivational changes of an autonomous nature explain the differences. PATHFIT2 students (N=180) from the Philippines were assigned to either a gamified digital intervention or a non-gamified, standard digital intervention for a duration of eight weeks. Both conditions were directed to use MyFitnessPal to log their exercise and were given daily activity prompts. The gamified condition was given additional stimulation in the form of rewards for points, streaks, bonus badges, and leaderboard feedback. At pretest and posttest, MVPA (verified activity logs for MVPA) and motivational regulation (using the BREQ-3) and cardiovascular endurance (3-minute step test), muscular endurance (a push-up test), and body

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mass index were assessed. The mixed-design ANOVA showed significant changes in MVPA over time with the gamified condition resulting in the more pronounced changes (η^2p = .11, d = 0.67). The gamified condition showed significant increases in both identified and intrinsic regulation. Improvement of both cardiovascular and muscular endurance were noted to be more substantial in the gamified condition although the changes in BMI were quite mild. Changes in intrinsic regulation were shown through bootstrapped mediation analyses to statistically account for part of the relationship between intervention condition and MVPA (indirect effect \u03b2 = .15, 95% CI [.07, .27]). This means that gamified digital interventions improve the level of physical activity participants engage in, beyond increasing it through digital prompts, and that alterations in autonomous motivation account for a large portion of the relationship. A university program that includes autonomy-supportive gamification may be an effective and widely applicable method for enhancing participants' behavioral and functional health.

Introduction

Engagement in physical activity means having a regular routine of movement that uses energy and meets the recommended levels of frequency, duration, and intensity (World Health Organization, 2020) of the activity. This is not just exercising, but it is behavioral consistency that helps sustain one's mental and physiological health. Lack of physical activity is correlated to an increased risk of suffering from cardiovascular disease, metabolic disorders, and decline of mental health (Pfisterer et al., 2022). For all the benefits, physical inactivity is still a major risk to health globally (Johannes et al., 2024). Due to academic pressures and sedentary lifestyle, university students especially are at a greater risk of falling activity levels and have a significant number not following the recommended levels of activity (Verma et al., 2022). Physical inactivity has been so common in higher education that it has practically become the norm and more behavioral patterns of this kind are calling for well planned interventions that can adapt to the given context.

A body of international research consistently points out the adjustment to university life as a notably vulnerable behavioral period.

For example, Kwan et al. (2020) illustrated in Canadian longitudinal studies a marked drop in activity as individuals transitioned from secondary school to post-secondary institutions. Similar research conducted in New Zealand documented a change in motivational orientation which resulted in an activity drop (Wilson et al., 2021). Zhang et al. (2022) found large-scale studies conducted in China, and even early years of university, a large number of participants did not even approach the minimum recommended levels of physical activity. Research conducted in Germany documenting increased sedentary behavior and the variable discipline specific increased further suggested that the academic environment has a direct impact on the movement behaviors of individuals (Edelmann et al., 2022). A systematic review from several countries has documented a number of barriers in to exercise in the university age population which includes lack of time, lack of motivation, an unsupportive environment, and a change in behavior or priorities (Brown et al., 2024; Ferreira Silva et al., 2022). Overall, evidence shows physical activity neglect in the university population is not just a lack of knowledge; it is a complex relationship with motivational and physical barriers.

Engagement in varying degrees in physical activity within the higher education system in the Philippines is similarly expressed across regions. In the case of Metro Manila, male students showed more of physical activity as well as higher fitness levels than female students. (Pituk & Cagas, 2019). In Bulacan, motivational orientations are sex-based with males being motivated socially with some level of competition while females have an avoidance health motivation (Tullao, 2025). In Pampanga, the primary motivational barrier related to health and strength development is the perception of poor health and strength coupled with a time and motivational barrier to engagement (Manasan et al., 2023). In Region III, the perception of physical fitness is a significant predictor of health-related behavioral control (Masagca, 2025). There is a need for behavioral structure and motivational quality based interventions as the motivational variability coupled with the contextual constraints is the major determinant of the observed physical activity behavior of the respondents.

Digital health innovations are great ways to solve problems like inactivity among university students. Regular digital approaches that are used in health innovations include things like smartphone

apps, fitness trackers, and text message services. They all work by providing prompts, feedback, and self-monitoring tools. In college students, digital health innovations result in increased step counts and increased overall physical activity levels (Bi et al., 2024; Peng et al., 2023). Due to the text messages, some students increased their physical activity (Smith et al., 2020), while in university students, the overall physical activity increased (Favieri et al., 2023). The increase in these studies was mainly attributed to the increase in step counts, while little was done to increase the amount of time spent in higher levels of physical activity or to sustain the behavior changes in students. Most digital interventions will increase physical activity because they increase routine adherence, but that does mean that they also increase motivation. In higher education in the Philippines, the use of smartphone prompts and digitally delivered low-dose interventions led to students becoming more active and also a positive increase in their academic well-being (Martin, 2026). Though we cannot conclude that was due to the method used, without a control group, we are still unsure if these interventions also helped to increase motivation, or if it was just behavioral compliance.

Gamification of physical activity interventions has shown improvement in activity levels of participants, especially young adults. Elements of games such as leaderboard, tracking, and rewards have shown an increase in average daily steps and moderate physical activity in comparison to non-gamified interventions (Sanudo et al., 2024). When gamified interventions are compared to both active and inactive control groups, they reveal small to moderate improvements in physical activity (Mazeas et al., 2022). Gamified interventions in higher educational institutions have shown considerable improvements in participants' fitness levels and adherence to physical activity guidelines compared to non-gamified educational interventions (Mora-Gonzalez et al., 2020).

This gap within the literature will be drawn on using Self-Determination Theory (SDT) and behavioral self-regulation frameworks. The theory of self-determination suggests that in order for someone to sustain being physically active, the needs of their autonomy, competence, and relatedness needs to be satisfied. Gamified interventions can improve someone's feeling of competence through feedback on their performance, provide them with more autonomy

through the ability to set their own goals, and improve feelings of relatedness through either competition or collaboration. Standard digital interventions, on the other hand, tend to work mainly through self-regulation prompts and self-monitoring, which stop the action/behavior from being initiated and create loops (habits) that are difficult to break, but do very little to improve the quality of a person's intrinsic motivation. Looking at it from the behavioral standpoint, what activity frequency interventions are likely to achieve may be on the basis of motivation, but it is also likely that the internalization of motivation varies. Most interventions are likely to improve behavioral change to some degree, but understanding the mechanisms is important to determine the "why" and "how" for the motivation behind the change. Therefore, this study aims to answer the question, do gamified digital interventions for physical activity lead to an increase in motivation and increase in behavior more than standard digital interventions for physical activity in a university setting? By developing a hypothesis and structure for this study, creating boundaries for behavioral and motivational pathways. The theories of behavioral changes in the digital sector will be advanced, and a foundation will be laid for the university setting to improve active behavior using digital means based on behavior change principles.

Methods

Research Design

This investigation utilized a quantitative randomized controlled trial with a two-group parallel pretest–posttest design to analyze the differing impacts of a gamified digital physical activity intervention versus a standard digital physical activity intervention on motivational regulation and physical activity behavior of university students. The design of randomized controlled trials is considered the gold standard for assessing impact because of the increased internal validity and reduction of systematic allocation bias (Hariton & Locascio, 2018).

Students were randomly assigned within each class to (1) a gamified digital physical activity intervention or (2) a standard digital physical activity intervention through a computer-generated random allocation sequence. One of the research assistants created the sequence to avoid bias from allocation. Randomization was assigned

on an individual basis within a given class to ensure an even distribution across different academic programs and to reduce potential confounding at the program level. Although randomization was not stratified by sex, baseline equivalence testing showed no significant differences in sex distribution across groups. Assignments to groups was done post-baseline assessments to ensure pre-test data was collected prior to any grouping. Lists of intervention groups were given to individual Messenger administrators by group condition to ensure no prior exposure to the intervention.

The trial was not formally preregistered in a public registry. Study hypotheses and analytic approaches were formulated *a priori* and based on Self-Determination Theory and prior digital behaviour change literature. All primary and secondary outcomes detailed correspond to the initially outlined aims of the intervention.

Allocation Concealment and Blinding

The allocation of groups was hidden until baseline data collection was finished. Given the behavioral nature of the intervention, participant blinding was not possible, since participants knew whether they were in a gamified condition or not. Objective assessments of fitness (step test, push-ups, and some anthropometric measurements) were done according to protocols that were not explicitly tied to group assignments. Analysts performed statistical analyses using codes to identify groups (Group A and Group B) and unblinded group identities only after completing primary analyses to reduce any bias.

Respondents and Sampling

The research was carried out in a public higher educational institution located in the Mindanao region of the Philippines. The participants in the study were PATHFIT2 students from the three (3) academic colleges: Computing Studies, Engineering, and Teacher Education.

The academic programs included were: (1) Associate in Computer Technology–Major in Application Development, (2) Associate in Computer Technology–Major in Networking, (3) Mechanical Engineering, (4) Geodetic Engineering, (5) Bachelor of Secondary Education–Major in Social Studies, and (6) Bachelor of Secondary Education–Major in Values Education. Each of the courses had ap-

proximately 30 students making the accessible population approximately $N = 180$.

In each of the courses, students were randomly assigned based on a computer-generated randomization sequence to (1) the gamified intervention group or (2) the conventional digital intervention group, with about 15 students assigned to each group per course. This form of randomization within a course was stratified to ensure even distribution of the intervention conditions across the academic programs and to reduce confounding at the level of the academic program.

The inclusion criteria were that participants had to: (1) be PATHFIT2 students, (2) own a smartphone with the MyFitnessPal application and Facebook Messenger notifications enabled, and (3) provide a written informed consent. Those who had medical conditions that inhibited them from engaging in moderate-intensity physical activity were excluded from the study. Given a total estimated sample size of $N = 180$ (about 90 subjects per group), the study had sufficient power to identify medium effect size differences in mixed-design ANOVA models (Faul et al., 2009). Available sample size was sufficient to conduct mediation analyses as mechanism-oriented tests.

Research Instrument

Physical activity behavior was assessed using two complementary indicators.

Weekly Moderate-to-Vigorous Physical Activity

The main behavioral outcome was measured by the weekly minutes of moderate-to-vigorous physical activity (MVPA) noted by participants in their exercise logs on the MyFitnessPal mobile application over the 8-week intervention period. Participants were asked to log only activities performed above a moderate intensity, which in the public health definition, refers to activities that are likely to cause a noticeable increase in breathing and/or heart rate (World Health Organization, 2020). From the exercise summary reports submitted during the week, minutes of MVPA and the total number of active days were calculated.

Verification and Data Quality Procedures

In order to improve accuracy in self reporting and to mitigate editing entries after the fact, participants were asked to submit screenshots of the activity summary from MyFitnessPal on a weekly basis, using a secure Google Form. Their reporting was evaluated for (1) consistent reporting for MyFitnessPal activity summaries over the weeks of the intervention, (2) plausibility regarding the duration of physical activity that was reported, (3) reporting was evaluated for lack of excessive and suspicious reporting. A reporting activity of over 600 minutes of MVPA was flagged for sensitivity analysis as it would be considered an outlier . Although entries within MyFitnessPal are self-reported, participants are able to self-verify and entry their information so that it provides a background of reporting accuracy and integrity.

Additionally, the International Physical Activity Questionnaire–Short Form (IPAQ-SF) (Craig et al., 2003) was used at the beginning of the intervention and at the end of the intervention, to capture self-reported data regarding physical activity of walking, moderate and vigorous activity levels in the past 7 days. The IPAQ-SF has been shown to possess reliability and validity in various settings. The internal consistency of the instrument in this study was adequate (Cronbach's $\alpha \approx .80$).

Convergent Validity Assessment

The IPAQ-SF was implemented as a convergent behavioral indicator and a means of assessing change consistency against logged MVPA minutes. Agreement denoting both direction and proportion of MyFitnessPal-derived MVPA and IPAQ-SF MVPA provided reassurance that the behavioral changes were due to more than a single measurement modality.

The Motivational Regulation for Physical Activity was evaluated using the BREQ-3. This comprises intrinsic regulation, identified regulation, introjected regulation, external regulation, and amotivation. Strong factorial validity and reliability have been demonstrated for the BREQ-3 in university settings. In this study, Cronbach's alpha coefficients were observed to lie between .76 and .89 across the subscales.

In order to present objective evidence of behavioral change, some selected health-related fitness components were evaluated at both pre and post testing. These were: (1) Body Mass Index (BMI) which was calculated from height and weight measurement and then interpreted using the Asian-Pacific classification guidelines; (2) cardiovascular endurance was estimated using the 3-minute step test; and (3) muscular endurance was evaluated using a 1-minute push-up test. All evaluations followed standard protocols which ensured consistency across test administrators during scheduled PATHFIT2 sessions.

Intervention Protocol

The intervention took place over eight consecutive weeks during the academic semester. Both intervention groups received structured daily prompts via Facebook Messenger at times 7:00 p.m. and 8:00 p.m. The 7:00 p.m. message is a reminder to set aside time to do some physical activity. The 8:00 p.m. message asks to do some moderate-intensity exercise.

The aim is to help participants reach the 150 minutes moderate-intensity physical activity goal established by the World Health Organization. For the duration of the intervention all participants used the MyFitnessPal app to track exercise.

To maintain documentation of adherence to intervention protocol and exercise data quality, participants sent a weekly MyFitnessPal exercise summary screenshot to a secure Google Form on Sundays at 9:00 p.m.. The screenshots were used to calculate weekly adherence metrics such as total minutes of activity and total number of active days. To limit attrition bias, all participants who completed the post-intervention evaluations were counted, regardless of adherence to intervention protocol.

Intervention Conditions

Participants in the standard digital intervention condition received constructed prompts and used MyFitnessPal to log their physical activities. This condition focused on behavioral cueing and self-monitoring with no other motivational enhancement.

Participants in the gamified digital intervention condition received the same prompts and logging instructions. However, a gamification structure was also embedded in the Messenger system,

which included (1) accrual of points for logged activity, (2) streak bonuses for logged activity on consecutive days, (3) weekly digital badges for logged activity, and (4) public rankings on a weekly activity leaderboard. All gamification features were based solely on logged activity. Apart from the gamified motivational architecture, the other no-system variations were participant activity levels.

Intervention Fidelity and Contamination Control

Different Messenger groups were made for each intervention condition for each course to reduce the risk of cross-condition contamination. Participants were directed not to discuss or post intervention materials, screenshots, or content from the leaderboards, and they were given specific timeframes for each intervention. Informal peer communication outside the platform could not be completely controlled given that participants were taking the same courses. No participants placed condition-specific limits on Messenger groups, and no participants placed limits on the use of cross-posting gamification elements. To reduce expectancy, coercion, and competitive academic pressure, participation was decoupled from course grading.

Statistical Analysis

Baseline variables and demographic characteristics were analyzed with descriptive statistics (means, standard deviations, and frequencies). Considering group (gamified vs standard) as the between-subject factor and time (pretest vs posttest) as the within-subject factor, a mixed-design ANOVA was performed. To understand the differences in changes throughout the intervention period, the Time x Group interaction was analyzed. Assumptions of statistics were considered following analytical standards (Field, 2018; Tabachnick & Fidell, 2019), and effect size was indicated as partial eta squared ($\eta^2 p$).

Since participants were located in academic courses, some exploratory intraclass correlation coefficients (ICCs) were calculated for main outcomes using unconditional random-intercept models with course as the grouping factor. ICC values were low (< .02), showing that clustering effects were negligible, and supporting the use of individual-level analyses.

Besides complete-case analyses, intention-to-treat (ITT) analyses were performed with multiple imputation with five datasets to estimate missing posttest values. Findings from the ITT models were aligned with complete case findings, showing that attrition did not significantly affect intervention outcomes.

Sensitivity Analyses

As MVPA data is self-reported, sensitivity analyses were run to test the impact of this attribute on the analyses. Accordingly, the Time × Group analysis was run again using the IPAQ-SF MVPA data, and a second analysis was run removing any MVPA values of over 600 minutes to see the impact of extreme values on the analyses. Additionally, the changes in logged MVPA were compared to changes in objective fitness levels (cardio and muscle endurance) to see if a change in behavior was linked to a change in fitness.

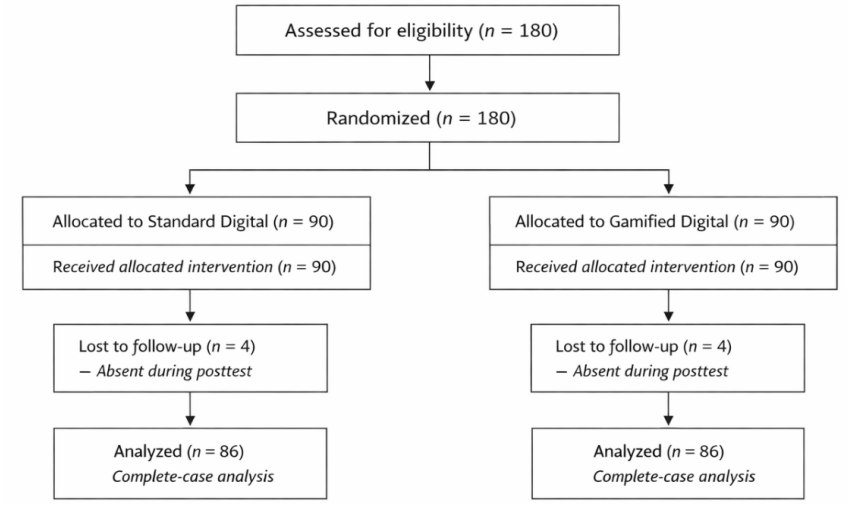
Mediation analyses were run to test motivational pathways using JASP with 5000 bootstrapped bias-corrected confidence intervals to estimate indirect effects of the condition on physical activity changes through changes in motivational regulation. Significance was set at $p < 0.05$ and all analysis was done using JASP version 0.18.3.

Ethical Considerations

Ethical approval was obtained from the institutional research ethics committee prior to data collection. Participants were informed of the study's purpose, procedures, potential risks, and voluntary nature before providing written informed consent. Participation in the intervention did not influence academic grading, and students were informed of their right to withdraw at any time without penalty. Data were anonymized using coded identifiers and stored in password-protected files accessible only to the research team. All recommended physical activities were moderate in intensity and self-paced to minimize risk.

Results

Figure 1
CONSORT Flow Diagram of Participant Enrollment, Randomization, Follow-Up, and Analysis



Participant Flow and Baseline Characteristics

Of the 180 enrolled participants, 172 (95.6%) finished both pretest and posttest assessments. Loss to follow-up was minimal ($n = 8$; 4.4%) and did not significantly differ between the gamified ($n = 4$) and standard digital ($n = 4$) groups ($\chi^2 = 0.00$, $p = 1.00$).

Equivalence of groups at baseline was assessed using independent samples *t*-tests and chi-square tests. Standardized mean differences (SMD) were calculated to evaluate balance between conditions.

Table 1 presents demographic and baseline study variables for both intervention groups.

Physical Activity Behavior

Weekly Moderate-to-Vigorous Physical Activity (MVPA)

Table 2 presents pretest and posttest weekly MVPA minutes derived from MyFitnessPal logs, including mean change scores across the 8-week intervention period.

Table 1

Baseline Characteristics by Intervention Condition (n = 172)

Variable	Standard (n = 86)	Gamified (n = 86)	p-value	SMD
Age (years)	19.6 (1.2)	19.7 (1.1)	.64	0.08
n (%)	52%	49%	.71	0.06
BMI (kg/m²)	23.6 (3.2)	23.8 (3.4)	.72	0.06
Weekly MVPA (min)	118.45 (42.30)	121.10 (39.85)	.58	0.06
Intrinsic Regulation	3.10 (0.58)	3.08 (0.60)	.79	0.03
Identified Regulation	3.42 (0.55)	3.40 (0.57)	.82	0.04
3-Min Step HR (bpm)	112.5 (8.4)	111.8 (8.7)	.61	0.08
Push-Ups (reps)	18.2 (5.1)	17.9 (5.3)	.74	0.06

Note: All standardized mean differences were below 0.20, indicating adequate baseline balance between intervention conditions.

Table 2

Weekly MVPA Minutes by Group (Pretest and Posttest)

Group	Pretest Mean (SD)	Posttest Mean (SD)	Mean Change
Standard Digital	118.45 (42.30)	156.70 (48.12)	+38.25
Gamified Digital	121.10 (39.85)	198.55 (52.44)	+77.45

Participant's weekly MVPA increased in both intervention conditions, but the gamified group showed a much more significant improvement.

A mixed-design ANOVA showed a significant main effect of Time, $F(1,170) = 84.62$, $p < .001$, $\eta^2 p = .33$, showing average increases in physical activity. More importantly, there is a significant Time × Group interaction, $F(1,170) = 21.48$, $p < .001$, $\eta^2 p = .11$, showing the gamified architecture had much more improvement associated than the standard digital group. The between-group posttest difference had a moderate effect size (Cohen's $d = 0.67$).

In the standard condition, the % of participants who met the thresholds of 150 minutes of moderate-intensity physical activity rose from 41% to 63%, and in the gamified condition, it increased from 44% to 81%. Compared to the standard digital group, At posttest, participants in the gamified group were 2.48 times more likely to meet the international guidelines of physical activity ($\chi^2 = 7.92$, $p = .005$). Levene's test showed a lack of significant MVPA between-group posttest variance differences, $F(1,170) = 0.84$, $p = .36$, suggesting the spread in MVPA across conditions was the same.

Motivational Regulation (BREQ-3)

Descriptive statistics for all five motivational regulation subscales are presented in Table 3.

Table 3
Motivational Regulation Scores by Intervention Condition (Pretest and Posttest)

Subscale	Group	Pretest Mean (SD)	Posttest Mean (SD)
Intrinsic	Standard	3.10 (0.58)	3.28 (0.55)
	Gamified	3.08 (0.60)	3.64 (0.52)
Identified	Standard	3.42 (0.55)	3.55 (0.53)
	Gamified	3.40 (0.57)	3.78 (0.51)
Introjected	Standard	2.85 (0.60)	2.90 (0.59)
	Gamified	2.88 (0.58)	2.95 (0.57)
External	Standard	2.40 (0.63)	2.35 (0.60)
	Gamified	2.42 (0.65)	2.20 (0.61)
Amotivation	Standard	1.85 (0.70)	1.80 (0.66)
	Gamified	1.88 (0.72)	1.60 (0.64)

Mixed-design ANOVA results for motivational regulation are summarized in Table 4.

Table 4
Mixed-Design ANOVA Results for Motivational Regulation

Subscale	F (1,170)	p-value	η^2p
Intrinsic	17.92	< .001	.10
Identified	6.42	.012	.04
Introjected	1.58	.21	.01
External	1.79	.18	.01
Amotivation	2.91	.09	.02

Significant Time × Group interactions were observed for intrinsic and identified regulation, indicating stronger internalization effects in the gamified condition. No significant differential effects were observed for introjected or external regulation.

Objective Health-Related Fitness Outcomes

Descriptive pretest and posttest values for BMI, cardiovascular endurance, and muscular endurance are presented in Table 5.

Table 5

Objective Fitness Outcomes by Intervention Condition (Pretest and Posttest)

Outcome	Group	Pretest Mean (SD)	Posttest Mean (SD)	Mean Change
BMI (kg/m²)	Standard	23.6 (3.2)	23.4 (3.1)	−0.2
	Gamified	23.8 (3.4)	23.5 (3.3)	−0.3
3-Min Step HR (bpm)	Standard	112.5 (8.4)	107.3 (7.9)	−5.2
	Gamified	111.8 (8.7)	102.4 (7.5)	−9.4
Push-Ups (reps)	Standard	18.2 (5.1)	21.5 (5.4)	+3.3
	Gamified	17.9 (5.3)	25.8 (6.1)	+7.9

Inferential analyses for fitness outcomes are presented in Table 6.

Table 6

Mixed-Design ANOVA Results for Objective Fitness Outcomes

Outcome	F (1,170)	p-value	$\eta^2 p$
BMI	1.23	.27	.01
3-Min Step HR	9.84	.002	.06
Push-Ups	14.27	< .001	.08

Significant Time × Group interactions were observed for cardiovascular and muscular endurance, indicating superior physiological improvements in the gamified condition. No significant interaction was observed by BMI.

Weekly Adherence Trajectory

To evaluate behavioral persistence across the intervention period, weekly adherence rates were examined. Table 7 presents adherence percentages for each week.

Repeated-measures ANOVA indicated significant effects of Week, Group, and a Week × Group interaction (all $p < .001$). Effect sizes were small-to-moderate (Week: $\eta^2 p = .10$; Group: $\eta^2 p = .12$; Week × Group: $\eta^2 p = .02$), indicating greater adherence stability in the gamified condition across the intervention period.

Table 7
Weekly Adherence Rates (%) by Intervention Condition

Week	Standard Digital	Gamified Digital
Week 1	78%	88%
Week 2	74%	87%
Week 3	72%	86%
Week 4	69%	84%
Week 5	66%	83%
Week 6	65%	81%
Week 7	63%	80%
Week 8	59%	77%
Average	68%	82%

Mediation Analysis

To test the hypothesized mechanism of change, a bootstrapped mediation analysis (5,000 resamples) was conducted. Standardized coefficients (β) are presented in Table 8.

Table 8
Bootstrapped Mediation Model Coefficients (n = 172)

Path	β	SE	*p*	95% CI
a (Intervention → ΔIntrinsic)	.42	.08	< .001	[.26, .58]
b (ΔIntrinsic → MVPA)	.35	.07	< .001	[.21, .49]
c (Total Effect)	.51	.09	< .001	[.33, .69]
c′ (Direct Effect)	.36	.08	< .001	[.20, .52]
Indirect Effect (ab)	.15	—	—	[.07, .27]

The intervention condition was coded as 0 = Standard Digital and 1 = Gamified Digital. The indirect effect was interpreted as changes in intrinsic regulation having a statistically significant effect on the relationship between intervention condition and logged MVPA. Changes in intrinsic regulation explained 29% of the total effect, signifying that motivational internalization may moderately explain the behavioral differences.

Correlational Analysis

Pearson product–moment correlations among posttest study variables are presented in Table 9.

Table 9
Pearson Correlations Among Posttest Study Variables (n = 172)

Variable	1	2	3	4
1. Weekly MVPA	—			
2. Intrinsic Regulation	.41***	—		
3. Adherence Rate	.36***	.38***	—	
4. Δ Cardiovascular Endurance	.29**	.22*	.24**	—

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

Intrinsic regulation was moderately associated with both weekly MVPA and adherence, while improvements in cardiovascular endurance were positively associated with activity volume, further supporting the behavioral validity of logged activity data.

Discussion

Participant Flow

A total of 180 students agreed to participate and completed a baseline assessment. Participants were evenly randomized to either the gamified digital intervention (n=90) or standard digital intervention (n=90) after baseline measurement. Eight participants (4.4%), four in each group, were lost to follow-up due to no-shows at posttest assessments. No participants were excluded in analyses after randomization for non-adherence. Final analyses were conducted with complete case data for participants who were pretest and posttest completers.

Trial Integrity and Baseline Equivalence

The test conveyed elevated retention (95.6%) alongside the lowest attrition being equal across the intervention conditions. From this we can gain confidence in the analytic sample's stability. We made no baseline comparisons across demographic, behavioral, motivational, or fitness variables, and from this there were no statistically significant differences, noting also, all standardized mean differences resided well below the threshold for imbalance (SMD < 0.20). These numbers demonstrate that randomization achieved group differences prior to intervention exposure. Achieving baseline equivalence is crucial in behavioral trials because it diminishes the

chances that post-intervention differences were artifacts of the intervention rather than pre-existing conditions. Thus, post intervention measures can be taken with greater internal validity to determine true differences between conditions.

Intervention Effects on Moderate-to-Vigorous Physical Activity

Both intervention strategies caused a noteworthy increase in weekly moderate to vigorous physical activity (MVPA), with the gamified digital intervention showing greater improvement than the digital intervention in a non-gamified condition. The moderate effect size (Cohen's $d = 0.67$) indicates that the combination of a digital prompt structure and a gamified digital prompt may increase behavioral activity in university students' populations. The results are in line with some of the physical activity interventions for university students that demonstrate a moderate effect size ($d \approx 0.52$) (Favieri et al., 2022). Also, a considerable number of randomized control trials that focused on physical activities among university students noted a significant increase in total physical activities as well as MVPA with program components that are of moderate to large in effect size (Yuan et al., 2024). The results suggest that the addition of a gamified prompt will most likely strengthen the intervention effects.

Previous digital health interventions in university settings show a lack of consensus, especially concerning higher-intensity activities. While digital health interventions are successful in increasing step counts, they do not result in improvements in multiple-vigorous physical activities (MVPA) of college students (Bi et al., 2024). The present research contributes to the body of literature by demonstrating improvements in MVPA and not just step counts. Distinguishing between MVPA and step counts is important both in research and practice since MVPA provides greater cardiometabolic health advantages than low-intensity physical activities. Therefore, digital health interventions seem to show gamification as a tool to facilitate increases in both the frequency of target behaviors and the intensity of those behaviors to increase the positive physiological effects.

The benefit of the gamified condition being the best out of the other conditions is not surprising as previous studies have shown that gamification elements such as the use of feedback loops, progress tracking, and social comparisons boost persistence in behavior.

In the case of Mazeas et al. (2022), a meta-analysis of gamified physical activities shows small to moderate effects in comparison to other control conditions, while large-scale research integrating the behavioral economics shows sustained improvement in physical activities that are gamified (Fanaroff et al., 2024). Under Self-Determination Theory, gamification is likely to enhance perceived competence and strengthen the internalization of self-regulation which leads to more profound behavioral engagement than self-regulation via cue-based self-monitoring. All things considered, gamified digital interventions are a valid and empirically sound method to increase MVPA among university students.

The increase of approximately 77 minutes per week in the gamified condition is a significant improvement towards adhering to the recommended guidelines. Looking at the epidemiological data, the more people participate in moderate to vigorous physical activities, the more they observe a decrease in their cardiometabolic risk, so it is important to encourage participation in physical activities. The observed magnitude of effect ($d = 0.67$) is greater than the average effect size in the most recent university-based physical activity interventions meta-analyses ($d = 0.52$). Therefore, gamified augmentation may increase the effectiveness of interventions more than standard digital prompting.

Motivational Regulation within the Self-Determination Theory Framework

The study shows that self-determined types of motivation, especially intrinsic and identified regulation, are positively related to activity and adherence levels. These findings are consistent with self-determination theory (SDT), which states that self-regulation leads to persistent behavioral execution when individuals are affirmed with a sense of competence, autonomy, and relatedness. Both experimental and longitudinal studies have shown that autonomy-supportive strategies increase the range of moderate and vigorous physical activities; intrinsic and identified regulations are strong predictors when students are exercising and are persistent in exercising (Friederichs et al., 2015; Sánchez-Herrera et al., 2022). This study supports continuum-based interpretations of progressively internalized forms of regulation and more stable behavioral engagement.

The more noticeable negative correlation between amotivation and physical activity is in support of this interpretation. Amotivation is a function of low perceived competence and low perceived personal value, which makes engagement harder to sustain. Earlier longitudinal studies have shown that motivational qualities act with self-regulatory capacity to determine long-term adherence, with self-efficacy being the most important mediator between the regulatory mechanism and maintenance of the activity (McAuley et al., 2011). This situational context shows that autonomous motivation is in conjunction with cognitive and behavioral self-regulatory mechanisms, not in isolation.

Some theorists are concerned about the possibility of tension in the implementation of gamified elements that use leaderboards. This may be particularly true when such elements are seen as externally controlling. From the perspective of SDT, however, such elements may have mainly positive motivational effects. Of course, competitive and ranking systems may be experienced as controlling, evaluative, or coercively. However, leaderboards may also be experienced in a more positive light, particularly when they are placed in a more voluntary and informational system. In such a case, they may be seen as feedback relevant to the development of the user's competence and may reflect the user's improvement and/or effort. In the current case, for example, the feedback given by the leaderboard was integrated with self-monitoring, streak and badge bonuses, and participation was decoupled from graded activities. To this end, the result of the research showed a lack of increase that would indicate that the gamified elements created externally or introjected controlling regulations and would indicate the presence of controlling pressures. This leads to the ranking system being interpreted as providing positive information concerning progress and competence, which in turn leads to the development of self-regulation and/or internalization.

Gamification may cause varying effects on the varying motivational quality due to differing contextual framing or differing individual factors including social comparison. Research should investigate the degree to which gamification impacts motivational quality by evaluating the degree to which individual motivational factors (autonomy, competence, and relatedness) need is satisfied. The present findings suggest that the primary motivational factor

that may increase engagement in gamified digital interventions is the autonomous regulation of motivation.

Engagement Dynamics and Adherence Trajectory

The patterns in weekly adherence in Table 7 suggest that rather than showing a straight-line path, there are fluctuations or increases in engagement across the course of the intervention. This kind of engagement variability aligns with previous research which shows that adherence to digital health technologies is not static but develops over time in a dynamic, multi-dimensional way, or actors such as level of adoption, consistency, persistence, duration, and eventual dropout (Figueiredo et al., 2025). Their research shows that persistent or changing levels of disengagement are shaped by personal, technological, and contextual factors. Variations in motivation, perceived usefulness, and external demands keep re-engaging or disengaging users.

Engagement trajectories in digital health interventions have shown that users tend to participate at the beginning of the intervention but then shift to low or no activity levels. In a longitudinal study of over 22,000 users of mHealth, Agachi et al. (2023) identified activity levels of mHealth users, and a significant percentage of participants dropped to low activity or no activity over the study period. This state transition supports the idea that adherence is not a linear process, but rather activity and inactivity levels. The fluctuations in adherence in the present study May reflect changing interactions with the intervention framework.

Using a behavioral framework, maintaining digital engagement means moving past the first interactions with a platform, and doing behaviors consistently. The definition of micro engagement and macro engagement illustrates that behavioral change may be enough for someone to engage with the elements of the platform on a consistent weekly basis and suggests that a habit may have become consolidated and fully reinforced. (Eiselt et al., 2026) Thus, the pattern in Table 7 illustrates that during the intervention period, supportive adaptive mechanisms aimed to stabilize engagement and reduce the risk of disengagement.

Translation to Objective Fitness Adaptation

Improvements in cardiorespiratory fitness and muscular endurance due to the intervention were substantial, but the same could not be said of the changes in anthropometric indices. This observation aligns with randomized controlled trials showing that, without major changes to body composition, substantial adaptations happen during short-term (less than 6 months) structured exercise interventions in university populations (Eather et al., 2018, Godoy-Cumilli et al, 2026). This reflects the primary cardiovascular and neuromuscular adaptations, with focus to these short interventions (8–12 weeks) that range in duration the physiological responsiveness of the young adult subjects.\par The additional improvement in muscular endurance also shows consistency with literature that suggests when university populations are controlled for adherence and progressive overload that almost any combination of exercise types is likely to result in substantial improvement (Hollerbach et al., 2021). Such adaptations are likely to be due to changes in the motor unit recruitment, metabolism, and less than voluntary exotic tolerance to repeated submaximal contractions. Those changes occur before the body experiences changes in fat mass or total body mass.

Short-term interventions, like those in our study, demonstrate limited anthropometric changes, while improvements in cardiovascular markers were noted (Pranoto et al., 2025). The evidence consistently supports a gap in functionality of fitness and body composition in which an increase in moderate to vigorous physical activity leads to enhancement in overall fitness and functionality. In contrast, to achieve changes in body composition a longer period of training, higher volume of activity and possibly alterations in diet are necessary to achieve a clinically significant change.

With a timeline of 8 weeks for the intervention and considering that the participants were predominantly in the norm weight category, anthropometric changes as a result of the intervention were not anticipated and because of the absence of dietary changes were not anticipated. The lack of change in BMI is congruent with the anticipated timeframes in short-term physiological changes from exercise interventions.

Autonomous Motivation as a Plausible Explanatory Pathway

Mediation analysis showed that shifts in autonomous (intrinsic) regulation statistically described a meaningful portion of the relation between intervention condition and logged MVPA. This supports Self-Determination Theory (SDT) where it is suggested that regulation of behavior in a self-autonomous manner leads to the continuation of that behavior over time. In this study, shifts in autonomous regulation explained roughly 29% of the total relation between intervention conditions and MVPA. This points to motivational internalization as a plausible pathway.

Motivational regulation and physical activity were, however, measured in the same pre–post interval which means the results should be viewed as evidence of statistical reasoning rather than actual chronological causation. No precedence can be established for this as the mediator and result were assessed at the same time. Therefore, it is plausible that enhanced intrinsic motivation was a result of increased physical activity, or that during the intervention phase both processes worked in a feedback loop. This analysis is consistent with previous structural and longitudinal studies showing links between autonomous regulation and moderate-to-vigorous physical activity (de Oliveira Barbosa et al., 2024; Navas-León et al., 2025). The continued direct effect of regulation is likely to suggest that other factors beyond intrinsic regulation may also explain behavioral differences, such as reinforcement, competition, or habit strength (O'Loughlin et al., 2022).

Theoretical Contributions

This study enhances the theory of change in digital behavior through the first experimental analysis of the role of change in autonomous motivation as an explanatory variable in the differences between gamified and non-gamified digital tools in relation to moderate to vigorous physical activity among university students. Utilizing Self-Determination Theory and a randomized control trial approach, the study differentiates between digital prompts that encourage compliance and those that foster internal motivational control. Results indicate that gamification in digital tools could enrich the type of motivation and increase the duration of behav-

ioral engagement, thus, aiding in the long-term and functional adjustment of the level of physical activity. The study's integration of psychological factors, physical activity, and health outcomes into a single framework provides valuable insights into the growing body of research on digital interventions to promote physical activity in the university setting.

The results show that certain models of digital health behavior change that emphasize structural incentive, cue, or motivation mechanisms, such as gamification, do not account fully or sufficiently for motivation sustained largely by habit, or reinforcing, mechanisms. Models that are com-b based, or drawn from behavioral economics, focus com-b on 'capability, opportunity, and reinforcements,' yet the results demonstrate that these models can work to reinforce and sustain engagement through habit and, most importantly, intrinsic motivation. In this regard, Self-Determination Theory is of value. These results go further than an increase in the frequency of targeted behavior to suggest that health models of technology may impact on the quality of the intrinsic motivation, and not simply the frequency of the motivation.

Practical Implications

For university health promotion programs, the results suggest that digital interventions should include more than reminder-based prompting and develop more advanced gamification elements that enhance the feelings of competence, visibility of progress, and sustained engagement. Simple, low-tech, and inexpensive motivational internalization, such as point systems, streak tracking, and feedback on leaderboards, can be integrated into existing messaging systems. The use and incorporation of gamification that supports autonomy and is embedded in the required physical education or wellness programs may improve program retention and decrease the decline in participation across academic semesters. Universities wanting to implement large-scale solutions to increase the amount of physical activity should emphasize motivational elements and activity tracking to enhance participation and health of the population.

Conclusions

Digital prompting and gamified digital interventions have shown positive impact on Physical Activity (PA) of university students.

Gamification demonstrated a much higher impact on a variety of activity types including moderate-to-vigorous activity, motivational internalization, adherence stability, and functional fitness. In the example of PA, the role of autonomous motivation was found to be a partial mediator. This finding suggests motivational internalization as a primary mechanism that connects gamified designs to changes in behavior. Additionally, the persistence of a direct effect suggests that the additional role of habit, social, or other behavior processes may exist. Therefore, it is recommended that the autonomy-supportive gamification approach be integrated into digital health interventions. This may be a practical approach to encourage some level of PA engagement, even if it is for a short duration, in higher educational institutions.

Limitations of the Study

There are numerous limitations to consider. Regarding MVPA, there were participant-entered MyFitnessPal logs, most of which were verified through screenshots. Although this method of verification increased traceability, it remained susceptible to self-report bias. In the gamified condition, there may be a reporting bias due to logging behavior, which would create an uneven reporting behavior. In addition to Sensitivity analysis and the improvement of fitness via the objective method, future studies utilizing accelerometry and/or derived-wearable metrics are suggested due to the imprecision of the current measurements. The study was limited to a single university and was only eight weeks, this would limit the cross-context and longitudinal generalizability. Because randomization was done individually within the same courses, there may have been informal interaction between different study groups, though the clustering effects were negligible. Also, there may have been some effects of motivational regulation and physical activity that were assessed within the same pre/post interval, and this may have made mediation pathways less clear. Lastly, while Self-Determination Theory was the basis for this research, the basic psychological needs of autonomy, competence, and relatedness were not assessed, and future studies should include these needs.

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PHYSICAL EDUCATION TEACHER EDUCATION

Empowering Elementary Classroom Teachers to Teach Quality Physical Education

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Abstract

This study examines the effectiveness of a professional development program, the Physical Education Teacher Itinerant Program, for elementary classroom teachers in Southern California. The purpose of this program was to equip elementary classroom teachers to teach purposeful physical education. The California Legislature has given every elementary school district the option to either employ a physical education specialist or have the credentialed elementary classroom teachers teach the mandated physical education instruction for grades 1-6 (Cal. Educ. Code 51210.2., 2003). Several studies support hands-on training for improving teacher confidence to deliver quality physical education and increase student physical activity (Escriva-Boulley et al., 2018; Sallis et al., 1997).

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This study used a 5-point Likert scale survey to gauge 156 elementary classroom teachers' perceptions of their preparedness to teach physical education and implement developmentally appropriate physical education curriculum. Descriptive statistics were used to analyze teacher confidence levels, perceptions of preparedness, and satisfaction in teaching physical education. The results of the survey indicated that the classroom teachers were generally satisfied with the training and perceived it as beneficial for implementing developmentally appropriate physical education in their classrooms. This study can be used to inform districts of the value of embedded professional development programs in empowering elementary classroom teachers to deliver high-quality physical education.

Introduction

The Role of Physical Education Specialists

Physical education (PE) specialists play a pivotal role in schools by designing and implementing curricula that not only develop students' motor skills and physical fitness but also foster lifelong habits of health, teamwork, and resilience (Chong et al., 2018). These professionals are responsible for creating inclusive and engaging programs tailored to students' developmental needs, emphasizing both physical competence and social-emotional growth (Ciotto & Gagnon, 2018). Having a credentialed PE specialist leads to higher-quality instruction that improves students' physical fitness, motor skills, and engagement in lifelong physical activity (Latino et al., 2024; Wei, 2025). Research also shows that qualified PE specialists foster more inclusive and effective learning environments that enhance both physical and social development (Kumar & Patel, 2024).

Physical education is a required subject from grades one through twelve in California (Cal. Educ. Code §§ 51210, 51220). At the elementary level, the multiple-subject classroom teachers (CTs) are often responsible for teaching PE. At the secondary level, PE is taught by a single-subject credentialed PE specialist.

Physical Literacy and the Importance of Standards-Based Instruction

Physical education specialists are trained to teach physical literacy. This includes teaching the knowledge and concepts behind movement, building motivation and confidence to be active, developing accurate motor and sport-specific skills, strengthening overall movement competence, and fostering essential fitness knowledge. Physical literacy is presented in standard-based content such as fitness concepts, fostering teamwork and cooperation, developing motor skills, and promoting an active lifestyle in a fun and engaging way that is developmentally appropriate (Physical Literacy, 2024). According to the Society of Health and Physical Educators (SHAPE) America's Shape of the Nation (2016), 39 states across the United States (US) require students to participate in PE at the elementary level (SHAPE America, 2016). Although almost every state in the US requires elementary schools to offer PE, very few provide enough funding for equipment, professional development, or certified PE specialists to ensure successful implementation (Thompson et al., 2024).

Barriers to Quality Physical Education in Elementary Schools

Physical education specialists typically complete in-depth training, often majoring in or minoring in PE/Kinesiology for their undergraduate degree. With PE as their main area of concentration, they become equipped with strong content knowledge and confidence in teaching PE (Truelove, 2021). In contrast, CTs usually receive very limited training, which may include one PE-related course, which leaves them feeling underprepared and less confident in delivering effective PE instruction (Truelove, 2021). CTs take a variety of courses in multiple subjects, which limit their PE expertise.

Research shows that PE specialists have higher self-efficacy and usually have fewer barriers to teaching PE compared to CTs, who struggle with barriers like time constraints, having to teach core subjects, district assessments, lack of resources, and insufficient content knowledge (Truelove, 2021). Constantinides et al. (2013) compared elementary PE classes taught by specialists and non-specialists in New York City. They found that students in classes led by PE spe-

cialists received more effective teaching methods, stronger lesson organization, and more opportunities for practice in skill acquisition and were provided developmentally appropriate physical education (DAPE; Constantinides et al., 2013). In contrast, the classes that were taught by nonspecialists spent more time on management and unstructured game play, resulting in fewer meaningful learning opportunities. For a quality PE experience that is developmentally appropriate, students need to be taught by teachers who are highly qualified to ensure students can receive the proper foundation for lifetime fitness and health.

California's State Mandates PE Requirements and Accountability

In the State of California, elementary schools have a minimum mandated time requirement for PE, which is 200 minutes every 10 school days (Cal. Educ. Code § 51223, 1976). In 2013, there was a series of lawsuits whose purpose was to ensure schools were providing PE appropriately (*Cal200, Inc. et al. v. San Francisco Unified School District,* 2013). Following the lawsuits, elementary school teachers are now required to document and verify that they meet the state-mandated PE minute requirements (Adams, 2016). Now that districts are being held accountable for the state-mandated PE minutes, CTs face the challenge of integrating PE into the curriculum while striving for high test scores in other core subjects (Adams, 2015).

Part of the CT's responsibilities is to teach common core standards and administer excessive assessments; therefore, some districts have hired PE specialists so that the teachers can plan for common core and have one less subject to teach (Adams, 2015). California has the largest public school enrollment in the United States (Holley, 2024). According to Thompson et al. (2019), half of the elementary school districts do not comply with the state PE law mandating students in grades 1-6 get 200 minutes in 10 school days, or the equivalent of 20 minutes of PE/day. This leaves half of the students in California at a disadvantage, having inconsistent and inadequate PE instruction.

Discrepancies Between Physical Education and Physical Activity

If only half of California school districts comply with the state PE law, what happens with the other half that do not comply? More than

likely, PE is documented to include free play, or games like kickball and basketball, walking or running laps, or unstructured physical activities. There is a discrepancy with PE compared to physical activity, recess, non-instructional physical activities, and athletics/sports. According to the California Department of Education (2019), PE is an academic subject that, through standard-based instruction, provides students with age-appropriate structured lessons on movement skills and acquisition, health-related fitness, knowledge of fitness concepts, and social skills. Physical activity is any bodily movement produced by skeletal muscle activity that requires energy expenditure and includes recreational and fitness activities like jumping rope, playing sports, and doing household chores. Recess offers unstructured activity breaks in which students may or may not be physically active. Similarly, movement time in which multiple classes of the same grade level choose from several activities supervised by non-credentialed staff and/or vendors while the CTs have meetings is considered non-instructional physical activity rather than formal physical education, consistent with guidance from the California Department of Education (2023) and the Center for Disease Control (2017). Athletics/sports are geared towards skilled youth, focusing on sport-specific skill refinement and competition (CA Dept of Education, 2019).

If general non-structured physical activities are being substituted for PE, students are not afforded the opportunity for foundational skill development (e.g., gross motor skills) that promotes long-term development and health. It is important to distinguish PE from unstructured physical activities to promote the goal of PE, which is to develop physically literate individuals to become lifelong movers. The essential components of physical literacy include skills, knowledge, confidence, and motivation. To become physically literate, students must learn fundamental movement skills, physical fitness, fitness concepts, skill development, and overall well-being through organized, developmentally appropriate physical activities (Mengyu et al., 2025). A comprehensive PE program should not be replaced with walking, running laps, or non-instructional physical activities. This is common practice in elementary school settings that do not have a credentialed PE specialist to teach DAPE. Therefore, their lack of training leads to insufficient PE instruction.

Development of the Physical Education Teacher Itinerant Program (PETIP)

In 2008, a large urban district in Southern California started a two-year grant-funded initiative, supported by state allocations, to establish the Physical Education Teacher Itinerant Program (PETIP). The program was designed to strengthen elementary PE by having credentialed PE specialists (i.e., PETIP teachers) to deliver consistent hands-on professional development to CTs. PETIP teachers traveled to five elementary schools a week (Physical Education/Grants, 2018). The main objective of PETIP was to provide CTs with instructional methods, PE subject matter knowledge, and equipment, as well as provide resources for them to competently teach DAPE (Physical Education/Grants, 2018). This program served 85 elementary schools and was geared to bridge the gap where hiring a credentialed PE specialist was not possible. This program used a "teach the teacher" model where PE specialists worked side by side modeling best practices and building teachers' ability to deliver standards-based instruction. The CTs gradually take over teaching PE with the itinerant teacher's guidance.

Research on Professional Development in Physical Education

Research supports the effectiveness of hands-on professional development. Sherman et al. (2010) found that after receiving structured training, most classroom teacher participants in their study consistently delivered DAPE, compared to initially, the teachers had barriers like academic priorities. Academic priorities are a common reason that teachers do not prioritize PE time. Likewise, Escriva–Boulley et al. (2018) found that professional development improved CT's instructional approaches and led to increased student physical activity levels. Sallis et al. (1997) further reinforced that when CTs are properly supported with evidence-based PE programs, there is an increase in student participation and physical activity. These studies validate the positive impact of consistent hands-on professional development on teacher effectiveness and student outcomes in PE.

Purpose of the Study

The purpose of this study was to explore if PETIP effectively prepared CTs to deliver quality PE instruction. In particular, it focused

on whether consistent, hands-on professional development gives teachers the tools to teach structured, standard-based instruction that supports students' physical literacy. Authors sought to know if by working with PETIP, the CTs will have enough knowledge and confidence to provide a structured educational program designed to promote physical fitness, skill development, and overall well-being through physical activity.

Methods

The physical education teacher itinerant program served as a professional development model, equipping CTs to deliver quality standard-based PE instruction. This "teach-the-teacher" model promoted physical literacy for all students by equipping CTs with the tools to teach the necessary skills, knowledge, and resources to teach quality PE. This program aimed to strengthen CTs' instructional capacity in PE assists schools in meeting state-mandated PE requirements and fosters confidence in teachers lacking formal PE training, ultimately improving the quality of instruction. To evaluate PETIP's effectiveness, a survey was administered to current PETIP classroom teacher participants. Likert scale items were used to collect quantitative data on teacher perceptions, with descriptive statistics calculated to summarize responses.

Setting

Physical education instruction was delivered by the credentialed PE specialist, who provided both in-person lessons with the students and detailed lesson plans that aligned with the California State PE standards once a week. PETIP incorporated a gradual release model, which allowed the CTs to progressively build confidence and competence in delivering PE instruction based on modeled practices throughout the year with the support of the PETIP teacher (Physical Education/Grants, 2018). PE presents unique challenges compared to classroom teaching, which includes outdoor environments that are uncontrolled by the weather, noise challenges, larger movement spaces, and equipment that requires specific detailed instruction for safe and effective use.

PE lessons often involve quick transitions between multiple activities, for which classroom management strategies need to be

established. While CTs manage their classes in the classroom, teaching PE outside is quite different. The PE specialists brought essential pedagogical and practical experience in these areas that general classroom teachers may not have. The PETIP grant not only provided funding for a credentialed PE teacher but also equipment to enhance instructional delivery by having enough equipment for individual and small group practice of skills.

Participants

This study sample consisted of 156 elementary classroom teachers who participated in the PETIP program. Elementary schools/teachers volunteered to participate in the PETIP program. To model an effective PE class, the credentialed itinerant PE teacher (i.e., PETIP teacher) was assigned to participating schools for two years. This gave the PETIP teacher time to support more teachers in the school; each year they worked with a different set of teachers. Each weekday, a PETIP teacher was assigned to one elementary campus, where they worked with six or seven CTs for about 40 minutes each throughout that day. They worked alongside the same six to seven teachers one day a week for a whole school year.

Procedure (PETIP Intervention)

Survey data were collected through Google Forms utilizing a 5-point Likert scale. The survey aimed to gauge participating teachers' perceptions of their preparedness to teach PE and implement DAPE curriculum. It also gathered information on participants' demographics, education training background, and their confidence and satisfaction levels in teaching physical education before and after the PETIP program. `

Summary of the Survey

The survey was used to gather data and evaluate the CTs' backgrounds, confidence, perceptions, and preparedness related to PE after participating in the PETIP program. The survey examined several key areas, starting with the CT's instructional context and prior preparation by asking respondents to report their grade levels they teach, the type of PE-related training they received before PETIP, and their years of teaching experience. The survey also included the

duration of each CT's involvement with the PETIP teacher. Teachers self-evaluated their confidence in teaching PE both before and after the program, identified areas where they still felt least confident, and reported if PETIP improved their preparedness to implement DAPE. Their beliefs and attitudes about PE were measured through a series of Likert-scale statements addressing perceptions of PE's importance, personal enjoyment of physical activity, expectations for students' success, administrative support, and their responsibility in helping students overcome movement challenges.

The teachers were also asked to evaluate their PETIP training experience by rating the expertise of the PETIP teacher, clarity and quality of lesson plans, continuity of lesson progressions, adequacy of hands-on practice, relevance of the curriculum, sufficiency of weekly instructional support, and overall satisfaction with the embedded coaching model professional development. Teachers assessed their self-efficacy after participating in PETIP, including their confidence in teaching locomotor and motor skills, delivering health-fitness concepts, locating instructional resources, using grant-provided equipment, sharing PE knowledge with colleagues, and whether they felt additional support would be beneficial in the future.

Data Analysis

Descriptive statistics were used to analyze the demographic information and the Likert scale responses regarding teacher perceptions and confidence levels. Percentages, mean scores, and frequencies were calculated to highlight trends in CTs' self-reported confidence, preparedness, and satisfaction with PETIP. These analyses provided awareness into the relationship between participation in PETIP and CRTs' perceived ability to deliver DAPE.

Results

According to the survey results, the participating teachers' confidence, readiness, and perceptions of support when teaching PE were significantly improved by participating with PETIP. Teachers reported starting the program with limited PE instruction training and low confidence in teaching PE; however, after participating in the program, they reported substantial increases in competence and confidence. They reported that they valued the expertise of the PE specialists. The teachers also expressed that they were very satisfied

with the embedded professional development model and that they wanted to continue with the program. Overall, the findings imply that PETIP successfully improves teachers' capacity to provide high-quality physical education instruction.

A total of 156 CTs completed the survey. Participants represented a wide range of teaching experience, with 19.1% reporting 1-4 years, 20.3% reporting 21-24 years, and 27.0% reporting 25-29 years of experience.

PETIP Survey Results

The survey was used to evaluate the effectiveness of the PETIP program in preparing elementary classroom teachers to deliver high-quality physical education and support the development of physical literacy.

Teacher Education and Training Background

Most teachers (63.9%) reported completing only one college-level PE course, whereas (19.4%) reported taking multiple PE classes in their teacher education classes. Some teachers (23.9%) reported attending one to two workshops related to PE, and 7.7% reported participating in multiple PE professional development workshops (see Figure 1).

Confidence in Teaching Physical Education

Before participating in PETIP, 15.0% of teachers reported that they felt confident and 6.5% reported feeling very confident in teaching PE. Also, 35.9% reported feeling somewhat confident, 34.0% reported feeling neutral, and 8.5% reported feeling not at all confident (see Figure 2). After participating in PETIP, 36.8% of teachers reported being confident, and 33.6% reported feeling very confident (see Figure 2). The combined percentage for confident and very confident increased by 48.9 percentage points.

Figure 1
Teacher Education and Training Background

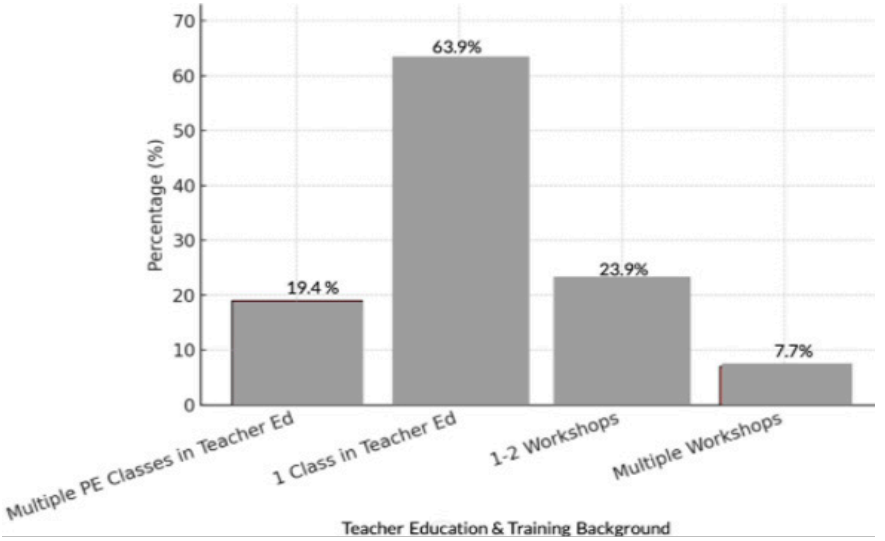
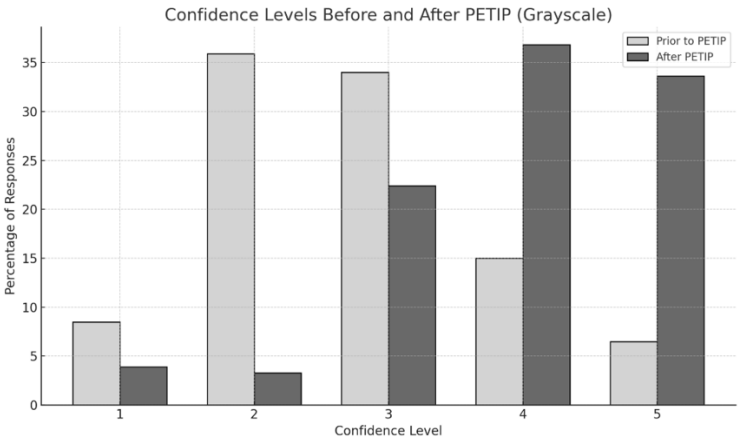


Figure 2
Confidence Levels Before and After PETIP



Perception of PETIP Teacher Expertise

A total of 73% of teachers agreed or strongly agreed that the PETIP teacher demonstrated knowledge and expertise in PE. Fewer than 1% disagreed.

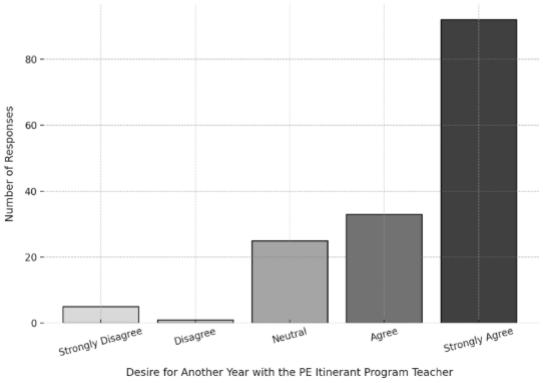
Confidence in Teaching Locomotor and Motor Movement Skills

After participating in the PETIP program, 52% of teachers agreed and 35% strongly agreed that they felt confident in teaching locomotor movements, for a combined total of 87%. Similarly, for gross motor skills, 59% agreed and 30% strongly agreed they felt confident teaching motor skills, for a combined total of 89%.

Desire to Continue the PETIP Program

Participating teachers overwhelmingly agreed they would like to continue in the PETIP program. Fifty-nine percent of teachers strongly agreed, and 36% agreed that they would like to continue working with a PETIP teacher for another year, for a total of 95% (see Figure 3).

Figure 3
Desire for Another Year with the PE Itinerant Program Teacher



Satisfaction With Embedded Training

After the PETIP program, 61.3% of teachers strongly agreed and 22.7% agreed that they were satisfied with the embedded PE training, for a combined satisfaction rate of 84% (see Figure 4).

Preparedness in Implementing PE Curriculum

When participants were asked how prepared they felt to implement the provided PE curriculum, most indicated moderate to high levels of preparedness. Specifically, 8% felt not prepared, 22% felt somewhat prepared, 41% felt prepared, and 24% felt very prepared (see Figure 5).

Figure 4
Desire for Another Year with the PE Itinerant Program Teacher

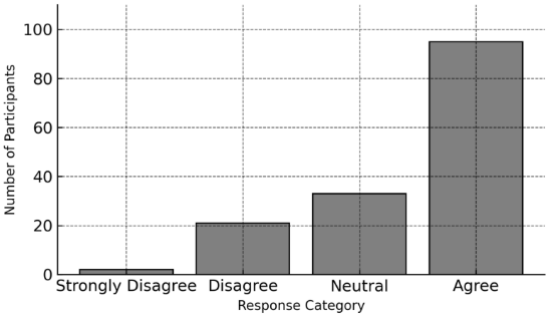
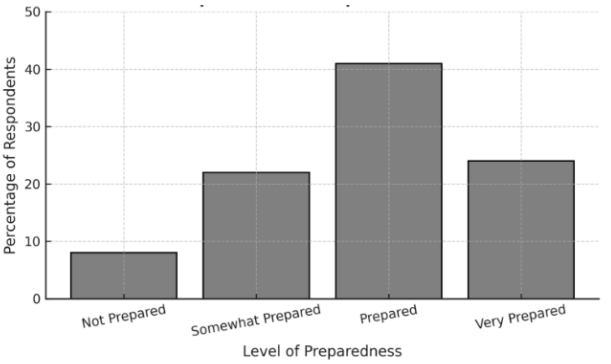


Figure 5
Desire for Another Year with the PE Itinerant Program Teacher



Discussion

The findings from this study indicate the ongoing need for targeted professional development in PE for CTs. Most of the participants reported completing only one college-level PE course, consistent with previous research indicating limited preparation in PE pedagogy for CTs (Escriva-Boully et al., 2018; Sherman et al., 2010). The limited training shows a critical gap in teacher preparation programs and reinforces the importance of ongoing, embedded professional training models like PETIP. Programs like PETIP that are focused on "teach-the-teacher" are especially valuable in districts where access to credentialed PE specialists is limited.

Confidence Gains

The results of this study showed that teacher confidence increased substantially after participation in PETIP. Self-reported ratings showed large improvements in both overall confidence to teach PE and the ability to implement DAPE lessons. These findings align with prior studies that link hands-on, long-term professional development with increasing CRTs' ability for self-efficacy and instructional competence (Sherman et al., 2010; Truelove, 2021). By providing modeling, feedback, and guided practice, PETIP appears to foster a practical sense of PE instruction that contributes to greater teacher confidence across all experience levels.

Satisfaction with the PETIP Model

Participant satisfaction with the embedded professional development PETIP model was especially high and showed that this model was valuable and effective. These results reflect positive perceptions of both the quality of coaching and the embedded nature of the support. The "teach-the-teacher" method, where credentialed PE specialists collaborate directly with the CTs, provides unique learning opportunities that traditional one-time workshops do not offer. These findings support prior literature outlining the value of ongoing professional development for improving teacher confidence in providing DAPE.

Sustainability

Demonstrating strong program sustainability and perceived benefit, nearly all participants expressed interest in continuing with PETIP an additional year. Continued desire to work alongside a PE specialist suggests that CTs viewed the partnership as a meaningful part of their professional growth. Keeping this embedded support could contribute to long-term improvements in providing DAPE, physical literacy, curriculum alignment with state standards, and student engagement in PE to create a path to a lifelong desire to move. For longevity, districts would need to plan for sustainable funding, beyond temporary grants, to support the continued employment of credentialed PE specialists.

Preparedness to Implement PE Curriculum

The participants reported improvements in their preparedness to deliver standards-based PE lessons after participating in PETIP. The majority reported feeling confident implementing lessons that align with the California State PE content standards, particularly those addressing locomotor skills (e.g., running, hopping, skipping), fundamental motor skills (e.g., throwing, catching, kicking), and manipulative skills using balls and implements. These findings suggest that the PETIP model effectively supports teachers in translating professional learning into standards-based instructional practice, leading to more consistent instruction in DAPE.

Limitations

There are a few limitations to consider, though this study provides compelling evidence for PETIP's effectiveness. First, the study used a Likert scale to collect self-reported data. While self-reported confidence is useful for measuring perceptions of teachers, it may not always be accurate for how effective it is for student outcomes or instructional quality. To give more comprehensive data, future research could include student assessments or observational data. Second, this study did not include a control group of teachers who did not participate in PETIP which limits the generalizability if improvement is due to PETIP participation. However, the substance difference of the before and after changes in confidence levels within the same group of teachers provides strong internal validity. Last, the study population was from one district in Southern California, which may restrict generalizability of the findings to other areas or states with different educational contexts or PE mandates.

Conclusion

This study conclusively demonstrates that the PETIP is an effective and highly valued professional development model for CTs. It supports the alignment of professional learning into classroom practice, which enhances the classroom teacher's preparedness and confidence in teaching PE. By implementing DAPE and delivering instruction that is standards-based, the CTs will have the skill set to help students become physically literate. The program's embedded curriculum with a hands-on approach, delivered by credentialed

PE specialists, directly addresses the existing gap in elementary PE, where a PE specialist is not provided.

The PETIP's value and positive effect on teacher quality are underlined by the high satisfaction rates accompanied by the strong desire of the PE specialists to continue the program. The results of this study provide compelling evidence for districts to consider implementing or expanding similar embedded professional development programs as a possible solution to the inability to hire PE specialists in the elementary setting. This program can be used as a tool for instructing and empowering elementary teachers to deliver high-quality physical education instruction that is developmentally appropriate, ultimately supporting the physical literacy and physical well-being of students.

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ADAPTED PHYSICAL EDUCATION

Role of Physical Education in Helping Students with ADHD: A Scoping Review

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Abstract

Attention deficit hyperactivity disorder (ADHD) is one of the common neurodevelopmental disorders among students. This scoping review aimed to map the evidence on the role of Physical Education (PE) in helping ADHD Students. PsycINFO, MEDLINE (PubMed), Google Scholar, ProQuest, and SPORTDiscus databases were searched for evidence. Following the recommended processes for conducting a scoping review, 11 articles were included in this review. The interventions included in this review can be summarized in three clusters: reduction of symptoms, obtaining strategies, and positive impacts on feelings, relationships, performance, engagement/enjoyment. Considering the various study designs, methods, sample sizes, and PE approaches in these 11 investigations, it is challenging to determine the best PE setting to help ADHD children. However, based on the results of this review, PE classes can positively impact ADHD students. Implementing a structured movement program and integrating this program into the PE curriculum would be beneficial for ADHD students.

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Introduction

Attention Deficit Hyperactivity Disorder (ADHD) is one of the most frequent neurodevelopmental disorders (Reeves & Bailey, 2016). It is estimated that the global prevalence of ADHD among children and adolescents is between 5% and 10% (Hall, 2024). Students with ADHD often may have difficulty maintaining focus and may exhibit excessive levels of activity. They may also experience lack of self-control and impulsive behaviors (Salari et al., 2023). This disorder also affects children's emotions, academic performance and social interactions (Zhu et al., 2023). It is important to treat the main symptoms of this disorder in children, since these symptoms might lead to lots of problems such as academic failure (Ogundele & Ayyash, 2023). Therefore, addressing the main symptoms of ADHD through effective interventions could be beneficial (Coghill et al., 2021). Behavioral and medical management are considered as primary interventions for ADHD children (Jerome & Jerome, 2020).

However, the evidence indicates that over a third of children do not respond or experience adverse reactions to the pharmacological interventions (Zhu et al., 2023). Concern has been expressed that pharmaceutical interventions may not be appropriate for managing ADHD symptoms in children and most of the parents are concerned about the short and long-term side effects of medications (Ng et al., 2017). Therefore, there is a strong need to consider alternative and non-pharmacological interventions to help ADHD children (Lelong et al., 2021). Non-pharmacological interventions are effective in reducing the behavioral problems in these students. Behavioral interventions are also considered as an alternative intervention to improve their social skills and academic performance (Ogundele & Ayyash, 2023).

As the pursuit of alternative interventions continues, physical activity is also considered as an effective strategy to help ADHD students (Cornelius et al., 2017). Physical activity (PA) is described as any bodily movement generated by skeletal muscle action, resulting in an increase in the energy expenditure (Caspersen et al., 1985). PA as a potential intervention for ADHD, could reduce the ADHD symptoms by increasing the level of dopamine and norepinephrine neurotransmitters. Furthermore, PA has been linked to increase the

levels of 5-hydroxytryptamine and endogenous opioids and potentially boosting mood and attention (Xie et al., 2021). Although many investigations have described the impact of PA on students with ADHD, few studies have examined the role of physical education (PE) as a treatment for these students (Giesige, 2018). PE defines as a socially constructed curriculum that includes the broader spectrum of physical culture, sport and health-related physical activities (Coulter & Ní Chróinín, 2011). Currently, much of the literature studying the potential impact of PE on ADHD emphasizes its contribution to motor development in ADHD students (Bicalho et al., 2023). Others suggest PE can reduce stress and anxiety in these students. PE also impacts positively on the social interactions and academic performance (Mulrine & Flores-Marti, 2014). While these benefits of PE for ADHD students are known, more research is needed to fully understand the role and mechanism of these benefits. It follows that Bicalho et al. (2023) highlights the need for a better understanding of the role of PE in ADHD treatment.

It is important for PE teachers to utilize their pedagogical skills when teaching students with ADHD (Mulrine & Flores-Marti, 2014). Therefore, some studies have been done in the field of PE and ADHD, but still the knowledge of physical educators and students about PE and ADHD is not enough (Bicalho et al., 2023). To our knowledge, there are no comprehensive reviews about the role of PE in helping students with ADHD. Additionally, there is a limited number of investigations assessing the outcomes regarding this role. By identifying the existing research and emerging evidence, this review aims to recognize gaps in the relevant literature on the role of PE in helping students with ADHD, ultimately facilitating the future research directions and the development of PE settings to help students with ADHD.

Methods

The aim of this scoping review was to assess the role of PE in helping students with ADHD. Therefore, to address this aim, we followed the established framework for scoping studies (Arksey & O'Malley, 2005), which consists of five stages: (1) identifying the research questions; (2) identifying relevant studies; (3) study selection, (4) charting the data; and (5) collating, summarizing, and reporting the results. For this scoping review, we also used the PRISMA-ScR

checklist (Preferred Reporting Items for Systematic Reviews and Meta-analyses Extension for Scoping Reviews (Page et al., 2021). The protocol was also registered in the Open Science Framework (https://osf.io/harwq/).

Identifying the Research Question

To fulfill the aim of this study, the following research question was developed: "What role can physical education play for students with ADHD?"

Identification of Relevant Studies

A comprehensive search was performed using five main databases of PsycINFO, MEDLINE (PubMed), Google Scholar, ProQuest, and SPORTDiscus. Key search terms were determined through the broad review of literature in the field of PE and ADHD. The identified key terms of *ADHD, Physical Education, students, children,* and *youth* were applied within the five relevant databases in the searching process. We also used search terms such as *structured PE* and *academic behaviors* to ensure comprehensive search. Database searches were performed for articles published between January 1, 2014, and April 20, 2024, to ensure the review included the most current knowledge on the topic. We also excluded systematic reviews and articles that lacked sufficient data for a meaningful second analysis. Upon a comprehensive search across the five databases and considering the inclusion and exclusion criteria, we realized that there is limited literature available on the topic of our study.

Selection of Sources of Evidence

Based on the recommendations of Arksey and O'Malley (2005), the criteria for the selection of studies were refined after the initial search. Therefore, the following inclusion criteria were applied for the abstracts: (1) must be related to PE and ADHD; (2) must be related to children and youth; (3) published between January 1, 2014, and April 20, 2024; and (4) published journals, PhD theses. The studies were also excluded based on the following criteria: (1) not related to physical education; (2) not related to ADHD; (3) not related to children and youth; and (4) published before January 1, 2014. After applying these criteria, the authors examined the full-text versions of all eligible abstracts for further review. Any conflicts were identified

and resolved through discussion between the three reviewers. The authors determined that 11 papers met the eligibility criteria for the final review.

Data Items

After determining 11 papers for the final review, the authors extracted and presented the key findings of each paper in a standardized table. This table includes the name of authors, year of findings and outcomes. No supplementary software or calibration were used during this process.

The study designs were diverse, including one experimental study, five quasi-experimental studies, three qualitative studies, and two observational studies. Each study was independently reviewed by three independent researchers, and discrepancies in the assessments were resolved through discussion. The primary objective of this scoping review was not to assess the study designs, although the included study designs will be briefly addressed. Instead, the authors aimed to describe and examine the role of PE in helping children with ADHD. Furthermore, the review aimed to suggest potential strategies for boosting the effectiveness of PE in managing the symptoms of ADHD.

Results

Results of the Search Procedure

Figure 1 presents the screening process. Articles were sourced from five different databases. After removing the duplicates and following the eligibility criteria, three independent researchers assessed the titles and abstracts of the retrieved articles. The articles that met the initial criteria were subsequently included in full review by the same researchers to determine their eligibility for inclusion in this scoping review. The 11 articles subjected to full review are presented in Table 1. The related characteristics of the investigated populations, research methods and objectives are also provided in this table. The outcome section of this table also described how the physical education setting impacted the symptoms of ADHD or how it could assist students with ADHD.

Table 1
Characteristics of Included Studies

Authors	Population	Study Design (research method)	PE intervention	Outcome
(Dana et al., 2018)	n= 40 boys with ADHD. Age: 7-10	Quasi-experimental study with pre- and post-test design	A three-month course of education based on developmental PE (two sessions of one-hour weekly with fundamental movement skills and physical fitness components)	Reduction of conduct problems, social problems, anxiety-shyness, psychosomatic, and overall level of ADHD
(Taylor et al., 2019)	n=12 children Study group: 6 children with ADHD (5 boys and 1 girl) Control group: no diagnosis of	Quasi Experimental design (A repeated-measures design)	40-min sessions of short-duration, mixed activities (warm-up, two different gym-based and outdoor blocks of mixed	A significant reduction in ADHD symptoms, helping children manage ADHD symptoms. Evaluated the exercises as
	ADHD (3 boys and 3 girls) Age: 10-11		activity, cool-down) Bi-weekly sessions for 11 weeks	acceptable and enjoyable for those with and without ADHD.

Table 1 (cont.)

(Taylor, 2019)	n= A single cohort of 4 boys with ADHD. Age: 10-11	Observational study	Moderate to high intensity PA. Ten 40-minute sessions over five weeks (short periods of each activity and a variety of different exercises including warm up, outdoor activities and indoor gym-based activities and cool down)	A general increase in engagement and effort in classroom-based lessons, lower hyperactivity and inattentive symptom scores
(Mok, 2023)	n=4(3 boys and 1 girl) Age:6-9	Experimental Design	30 minutes of structured PA	Decreasing the number of off-task behaviors
(Villa-de Gregorio et al., 2022)	n=13 students with ADHD (9 boys and 4 girls, AND 13 students (9 boys and 4 girls), without attentional problems (Age:15)	Quasi-experimental design	A 12-week curriculum-based PE program	A curriculum-based PE program influenced the social preferences for learning in PE

Table 1 (cont.)

(Vaage, 2017)	n=3 (1 boy and 2 girls) at three different secondary schools Age:13-15	Qualitative phenomenological research	How children with ADHD experience PE.	The structure given by the teacher, the valuing/de-valuing of certain activities and how the students can adjust to the habitus of the field were the main experiences that could be helpful for ADHD students
(Roca, 2018)	n=3 pupils in the 4th, 5th and 6th grades diagnosed with ADHD	Qualitative research	Identify the behavior of pupils with ADHD, distinguishing between desirable and undesirable behaviors.	Outcomes to help the students with ADHD: a) the teachers must create situations in which desirable behaviors occur more frequently b) use techniques to increase or maintain behavior c) use reinforcement techniques or positive techniques (RTB) more than punishment

Table 1 (cont.)

(Bores-García et al., 2024)	n = 8 secondary school ADHD students (5 girls and 3 boys) Age: 11-16	A qualitative descriptive study based on an interpretative framework.	Describe the perspective of ADHD students and PE teachers concerning PA practice in high school	ADHD is not experienced as limiting the practice of PA and PE by students, except in motor activities that require concentration
	And 4 PE teachers (1 woman and 3 men)			such as tactical games. On the contrary, PA and PE help ADHD students feel better. Teachers have not had to make extensive methodological modifications in their teaching styles with students with ADHD
(COSTA et al., 2015)	n=4 students with ADHD (3 girls and 1 boy) Age: 6-10	Observational study	Three thematic types of activities were selected and applied: psychomotor, play activities and strategy games.	Obtaining some strategies to help ADHD students including teacher /student and student /student bond; cooperative work.; mediation; routine; resource selection and environment.

Table 1 (cont.)

(Hemayattalab et al., 2016)	n= 30 boys Age: 9-11	Quasi-experimental study	SPARK physical education program (Effects of sports, play, and active recreation in kids) for 12 sessions of 30 minutes and has two parts: a health-fitness activity (15 min) and a skill-fitness activity (15 min).	Reducing behavioral problems, including externalizing and internalizing behaviors along with eight syndromes (anxiety/depression, withdrawal, somatic/ thought/ social complaints/attention problems, delinquent and aggressive behavior)
(Banikarimi et al., 2018)	n= 38 elementary school boys Experiment (21 subjects) and control (17 subjects)	Quasi-experimental study with a pretest-posttest design.	The experimental group trained for ten sessions in the fundamental motor skills (FMS) program and the control group continued with its daily activities.	FMS training can have a positive effect on children's performance in motor impulsiveness and controlling movement and impulses in children with ADHD symptoms.

Synthesis of Results

Participants

The 11 studies included a total of 149 participants ranging from 7 to 16 years of age. Four PE teachers were included in the population of the study by Bores-Garcia (2024), since this study was qualitative. Therefore, the total number of participants in this scoping review is 153.

Intervention

The interventions included in this review can be summarized in three clusters: reduction of symptoms, obtaining pedagogical strategies, and positive impacts on feelings, relationships, performance, and engagement/enjoyment.

Reduction of Symptoms

Although several studies (Dana et al., 2018; Hemayattalab et al., 2016; Mok, 2023; Taylor, 2019; Taylor et al., 2019) each utilized different methods for PE sessions, they all resulted in reducing the symptoms of ADHD. For example, Dana et al. (2018) found that fundamental movement skills and physical fitness components in the PE sessions led to decreased conduct problems, social problems, anxiety-shyness, psychosomatic, and overall levels of ADHD symptoms in the experimental group of 40 students with ADHD. Taylor et al. (2019) demonstrated that 40-min PE sessions of short duration and mixed activities resulted in a significant reduction in ADHD symptoms, helping children manage their ADHD. In another study (Taylor, 2019), the investigators used moderate to high-intensity PA during PE sessions, and they concluded that this PE intervention led to lower hyperactivity and inattentive symptom scores in kids. Mok (2023) also concluded that structured PA during PE sessions decreased the off-task behaviors in students with ADHD. Although the sample sizes are low in these two investigations (Mok, 2023; Taylor, 2019), their findings are still valuable as they are among the few research studies that have examined the impact of PE setting on students with ADHD in school. Also, the results of a quasi-experimental study by Hemayattalab et al. (2016) suggested that after implementing the SPARK PE program, the level of behavioral problems reduced in students with ADHD.

Obtaining Pedagogical Strategies

Three of the studies included in the review shared outcomes related to pedagogical strategies for most effectively working with ADHD students. The qualitative research implemented by Roca (2018) demonstrated that using strategies such as creating situations in which desirable behaviors occur more or using reinforcement more than punishment can be helpful for students with ADHD. In

another observational study (COSTA et al., 2015), psychomotor and play activities were applied to obtain some strategies to help three students with ADHD, and researchers realized that the following strategies could be implemented to assist these students: teacher/student and student/student bond, cooperative work, mediation, routine, resource selection, and environment. Vaage (2017) in qualitative phenomenological research concluded that the structure given by the teacher, the valuing/de-valuing of certain activities and how the students can adjust to the habitus of the field were the main experiences of students with ADHD during the PE sessions. Although the sample size in all these studies (COSTA et al., 2015; Roca, 2018; Vaage, 2017) were low, the strategies seem effective in helping ADHD students.

Positive Impacts on Feelings, Relationships, Performance, and Engagement/Enjoyment

The quasi-experimental design study implemented by Taylor et al. (2019) in the study group of six children with ADHD demonstrated that 40-min sessions of short duration, mixed activities resulted in a reduction in ADHD symptoms (as previously mentioned). In addition, the students with ADHD evaluated the PE sessions as acceptable and enjoyable. In another observational study on a single cohort of four boys with ADHD, a general increase in engagement and effort in classroom-based lessons was reported.

In a 12-week curriculum-based PE program (Villa-de Gregorio et al., 2022), the researchers concluded that this program could influence the social preferences for learning in PE by promoting the ADHD students' relationships with other classmates. In the most recent study by Bores-García (2024) on secondary school students, it was determined that teachers have not had to make extensive methodological modifications in their teaching styles with ADHD students. Another important finding was that PE sessions could successfully help students' positive affect. A quasi-experimental study (Banikarimi et al., 2018) on 38 boys (21 as experimental and 17 as control subjects) with a pretest-posttest design concluded that ten sessions of fundamental motor skills program in PE setting can have a positive effect on ADHD children's performance in motor

impulsivity and controlling movement. This research examines fundamental motor skills training, which is considered significant.

In another investigation on a low sample size of four participants (Taylor, 2019) with ADHD, moderate to high-intensity PA in PE sessions increased participants' engagement in the class lessons.

Discussion

Eleven articles were included in our final review. These articles examined how PE can help children with ADHD. In the studies included in our review, a diversity of methods was implemented. Two of the studies were observational (COSTA et al., 2015; Taylor, 2019) in which different activities were applied. Three of the investigations were qualitative (Bores-García et al., 2024; Roca, 2018; Vaage, 2017). In these studies, the authors investigated the experience of children with ADHD with PE sessions. All three studies concluded that PE sessions could have several positive impacts on ADHD students, mainly helping them feel better and helping the PE teachers to identify some helpful strategies and techniques.

Five other studies were quasi-experimental design (Banikarimi et al., 2018; Dana et al., 2018; Hemayattalab et al., 2016; Taylor et al., 2019; Villa-de Gregorio et al., 2022), and in two of them the sample sizes were low (Taylor et al., 2019; Villa-de Gregorio et al., 2022). Three of these studies resulted in the reduction of ADHD symptoms in children (Dana et al., 2018; Hemayattalab et al., 2016; Taylor et al., 2019), While studies (Banikarimi et al., 2018; Villa-de Gregorio et al., 2022) concluded positive effects of PE on the student's performance and relationships/social preferences in PE, respectively. In another investigation conducted by Mok (2023), structured PA was implemented during the PE sessions and this approach resulted in the reduction of off-task behaviors. All in all, the findings of these 11 included articles in our review indicated the positive impact of physical education sessions on helping students with ADHD.

One key observation in some of the included articles in this review (COSTA et al., 2015; Mok, 2023; Roca, 2018; Taylor, 2019; Taylor et al., 2019; Vaage, 2017; Villa-de Gregorio et al., 2022) is that the samples sizes are small. Since the findings from studies with small sample sizes may not generalize well to the broader population of students with ADHD, this highlights a potential limitation in existing literature. However, the study samples represent the ratio

of students identified as having ADHD in general education classes. Various sample sizes and different research methodologies undermine any significant relationship between PE and reducing ADHD symptoms. Individual differences, various PE programs, and different study designs make it challenging to determine a direct link between participation in PE and symptom reduction in students with ADHD. Moreover, given the nature of pilot studies and the small sample sizes, the findings should be considered with caution. Given that some of the studies included in this review were conducted in a relatively short time frame, another issue must be considered in interpreting the results. Although findings suggest that both short-term and long-term engagement in PA are beneficial for children with ADHD, long-term training will result in improvement in executive function (Chan et al., 2022). Moreover, it is challenging to determine the precise mechanisms through which PE sessions may reduce symptoms of ADHD. Some studies have demonstrated a positive correlation between PA and the release of dopamine in the brain, which is believed to affect attention and cognitive function (Reeves & Bailey, 2016). Some findings also suggested that PA might stimulate neurohormonal mechanisms and enhance children's attention (Hemayattalab et al., 2016). Increasing the functional connectivity between attention and executive control following acute PA might be another potential mechanism which improves the reaction time in ADHD students (Suarez-Manzano et al., 2018).

While PE settings and sessions may not be utilized as much as PA, in general, in addressing the needs of students with ADHD, the effectiveness of PE as a source of PA for these students requires more investigation. With many students identified as having ADHD having Individualized Education Program in place, PE is a legal requirement for them in schools. However, the effectiveness of diverse activities within the PE sessions in engaging and helping students with ADHD may vary. Studies that prioritize developmental PE, mixed activities, individualized movement, moderate to high intensity PA and fundamental movement skills (Banikarimi et al., 2018; Dana et al., 2018; Taylor, 2019; Taylor et al., 2019) may offer greater benefits for students with ADHD within the PE setting.

In contrast, traditional PE classes may rely more on team sports and competitive activities, which might be challenging for students

with ADHD, since these students struggle with attention and social interactions. In one of the studies included in Table 1 (Bores-García et al., 2024), the authors concluded that ADHD is not considered as a limitation to take part in PE classes, except in situations that require great concentration such as tactical games. Decision-making, following game rules, and adapting as a team member are the cognitive factors that are associated with participating in physical activities and children with ADHD typically display poor performance in these areas (Christiansen et al., 2019). Therefore, the PE setting can provide an environment to improve these psychological issues of children with ADHD.

Self-Determination Theory (SDT) is an important theorical framework that can be considered for this scoping review. This theory is an approach to human motivation and personality and emphasizes the importance of autonomy, competence, and relatedness as basic psychological needs for human development (Ryan & Deci, 2000). These factors are crucial for intrinsic motivation and engagement in PE settings. Therefore, designing the PE sessions with consideration of these three principles (autonomy, competence, and relatedness) can be beneficial for ADHD students. By allowing the ADHD students to make choices in activities (autonomy) in PE sessions, their engagement would be increased. By designing challenging and achievable activities, the PE teachers can help the students feel successful (competence) and more willing to participate in the activities. By providing a cooperative, supportive and inclusive environment (relatedness) for these students, their motor skills, attention and active participation may be improved. This approach aligns well with the results of some of the studies included in this scoping review, where diverse and socially engaging activities within the PE sessions led to positive impacts on ADHD students.

Conclusion and Recommendations

There is a significant need for non-pharmacological interventions for children with ADHD, so the primary aim of this scoping review was to map the existing evidence for the role of PE in helping these students. These children often perform extra physical activities because of their hyperactive tendencies. Therefore, implementing an extra PA program that aligns well with their needs would be benefi-

cial for their development (Simion, 2015). PE activities that promote structured routines, clear instructions, cooperative learning, and opportunities for free movement activities may complement the needs of students with ADHD (Higgins et al., 2018). Moreover, supportive and inclusive PE classes enable educators to create opportunities for ADHD students to improve their physical fitness, motor skills, emotions, and overall well-being. The existing relevant literature provides limited insights into the impact of structured and school-based PE programs on students with ADHD. However, the conclusion of this scoping review shows that PE can be considered as a potential additive approach for the management of this disorder. PE sessions can have positive impacts on the emotions, relationships, performance, and enjoyment of children with ADHD and these children would also experience fewer symptoms. Obviously, the PE teacher plays a significant role in enhancing the social inclusion of children with ADHD, and developing their fundamental skills (Bicalho et al., 2023), so when the PE teachers are equipped with an understanding of the student's challenges, as well as their educational needs, it enables them to support students with ADHD to reach their full potential (Mulrine & Flores-Marti, 2014). As a result, teacher training and ongoing professional development for PE teachers seems necessary in schools to maximize the benefits of PE for ADHD students. Training programs should include pedagogical strategies to address learning challenges experienced by ADHD students in PE settings. Additionally, given the limited amount of research on the impact of PE on students with ADHD, it is necessary to conduct studies in this area with larger sample sizes and long-term approaches to gain more insights in helping these children. Movement interventions within PE sessions at schools are also beneficial for children diagnosed with ADHD. Accordingly, more research should be conducted in diverse PE settings to provide optimized interventions for helping ADHD students. On the other hand, students with ADHD might experience some difficulties in understanding the conceptual details and objectives within PE classes. Consequently, it is highly recommended that behavioral interventions be implemented by PE educators. This approach would be beneficial for inclusion of children with ADHD (Henry, 2016). Educators, healthcare providers, and family members must support these students to enhance their quality of life (Oliveira

et al., 2018). By reviewing the existing literature, addressing the characteristics and needs of ADHD students, and considering inclusive PE sessions, educators can contribute to the overall development and success of students with ADHD.

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METHODOLOGY

Early Field Experience in an Elementary Physical Education Methods Course: Creating and Implementing a Field Day for Homeschoolers

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Abstract

An early field experience (EFE) is a platform for pre-service teachers (PTs) to put theory into practice. It is typically conducted in a K-12 school setting. Over the years, several scholars have experimented with the effectiveness of EFEs that were carried out virtually, over a summer term, with homeschoolers, or at a juvenile delinquent facility. This study examined another atypical EFE where the PTs in an elementary physical education (PE) methods course planned and implemented a field day for a group of homeschoolers. Field day instruction documents and two sets of reflection assignments were collected and analyzed using the standard interpretive methods of analytic induction and constant comparison in three stages. Findings indicated that the PTs' field day experience as elementary school students had an influence on how they carried out the homeschool field day. Along with the event itself, the unexpected weather conditions helped them acquire many skills that they could use in teaching PE and running their own field day in the future. This EFE has given them profound perspectives about the value of organized field days and elementary PE teachers. Practical implications and study limitations are discussed.

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Introduction

In the field of physical education teacher education (PETE), a typical early field experience (EFE) occurs in K-12 school settings where pre-service teachers (PTs) observe or assist in-service teachers delivering a lesson, and, when appropriate, team-teach or solo teach a small group of students in physical education (PE). The purpose is to provide real-world opportunities for PTs to have first-hand experience running a PE class. Quality EFEs have a positive impact on PTs' professional development (Barney & Christenson, 2009; Barney & Pleban, 2006; Curtner-Smith, 1996; Curtner-Smith & Sofo, 2004; O'Sullivan & Tsangaridou, 1992). For instance, the 39 PTs in O'Sullivan and Tsangaridou's (1992) study recognized that quality lesson planning and effective classroom management are essential for a successful lesson. Those in Barney and Christenson's (2009) study, on the other hand, acknowledged the importance of gym voice, and over-planning for PE is usually taught in an open space and how students react to the planned activities can be quite unpredictable, especially to novice teachers.

Over the years, several PETE faculty and scholars have introduced their PTs with EFEs outside of the typical K-12 PE settings. In reaction to the global COVID-19 pandemic, the PTs in Chen's (2022) 200-level PETE activity class were required to search for a minimum of a one-hour video related to sports on the internet, watch it, and report why they chose the video and what they learned from it on a weekly basis. This virtual EFE appeared to help the PTs acquire content knowledge, make game-related observations, and furnish entertainment. In addition, to accommodate the PTs who were unable to attend classes during the regular academic terms, Stephenson et al. (2022) set up an EFE at a Boys and Girls Club. Over the five-week summer term, the three PTs reported the absence of appropriate assessment exposure and role modeling due to the lack of typical organizational structures in K-12 school settings. Moreover, instead of taking PTs to a school site, Chen (2020, 2021) brought homeschoolers on campus and created a student-teacher ratio of 1:1 or 2:1 EFE. The setup was found to be beneficial for both lower- and upper-division PTs as they practiced instructional and managerial tasks and bonded with the kids during the experience. Most recently, Project FLEX (Wahl-Alexander et al., 2024) provided

a unique experience working with incarcerated youth. Not only did this EFE give the PTs a platform to practice their teaching skills with at-risk youth, but it also gave the incarcerated youth an opportunity to experience a college life on Northern Illinois University campus.

Regardless of the site and student population, most EFEs deal with teaching PE, but there are responsibilities outside of teaching in a school setting. Running a field day, for example, may be considered an implied duty for some PE and related arts teachers. PTs who student-teach in the fall do not have the opportunity to experience it because field days are typically a spring event. Not all student-teachers in the spring get to experience a field day because they may be in their secondary school placement, or the university calendar ends before public schools do. All these reasons prompted a different form of EFE where PTs created and implemented a field day for a small group of homeschoolers on university campus. This study aimed to examine the participants' experiences from the creation and fulfillment of the event. Specific research questions (RQs) included:

1. What were the PTs' field day experiences as elementary school students?
2. What did they learn from the planning and implementation phases?
3. How did this particular EFE shape them as future professionals in PE?

Methods

Participants

The participants included 13 PTs, four female (30.8%) and nine male (69.2%), enrolled in an elementary PE methods course at a regional university in the mid-eastern region of United States. Three of the PTs were African American (23.1%), nine were Caucasian (69.2%), and one was of Asian and American descent (7.7%). Out of the 13 PTs, seven were in their last semester before student-teaching (53.8%), while the other six had one more semester to take classes (46.2%), one of which was a secondary PE methods course.

As part of the course requirement, the PTs were scheduled to do four observations and teach five lessons at a local elementary school.

They also took turns teaching a one-hour lesson to 24 upper elementary homeschoolers on university campus. A lead teacher for each PE lesson was randomly selected out of the 13 names, and a back-up lead teacher was also randomly assigned in case the former was absent that day. During the one-hour timeframe, the lead teacher delivered a lesson off of a plan created by the course instructor while the other 12 PTs partnered with two homeschoolers and underwent the planned activities.

The last part of the EFE in this elementary PE methods course was the creation and fulfillment of a field day. The event was scheduled during the time of the methods course and the subsequent PETE course on the last Friday of the semester. Ten out of the 13 PTs were enrolled in the subsequent PETE course, and the other three PTs had a break between classes during that time. The class was instructed to take charge of a station in pairs and elect an organizer for the event. The course instructor provided a list of 17 popular field day activities for them to choose from but emphasized the autonomy of exploring other activities or games they wanted to host. An internal grant of $3,000 USD was funded to run the field day.

The Field Day

The field day was a culminating event of the Holistic Health and Physical Education Program for the Homeschoolers, which consisted of four mini-programs. The PreK Movement Education Program (PKM) was designed for children three to five years old and overseen by a Child and Family Services (CFS) faculty. The Early Childhood Movement Education Program (ECM) was designed for children five to eight years old and overseen by an Elementary Education Teacher Education (EETE) faculty. Along with the Physical Education Program (PEP; designed for eight to 11 years old, mentioned in the previous section), the course instructor oversaw the Health Education Program (HEP) designed for children 11 to 15 years old.

Sixty-one homeschoolers registered, and 23 college students (not including the 13 PTs) volunteered for the event. Table 1 illustrates the group assignment and the number of people in each group. The nearly 1:1 child-college student ratio in the PKM groups was designed for the college students to assist the young children during an activity and for behavior management purposes. As the age of the

Table 1
Field Day Group Assignment

Group	# of Children	# of College Students	# of Preteens/Teenagers
PKM 1	7	6	
PKM 2	7	6	
ECM 1	8	3	
ECM 2	9	4	
PEP 1	7	1	2 from HEP
PEP 2	7	1	3 from HEP
PEP 3	8	1	3 from HEP

children increased, less assistance was believed to be needed from the college students, hence the reduced number of college students in the ECM and PEP groups. The eight homeschoolers from HEP were divided into three PEP groups and participated in each station to make the games more fun and competitive for the older children.

According to the number of PTs in class, there were six physically active stations, and there were water balloon tosses, relay races, sponge squeeze, rubber duck relay, whack-a-mole, and space invaders. Two sedentary stations were added as a break for the rotation. The two sedentary stations were arts and crafts (i.e., coloring cardboard circles that later made into two running and jumping figures as murals) staffed by the EETE faculty and a college student, and temporary tattoo station facilitated by the CFS and PETE faculty. As the field day organizer, Braelyn drew a map for the station layout, direction for rotation, and where each group would start their first station.

Because of other materials to be covered in this class, the PTs did not officially start planning the event until five weeks out, during which the course instructor gave them 20-30 minutes each time they met in the university classroom. According to the time available for the field day, Braelyn made an executive decision for each group to stay at a station for 10 minutes. Station leaders specified equipment, set-up, activity procedures, and modifications in writing and turn it in to Braelyn, who consequently composed all documents into one and shared it with the college students and faculty members who were not involved in the planning phase. Approximately half of the

Figure 1
Field Day Map with the First Station Assignment

$3,000 USD was spent on equipment and supplies for the stations, and the other half went to participant incentives (i.e., popsicles for homeschoolers, box lunches for adults, and field day design t-shirts for all).

The event was scheduled to start at 9:15 a.m. At check-in, homeschoolers received a T-shirt and a colored wristband indicating the group they were assigned to. The PTs were asked to arrive an

hour early and the other personnel by 8:45 a.m. They also received a T-shirt and a colored wristband upon arrival. The first station was set to start at 9:30 a.m. After eight 10-minute rotations, all homeschoolers would receive one or more popsicles around 11 a.m. with parental permission on site. Homeschool families were encouraged to bring snacks and join the adults for a picnic on the quad. On the day of the event, however, it started raining and thundering around 8 a.m., forcing the field day to be moved inside the recreation center. All water-related stations were told to run it as a dry station because water was forbidden inside. With all the last-minute modifications, the PTs managed to start the event on time. All groups went through the eight stations and had time for popsicles. It wrapped up around 11:15 a.m. without a picnic at the end because the sky was still cloudy and the grass was wet on the quad.

Data Collection

The *field day instructions* document that Braelyn compiled and two reflection assignments were used to answer the RQs. Eight guided questions in the *pre-field day reflection assignment* were used to prompt the PTs to describe their field day experience as elementary school students, any positive attributes while planning the event with others, and any challenges or obstacles they faced before the field day. Another eight questions in the *post-field day reflection assignment* were used to guide the PTs to express what they did, what worked well and what surprised them during the field day, and how running this event changed their view about field days in any way.

To reduce the possibility of "studentship" (Graber, 1998) or "impression management" (Lawson, 1983a, 1983b) where the PTs might provide information that was aligned with the course instructor's perspectives so as to win favor, each assignment was worth 24 points, which was only 8% of the course evaluation. Another strategy to warrant honest responses for the purpose of the study, since the course instructor also served as the researcher/author, was that the assignments were graded by a graduate teaching assistant who was instructed to make sure all questions were answered within two to three pages following the correct spacing and formatting requirements. Although four pages or longer were allowed, all assignments were between two to three pages. All but one PT received full credit

on both assignments. The one PT missed 10% of the grade on the post-field day reflection due to late submission penalty.

Data Analysis

Data collected from the field day document and two sets of reflection papers were analyzed using the standard interpretive methods of analytic induction and constant comparison in three stages (Goetz & LeCompte, 1984). In the first stage, all 26 papers were carefully read; statements related to the PTs' field day experience, lessons learned from planning and implementing the field day, and how this EFE affected them as future PE teachers were highlighted. Stage two involved transferring the highlighted statements into codes and categories; the recurring ones were then put under preliminary themes. In the third and last stage, statements categorized in the same preliminary theme were read repeatedly and compared with those in another theme, ensuring they were placed in the proper category and consistency in each theme was met. At this time, relatively small categories were collapsed into overarching themes.

Findings

RQ #1: What were the PTs' field day experiences as elementary school students?

Water and Competition

When asked to recall their own field day experience, most participants favored activities that involved water and competition. Since it was always hot outside when they had field days in elementary school, every chance they had to cool off was considered a treat. Whether it was shooting water blasters at a beach ball or tossing water balloons with a partner, several participants thought it was the highlight of their day. As Mason stressed, "a game where we could get soaking wet was all we cared about." In a game that involved transporting water from a full bucket to an empty one using a sponge, Sophia shared a light-hearted dilemma between cooling off and winning the game:

> I remember having to pass the sponge over our heads to get it to the other end. We wanted to squeeze the sponge over our heads to cool down, but we couldn't because we were trying

to keep as much water in the sponge as possible so we could fill up the other bucket before the other teams did.

While some participants enjoyed their small doses of fun from water shooters, water balloons, sponges and buckets, Owen shared, in his opinion, "the most entertaining activity" from his fourth-grade field day:

> The waterslide was set up on top of a huge hill and constructed by a very large tarp that was at least 20 yards wide and 70 yards long. The water was from a fire truck, and it was full of soap to make it slippery. It was something that we looked forward to throughout the year because it was something that only the fourth graders got to do. The fact that we were allowed to come to school with swimming clothes and get wet was a huge attraction to us.

In addition to water, activities with a competition element where they could earn prizes or receive recognition as winners appeared to be memorable to the participants. Jayden recalled, "at my school, every field day event had a 1st, 2nd and 3rd place winner. If you placed, you received a ribbon. To small kids, those were like Olympic gold medals." Their competitive nature was displayed not only in individual events (e.g., 100-yard dash, sack race, hula hooping) but in team games (e.g., tug of war, kickball, soccer) also. Eli wrote:

> All the boys would come together and play 2-hand touch football. We would create 2 super-teams and have our own Super Bowl. It was the last showdown before the school year ended. Nothing in the entire school year meant more to us, as we had this planned since day 1 of the school year.

The competition was even more fun when the teachers were involved. Competing with or against their teachers was something they did not get to do on a regular basis. Ben remembered the laughter of the entire school when students and teachers fell from the dizzy bat, which was, "a meaningful experience because it created a bond when everyone was laughing together." Sophia got to dump a bucket full of water on her teacher's head because her team won the water

relay game. Examples like Ben's and Sophia's apparently brought joy to their field days.

Field Day Equals Free Day

Four of the participants did not have organized or structured field days in elementary school. It was a day that they had free rein to do whatever they wanted and had completely freedom to choose how they would spend their time. Lucas recalled:

> We would be released to the playground at the start of the day and have free will to do whatever. The whole grade would rush to the playground, and we would all find the best spot to set up camp. We would bring blankets and things of that nature and almost make a little campsite of sorts. We would run around and play games, but nothing was very organized.

Similar to Lucas' experience, Braelyn would, "bring tents, towels, snacks, sit around with friends, and hang out." Michael and his schoolmates would, "bring snacks, balls, and any games from home that [they] wanted to play throughout the day." When they felt like it, they would get up and play games like red rover, kickball, or two-hand touch football. Amelia expressed a bit of sadness when her peers talked about their field day experience because all she could remember were, "free play on the playground," "fun snacks," and, "the Fire Department came in and sprayed us with their fire hose."

RQ #2: What did they learn from the planning and implementation phases?

Game Design and Modification

Four pairs of participants picked the games from the list that the course instructor provided and added multiple modifications to keep most people active and make the tasks challenging for the wide range of age groups. Grace and Amelia, for example, added, "crab crawl, bear crawl, hula hoop pass, and egg and spoon balance" into the original running relay race. They also set up zigzag pathways and cones for the homeschoolers to go around instead of the traditional out-and-back straight-line running pattern. Lucas and Mason, on the other hand, listed, "bean bags, foam balls, and frisbees" as the objects for throwing. Based on the skill level of the groups, they also

made the target requirements of, "making a contact to the discs or cones → knocking the discs off the cones → knocking the discs off the cones and knocking the cones down" and adjusted the throwing distances from short-to-long.

Two pairs of participants either found their game elsewhere or created it on their own. Owen and Jayden originally wanted to do tug of war, but after discussing the game design with each other and their peers, they settled with rubber duck relay, "because we have a way less risk of injury in this activity compared to tug of war... activities with water and competition are a field day environment the kids are bound to enjoy (Owen)." Having a similar mindset about incorporating water in their station and combining it with one of his favorite childhood games (dunk tank), Eli explained how he came up with the game:

> I got the idea when I went to this arcade with a friend back at home. We were playing whack-a-mole when a kid walked in front of us and she said, "that kid was about to get whacked if he got any closer." That sparked the idea of a human version of whack-a-mole. I figured why not combine it with one of my favorite activities, throwing, and then I naturally came to water balloons because it is field day.

The construction of Eli and Ben's human whack-a-mole consisted of taping nine 30" diameter hula hoops in the three-by-three pattern and using four bamboo sticks to hold up the hoops on the grassy ground. Homeschoolers were to stand in all four directions from the same distance to them. On signal, they would throw water balloons (four were thrown at a time) to Eli or Ben who stood in one of the nine hoops. The next person in line would grab new water balloons, wait for the signal, and throw. When Eli or Ben got hit by a water balloon, they would move to another hoop for the next round.

Event Logistics

As the event organizer, most before-field day tasks fell heavily on Braelyn. She, "created a map layout of the quad," "assigned a spot for all eight stations and labeled the equipment needed for them," "assigned a station for the seven groups to start at, along with the direction which they would rotate to." She also, "labeled five speakers for

everyone to hear the music no matter where they were and a water cooler for hydration." Her peers noticed and appreciated her hard work; Lucas noted, "choosing [Braelyn] as our leader worked well. She is very organized and responsible. She made the entire planning period go smoothly." Mason echoed:

> [Braelyn] is one of the best people for this position. She stays vigilant at watching how everyone moves around and makes sure they have plenty of room at each station. Having a visual layout for how everything is set up and how everyone rotates to the next station is very helpful. I think these are very important factors for the success of the field day.

Another aspect of organizing this field day was determining how to spend the $3,000 USD as a group. Many participants agreed equipment and supplied for running the stations should come first. Liam recalled:

> Something I didn't know about planning a successful field day was the amount of money spent on the equipment. Seeing us having to make a list for equipment and then order it online showed me the amount of money that is put into a field day so students can have fun and really enjoy themselves.

Many participants agreed that the equipment and supplied purchased should have a long-term value for the PETE program rather than the one-time usage for a field day that might not occur in the future. This decision was hard for Eli and Grace to hear because the former, "initially planned on doing a dunk tank" and the latter wanted, "a bouncy house or obstacle course that was an inflatable." Ideas like these were shut down because, "it costs too much and we can't use it in teaching [PE]" (Braelyn). Almost equally important, at least by its monetary value, the participants thought having a special field day t-shirt made and giving out popsicles and box lunches were attractive incentives for all that were involved. Ben justified the situation after his partner's dunk tank idea was voted down:

> I didn't know how much it cost to make T-shirts, but it was something cool to have and be reminded of what we did for the kids. As a college student, I go to events that give out free

shirts and food, so I guess it was worth it to have those for the other [college] students who came out to help us.

Change of the event location was one thing that the participants did not foresee. They were given two basketball courts, but it was still much smaller than the quad. Station layout stayed the same, but there was less space for the groups to move within and rotate through the stations. Because water was not allowed on the courts, four water-related stations had to modify their games at an hour's notice. Instead of water balloons, Michael and Sophia used rubber chickens, fish, and pigs for the throwing and catching games. Instead of having the rubber ducks floating on water inside a kiddie pool, Owen and Jayden simply lay the ducks in a hula hoop. Eli and Ben used chairs to hold up the bamboo sticks that supported the three-by-three hula hoops and different size/material balls (rather than water balloons) for throwing at their whack-a-mole station. Leo and Liam's sponge squeeze station was replaced with a scooter relay race. The last-minute change of location caused by the unexpected weather conditions was a stressful situation, even to the two non-water stations, but all of them expressed a sigh of relief when they saw how much fun the homeschoolers had at their stations. The following data snippets illustrates Eli's and Grace's reflection, respectively:

I fully anticipated using those bamboo sticks and just stick them in the ground, but we had to find another way because we moved inside... We got a lot of compliments from group leaders and even some parents joined in on the fun. Although the setup was a pain, we managed to make it work. It was a simple game and definitely worth doing again.

I was impressed by how well my classmates were able to adapt to moving inside and getting everything set up. Some of them had to change their games in very little time, but they all worked out pretty well... The kids really enjoyed the egg and spoon race. Truthfully, I didn't think that game was going to work that well, but it was a hit.

Pedagogical Skills

The unexpected weather conditions taught the participants the importance of a rainy-day plan that they would not have learned otherwise. Many of them were like Eli who ,"checked the weather every day last week and it said no rain until later on in the day after field day," so an alternative plan did not cross their mind. They had no plan of what they were going to do if the field day had to be moved inside because of the weather. Amelia felt lucky for her relay race station because, "it was easy to adjust from outside to inside so the rain was not a huge deal for [her] group," but seeing how stressful her peers were from the, "unfortunate last-minute changes they had to make, a proper back-up plan would be beneficial." Mason echoed that a contingency plan would have not only saved them from the unnecessary stress but also provided a better field day experience for the homeschoolers:

> The groups who had water-based games had to choose a different game in a short amount of time, which is extremely stressful. I feel like a contingency plan could have saved a lot of unwanted stress on everyone. I also feel like if [Eli and Ben]'s group had some better equipment in case we were inside, their game could have been even better.

Lucas wished he and his partner had, "at least discussed what we were going to do in case of rain, because without it, things could get unorganized and become a mess quickly." As PE teachers, weather is always something they must consider when planning an outdoor unit or, in this case, a field day. It was worth noting that the participants were able to make the connection from hosting an event to teaching in PE. In reaction to this unfortunate turn of events, some participants suggested planning two separate activities, one inside and one outside, while the others thought equipment modification would suffice.

Communication was another skill that many participants learned from this EFE. They valued the time in class to share ideas amongst each other and make group decisions such as game selection, existing equipment allotment, and budgetary items. They listened to each other's ideas carefully to create suitable activities for the homeschoolers, and they felt everyone was very respectful about

the critics and suggestions. Outside of class, they continued to communicate with each other via phone/video calls, text messages, and in-person meetings. Collectively, open-mindedness, availability and having a unified goal contributed to the success of the field day. The following data extracts illustrate these key elements:

> Everyone was open to ideas. I mean actually open to them, not just listening and doing them your own way. I used to struggle with that, but I understand that some people are after the same feeling of accomplishment that I'm after, so I can afford to put my pride aside and have some leeway when it comes to something like this. (Lucas)

> I almost always have my phone on me, so I'm just a call or text away, and that helps a ton. My partner was pretty good about this too, and we got things situated pretty quickly, given the fact we didn't have too much time to get things done in class. (Eli)

> We are very communicative with one another, and we both want to succeed. We work very hard and hold each other accountable, constantly checking in to make sure we are getting our work done because we want the kids to have the best experience at our field day. (Grace)

The importance of communication was extended to verbal and nonverbal delivery during the event. They noticed that, like many of the students they had encountered in public schools, the homeschoolers did not want to listen and had a short attention spans, so they learned to go through the rules quickly and just let them play. Some of them also found it useful to, "cut down the talking time and just show them how to play because [they] can always stop the game and repeat the rules" (Sophia). The nonverbal communication also covered their enthusiasm and encouragement toward the homeschoolers' performance during gameplay. Michael noted, "it does not matter if you think the activity is boring. The kids will love it as long as you are excited and cheering for them."

Adaptability is the third pedagogical skill they acquired. In addition to the last-minute game modifications and replacements caused by change of location, the participants became more competent in making the activity more age/skill appropriate while keeping most homeschoolers engaged during the 10 minutes. This task was particularly challenging with the PKM groups because they were not familiar with young children's locomotor development. Amelia reflected, "it is impossible to get the younger students to do any sort of organized game so realistically we should have a separate activity for them." In congruence with Amelia's point of view, Jayden noticed the parents were essentially the ones who were playing their rubber duck game and, "should just not include them [i.e., PKM children] in the field day." Regardless, it was their attempt to, "modify our game on the fly" (Jayden) that demonstrated their acquisition in the skill of adaptability. The following data passages illustrate their attempts catered to the young children and in general:

> They were supposed to pick up two ducks, look at the numbers on the bottom. If they match, they keep the ducks and run back. If they don't match, they put them down and run back. They [i.e., PKM children] would have struggled with it, so we switched the basis to matching 2 ducks with the same color. It was not something that we thought about until they arrived at our station. (Owen)

> When we saw them getting bored with throwing and catching, we told them to put a spin on it [i.e., throwing] or try to catch it [i.e., rubber chicken, fish or pig] behind their back or under their legs... We also used the squeaky chicken as a baton for relay race when they got tired of the [original] game. (Michael)

RQ #3: How did this particular EFE shape them as future professionals in PE?

Value of Organized Field Day

According to the participants, field day was a day to celebrate the end of the school year, a break from learning, and a fun time to play

games and eat snacks that they did not get to play or eat on a regular basis. After planning and implementing one themselves, the participants believed that a structured field day with organized games could be beneficial for elementary school students' physical and social well-beings as it promoted physical activity, teamwork, cooperation, and good sportsmanship through fun and friendly competition. Now standing on the other side and walking in the shoes of their elementary school teachers, several participants realized that it was not easy to run a field day like the ones they had experienced before, but they were confident to accomplish the mission when an opportunity presents itself in the future:

> This experience is beneficial to me because I was able to see how a field day was really run. I was able to see the planning side of things. I learned to plan months ahead, get help from others... This is a great first-time field day for me, and I plan on using everything that I learned in my future field day at my school. (Liam)

> Participating in this field day is super helpful for me because I will be running my own field day someday. I've learned how to set up and organize games and activities, talk to people, and solve problems on the fly. Plus, when things don't go as planned (which happens a lot!), I've had to be flexible and come up with solutions on the spot. (Ben)

This EFE gave the four participants who did not experience organized field days another layer of realization. Instead of telling his future students to, "bring stuff from home to play on a free day," Michael now knew, "how to set up different games and activities, how much time to spend at each station, and how to rotate from station to station." Moreover, not knowing field days were more than free play, fun snacks, and getting sprayed by a fire hose, this experience gave Amelia, "a real inside look at how planning needs to happen for [her] future students to have a safe and active field day." Same as Michael and Amelia, this EFE had changed Lucas' view about field day, "This is very different from the free-for-all recess that I experienced as a kid. I value the organization and competitiveness of a field day over what I was used to." The experience was especially meaningful for

Braelyn because, unlike her peers who were only in charge of one physical activity station, she ran this event in the leadership position:

> I am a natural leader and being our field day coordinator proved that. I enjoyed planning, setting up, and instructing my classmates on what to do during the field day... I look forward to doing it for my students in the future. I will find cost-efficient ways to play fun games and get everyone involved.

Profound Perspectives

Most participants realized that it must take a village to run a field day because it was a time-consuming mission that required a substantial amount of financial and personnel support. They had no idea how much time, effort, and resources that were poured into the planning and organization in order for a fun and safe field day to occur. Jayden recalled, "as a small child I didn't know the logistics involved in making an event run smoothly. Now I understand how many people, how much time, effort, and money that goes into a field day especially at a large school." Owen seconded Jayden's opinion, saying, "There's a number of things that they have to consider whenever planning the field day and that is something that can easily be looked past if you are not a teacher." The following data extracts highlight the needs for financial and personnel support:

> Planning a field day takes a lot because if you want to have prizes, you have to budget for that. To have inflatables, you'll need money for the rental and they aren't cheap... If you want to provide snacks for the students, you need to go back into budgeting again. (Grace)

> I will have to rely on a lot of co-workers' help because it is definitely not a one-teacher job, so getting all staff members on board is critical to having a successful field day... A lot of these classroom teachers see their students every day so they also have a good knowledge of what would work best for their students. (Amelia)

The participants expressed much higher respect for their elementary PE teachers. They now understood their teacher's hard work to make their field days memorable and believed that the teachers who planned and coordinated field days like how they did for the homeschoolers deserved all the recognition for the long planning hours and thoughtfulness they put into it. By comparing to his high school PE teacher who, "never did anything except for rolling out the basketballs and having us run the mile in the first week of school," Mason claimed, "my respect for them has increased drastically. In elementary school, I never thought about what my teachers had to do for field days. Going through the classes to become a PE teacher myself, I'm inspired to be like them." Sophia recognized the field days that some elementary PE teachers put on were on a much larger scale. The smiles on their students' faces must be rewarding enough for them to keep going:

> Our field day was only like 60 students, and a lot of teachers had to plan for over 800 students. I can't even imagine the stress had on those teachers, but I understand why they were so proud of the field days they did, because when they planned something that big and that hard and it was a hit for all students, it must make them feel so proud to be a physical educator. (Sophia)

Discussion

Collectively, this EFE was a meaningful experience for the 13 participants. First, their past field day experience helped them create games involving water and competition because they were what made their elementary school years memorable, at least to the nine participants who had structured field days growing up. Through game design and modification, the participants were able to plan a variety of equipment, rules, and challenges to keep all homeschoolers at their stations occupied for 10 minutes. During the planning stage, the participants demonstrated effective communication skills both in and out of the classroom. They were also respectful during the discussion of budgetary items and open-minded about sharing ideas, critiques, and suggestions.

If the weather had held up, they would not have learned the importance of a contingency plan. Many participants had no back-up plan in case of rain; hence, the change of event location at an hour's notice caused some unwanted stress on them. However, it served as a teachable moment for them to acquire the pedagogical skills of planning and adaptability. To their own surprise, they showed impressive last-minute adjustments to the game design upon learning water was forbidden inside the recreation center. They were able to change the rules "on the fly" based on the age or skill level of the homeschoolers. It was also during this implementation stage that the participants gained another opportunity to practice their verbal and nonverbal communication skills with the homeschoolers.

After all, this EFE had prepared the participants to plan fun and safe activities, set up and rotate stations, organize staff members for different tasks, budget necessary equipment and supplies, and deal with other event logistics. It had changed or emphasized their perspectives about an organized field day. Feeling competent to lead one field day upon becoming an elementary PE teacher, this experience was especially valuable for the four participants who had a free day of doing whatever they wanted outside as a field day. Furthermore, realizing all the time, effort, and resources required to put on a successful field day, they now had a much higher respect for elementary PE teachers. Speaking from their own experience, these teachers deserved much more praise than students had given them. In return, the participants were inspired to put on a field day in the future and felt proud of being a physical educator.

Conclusion

This study showed that, in addition to observing and teaching PE classes at a school site, planning and implementing a field day could be a beneficial and meaningful EFE for PTs enrolled in an elementary methods course. In this case, a group of homeschoolers were brought to the university campus, and the class had complete control over how the event was to be run. On top of the elements discussed in this research, PETE faculty members who are interested in incorporating such EFE may consider the following recommendations. The first was to have the class start the planning process earlier than five weeks. The more time for them to hash things out, the better

the event will turn out. The second was to seek interdepartmental collaboration, especially when the students attending the field day were outside of the PT's certification grade level. In this case, the PETE faculty could have invited the CFS faculty and students to officially join the planning and implementation phases. The third was to expand the field day to all homeschoolers in the community. This could be a difficult task to tackle, compared to the first two, but including more homeschoolers in the surrounding area would give the PTs several students similar to that at a typical elementary school.

This research was limited to the data collected from 13 PTs from a PETE program in the mid-eastern region of the country. The generalization of findings presented in this study should be drawn cautiously. Replication studies from different regions of the country would help create a clear trend on the value of using field day as an EFE. Besides, data collection tools were limited to two forms of written documentation from the participants. Other qualitative (e.g., formal interviews, informal discussions) or quantitative (e.g., value inventory survey, best practice questionnaire) methods may be able to provide richer data from the participants' perspectives. Data collected from other stakeholders could be collected also, for the comparison between the two or amongst multiple disciplines.

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SPORT EDUCATION

Empowering Students: Developing Life Skills through School Sports Coaching

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Abstract

The purpose of this study was to examine the effectiveness of coaching strategies in fostering student life skills through school sports programs. This study used a case study design, which is a qualitative method, and thematic analysis. Subjects were 13 physical education teachers with at least five years of teaching experience and relevant educational background, who were selected using a purposive sampling method. The findings were organized into three overarching themes. 1) Supportive Environment and Social Development: This theme emphasizes creating a respectful and accepting atmosphere that fosters psychological and social support. Coaches focus on teamwork and collaboration, enabling students to feel valued and develop strong relationships while learning to resolve conflicts effectively. 2) Personal Skill Development: This theme highlights the role of sports coaching in equipping students with critical life skills such as goal setting and

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planning, stress and emotional management, and problem-solving. Structured plans and consistent feedback help students build resilience, manage challenges, and make sound decisions both in and outside sports. 3) Bridging Sports and Daily Life: This theme underscores the importance of transferring skills learned in sports, such as teamwork, leadership, and reflective feedback into everyday personal, academic, and social contexts. By practicing leadership, communication, and teamwork, students enhance their ability to navigate real-world challenges effectively. In brief, the study concludes that intentional and structured coaching approaches are pivotal in not only improving students' athletic performance but also equipping them with essential life skills. These skills, when transferred into daily life, contribute to students' holistic development, preparing them for future academic, personal, and professional success.

Introduction

Among the most popular extracurricular activities in schools, sports offer a perfect opportunity for the development of life skills. These activities can potentially enhance social, psychological, and emotional skills in students, especially during adolescence, and prepare them to face current and future challenges in life (Camiré & Kendellen, 2016). Participation in sport provides students with many experiences and opportunities for developing life skills such as teamwork, responsibilities, dealing with stress, and solving problems, which are useful not only within sport itself but in life generally. In this context, life skills developed from participating in sports can have several effects on the student.

In broad terms, life skills can be defined as an ability that each one possesses in relation to increasing potential successes or achievements in different contexts and environments in and outside the sphere of school (Danish et al., 2004). Research shows that coaches can lead in developing participants' life skills by fabricating quality relationships and meeting basic psychological needs (Bailey et al., 2009; Carson Sackett & Gano-Overway, 2017). The coach is important in creating the right psychological environment and context for transferring skills and developing them further in students. Martin et al. (2022) emphasize the importance of coach education in enhancing youth development, showing that coaches can strengthen

athletes' life skills through purposeful and structured approaches. More specifically, coaches can transfer these life skills to students by creating a supportive environment or using diverse teaching methods. Moreover, studies indicate that coaching approaches can influence the transfer of life skills beyond sports, especially when coaches create a supportive environment intentionally and purposively (Pierce et al., 2024). More targeted approaches would provide a better chance of successfully transferring skills into lives beyond sports.

The theory of Positive Youth Development (PYD) provides grounding to suggest that participation in sports activities can further develop key life skills for youth to succeed. This PYD theory has been embraced to highlight that sports can inherently cultivate strengths, rather than focusing on skill development as emphasized in the traditional 'deficit' model (Lerner et al., 2009). Indeed, life skills that the youth learn in the process of communication, time management, setting goals, and conflict resolution within a sports environment affect personal and social development (Pierce et al., 2017). However, these skills are considered complete life skills only when transferred to the outside world and applied in everyday life (Weiss et al., 2014). One of the difficulties in teaching life skills is that coaches may not have the training to deliver such skills. Researchers proffer that coaches can use two methods in delivering life skills: implicitly and explicitly.

An implicit approach refers to instances when the coach does not make an explicit focus on the development of life skills. Conversely, an explicit approach is when the coach makes a conscious effort to focus on the development of the life skills of the athletes (Bean et al., 2018). Research shows that using an explicit approach can increase the likelihood of success in transferring life skills from sports to other environments (Turnnidge et al., 2014). Since coaches are at the epicenter of this process, their education on how to transfer life skills is crucial. MacDonald et al. (2020) demonstrated that coaches who implement training programs using a life skills approach are often more effective at transferring these skills compared to those who do not. Therefore, developing educational tools and providing learning opportunities for coaches may have a considerable effect on enhancing the outcomes of PYD and translating these skills into

the daily lives of athletes (Camiré et al., 2021). In particular, models of Life Development Intervention and Coaching emphasize the development of life skills regarding psychological needs of autonomy, competence, and relatedness (Hodge et al., 2013).

One of the gaps in the literature is a lack of detailed studies regarding how coaching approaches and implicit-explicit modes add to students' life-skills development and how important coach education is with respect to that. Additionally, many studies have also not been conducted with a specific focus on how to employ targeted methods in order to use coaching for transferring skills. The aim is to fill the gaps that have been left behind, looking into coaching methods and coach education that have presented strategies for effectively transferring life skills from sport into life outside of sport. More specifically, this research examines explicit and implicit coaching methods in light of developing life skills, ways of transferring them, or failing to do so within students' lives, making up for existing gaps. Therefore, the main research question is: How can life skills be enhanced in school sports through effective coaching approaches and transferred to students' lives beyond sports?

Methods

A case study was adopted since it would provide a thick description of a phenomenon being studied within its specific context. This research employed a case study design, a qualitative research method, to provide an in-depth understanding of the phenomenon within its specific context. The case study approach was chosen as it allows for a comprehensive exploration of the influence of coaching strategies in school sports on students' life skills development (Camiré et al., 2013). By focusing on participants' experiences and the interplay of these experiences within a structured environment like school sports, this design supports a detailed and nuanced examination. The main objective of this research is to try to establish the influence of coaching strategies in school sports on developing the life skills of the students. To achieve the study's objectives, multiple data collection methods were utilized, including semi-structured interviews. This facilitated a rich contextual understanding and enabled the findings to be substantiated through thematic analysis. The research is grounded in the PYD theoretical framework, which emphasizes

a thorough examination of the implementation processes and outcomes related to students' growth.

Given these requirements, the case study approach was deemed the most suitable methodology. The study adopts a qualitative approach with thematic analysis as the primary method for analyzing data. This inductive process is particularly well-suited for uncovering recurring patterns or themes, offering a nuanced interpretation of complex and subjective topics (Naeem et al., 2023). By eschewing preconceptions, this method allows the investigation to faithfully represent participants' real experiences. Such an approach is especially effective for exploring intricate areas like the role of coaching strategies in fostering life skills development through school sports (Braun & Clarke, 2006). This research will adopt a qualitative approach, including thematic analysis—a qualitative data analysis approach—to identify and analyze the regularities in the data having an inductive approach, which is especially effective and ensures a deep and nuanced sense of the data, from which the detection of somewhat invisible patterns or themes then becomes possible. Using this approach, the goal was to investigate the themes from the data that could underpin the findings of real participants' experiences without predisposing ideas. It helps in the analysis of particularly complex and subjective areas such as life-skills development through coaching strategies in sport at school (Braun & Clarke, 2006).

Participants

All participants were physical education teachers in Iran, selected through purposive sampling. Eligibility criteria included a minimum of five years of teaching experience and a relevant educational background in physical education or sports sciences. Participants were recruited until theoretical saturation was achieved, resulting in a total of 13 participants, ensuring no new information emerged during data collection.

Table 1 displays the participant demographic information, which included: field of study, years of work experience, gender, and level of tertiary education obtained. The list includes professionals from different dimensions of sports and physical education working with various qualifications, a number of whom are PhDs, Masters, and postgraduates. These are years of experience ranging from five to 17, thus showing the highly diverse expertise levels in this group. Most

Table 1
Demographic Information of the Research Participants

Field of Study	Experience (years)	Gender	Education Level
Motor Learning and Behavior	17	Male	PhD
Sport Management	12	Male	PhD
Sport Management	16	Male	Master's Degree
Sports Pathology	9	Female	PhD
Physical Education	12	Male	Bachelor's Degree
Sport Psychology	8	Male	Master's Degree
Sport Management	15	Male	Ph.D. Candidate
Motor Behavior	6	Female	Ph.D. Candidate
Exercise Physiology	5	Female	Master's Degree
Physical Education	12	Male	Bachelor's Degree
Sport Management	14	Male	Master's Degree
Exercise Physiology	13	Male	Master's Degree
Sports Pathology	9	Male	PhD Candidate

of the participants are male, although there is some representation from the female gender in such fields as sports pathology and motor behavior. This, therefore, constitutes a complete demographic representation to ensure that various subfields in the sports sciences are well represented.

Data Collection Tools

Semi-Structured Interviews

A semi-structured in-depth interview is a qualitative research methodology which gives flexibility to the exploration of chosen areas under discussion. In this method of interviewing, the set of predetermined questions needs to be used by a researcher while the conversation goes in a free-flowing way to allow the responding participants the opportunity to illustrate their answers in a rather expansive and comprehensive manner.

Interviews conducted in the study, under the control of sports psychologists and coaching specialists, were done by each interviewed participant in a 30- to 60-minute talk. The interviews had

been recorded using audio; others also used a written form of documentation. The nature of the interview questions was open-ended to dig into how coaching within sports relates to developing life skills. These questions were then grouped into five key themes: 1) How do you create a supportive and positive environment for students, and what do you do to enhance their self-confidence and sense of worth? 2) What methods do you use to teach social skills, such as teamwork, stress management, and problem-solving, to students? 3) How do you help students set both short- and long-term goals, and assess and give feedback on progress? 4) How do you teach leadership and decision-making skills for sport and non-sport situations? 5) To what degree do the skills learned by students in sport transfer into life, and what strategies were employed to facilitate the transfer process? These questions were elaborated in order to grasp valid data in detail about the impact of sports coaching on developing life skills in students.

Data Collection Process

Data collection was conducted using semi-structured interviews with physical education teachers, having started the material collection in the summer and autumn of the year 2024; it was implemented face-to-face with informants, taken into consideration online through information platforms to ensure even more plural diversity and variant variation across respondent answers. To enhance internal validity in this study, the findings from the subjects were considered at different phases while obtaining feedback. The patterns deduced in each interview, for example, were once again represented at the interviews' end, and those with any discrepancy were reviewed, re-checked, and re-discussed. This eliminates response biases and guarantees there are no fallacies or inaccuracies in the research data collection.

Complementary Actions for Trustworthiness

To enhance the validity and accuracy of the results, several complementary measures were taken: (i) data collection from various sources; (ii) review of the data by a research assistant; (iii) involvement of an expert in thematic analysis and the research topic; and (iv) repeated questioning to identify biases and reduce potential influences during data analysis. The interview transcripts and initial

interpretation of participants' responses were presented to them for review and verification. This allowed the participants to ensure that their views had been accurately recorded, and misrepresentation did not occur. Besides that, expert reviewers who understand qualitative research and the substantive area being investigated reviewed the process adopted and preliminary findings from this study. They reviewed and gave useful feedback for refinement of the data analysis and interpretation (Nowell et al, 2017; Karimi & Soltanian, 2024).

Reliability of the Coding

Reliability could be ensured in the process of coding as inter-rater reliability was considered as a quality indicator of the performance of the coders. The two independent coders reached an 85% agreement, which indicates a high consensus with appropriate reliability in the coding process (Noble & Smith, 2015).

Data Analysis Method

Thematic analysis is the approach to data analysis in this research. This is one of the most common methods used in qualitative research to interpret meanings and hidden patterns across the data (Karimi & Soltanian, 2024). Initial coding of meaningful segments of text was performed, then categorized and organized into similar codes (Karimi et al., 2024).

Results

This study explores the development of life skills in students through coaching strategies in school sports, categorized into three overarching themes. The first theme, Supportive Environment and Social Development, focuses on creating a respectful and accepting atmosphere that fosters psychological and social support while emphasizing teamwork and collaboration. The second theme, Personal Skill Development, highlights the importance of equipping students with essential skills such as goal setting and planning, stress and emotional management, and problem-solving and decision-making to support their growth and resilience. The third theme, Bridging Sports and Daily Life, underscores the transferability of skills learned in sports, such as teamwork, leadership, and evaluative feedback, to everyday personal, academic, and social contexts. These themes and their associated categories collectively provide a holistic understand-

ing of how sports coaching can prepare students for success both within and beyond the sports field.

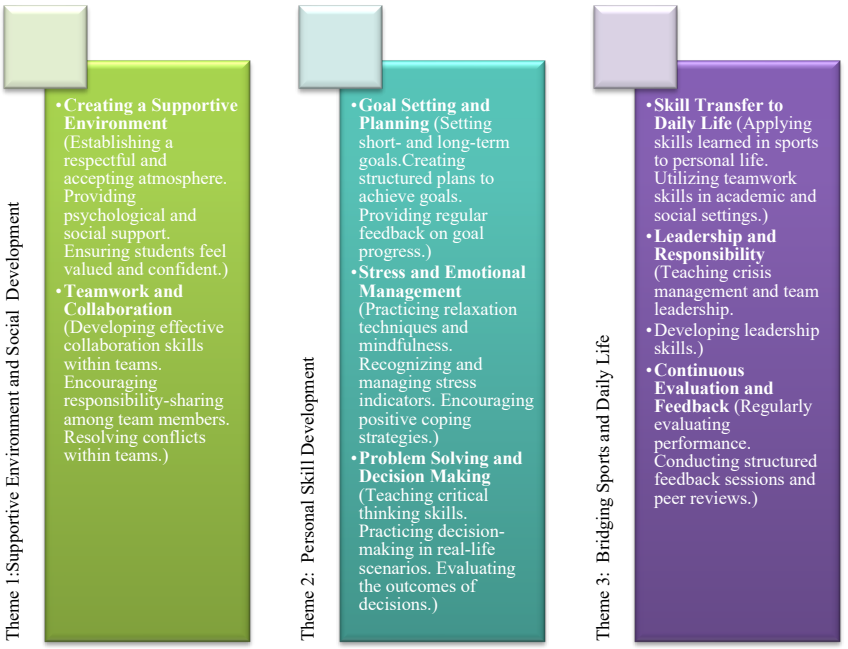
Table 2
The Results of Extracting Themes from Research Interviews

Overarching Themes	Organized Themes	Foundational Themes
Creating a Supportive and Positive Environment	Mutual Respect and Acceptance	Creating an environment based on respect and mutual acceptance.
		Ensuring students feel valued and confident.
		Providing psychological and social support.
	Social and Emotional Skill Development	Teaching teamwork skills.
		Training stress management techniques.
		Enhancing problem-solving skills.
Teaching Goal-Setting and Planning	Short-Term and Long-Term Goals	Encouraging students to set short- and long-term goals.
		Helping students design detailed plans to achieve their goals.
		Motivating students through goal achievement recognition.
	Progress Evaluation	Regularly assessing students' progress toward their goals.
		Providing constructive feedback to guide improvement.
		Revising plans to ensure continued growth and success.
Enhancing Teamwork Skills	Collaboration and Responsibility	Teaching effective collaboration within groups.
		Encouraging responsibility sharing among team members.
		Resolving team conflicts effectively.
	Leadership Development	Offering opportunities for students to lead teams.
		Teaching how to guide groups during critical situations.
		Involving students in managerial tasks within sports environments.
Teaching Problem-Solving and Decision-Making	Critical Thinking Skills	Encouraging students to think critically about challenges.
		Teaching students to analyze potential outcomes.
		Helping students evaluate decisions and learn from mistakes.
	Real-Life Problem Scenarios	Simulating real-life situations for decision-making practice.
		Encouraging reflection on problem-solving strategies.
		Reinforcing effective solutions through discussion.

Table 2 (cont.)

Enhancing Communication Skills	Verbal Communication	Training students to express their ideas clearly.
		Teaching the importance of active listening.
		Practicing conflict resolution through communication.
	Non-Verbal Communication	Highlighting the role of body language in effective communication.
		Encouraging students to maintain positive non-verbal cues.
		Developing skills for understanding others' non-verbal signals.
Stress and Anxiety Management	Relaxation Techniques	Teaching deep breathing and relaxation exercises.
		Practicing mindfulness activities.
		Applying relaxation methods during stressful situations.
	Emotional Regulation	Helping students recognize signs of stress and anxiety.
		Teaching strategies to manage emotional responses.
		Encouraging positive coping mechanisms.
Enhancing Self-Management Skills	Time Management	Teaching students how to prioritize tasks effectively.
		Encouraging the use of planners and schedules.
		Helping students balance academic, personal, and sports commitments.
	Self-Evaluation	Training students to assess their own performance.
		Encouraging reflection on achievements and areas of improvement.
		Setting realistic and measurable self-improvement goals.
Developing Leadership Skills	Role Modeling	Encouraging students to take on leadership roles in teams.
		Teaching responsibility and accountability in leadership.
		Providing feedback to enhance leadership abilities.
	Decision-Making in Leadership	Training students to make decisions under pressure.
		Encouraging group involvement in decision-making processes.
		Building confidence in guiding teams effectively.
Transferring Skills from Sports to Daily Life	Skill Application	Demonstrating the real-life application of sports skills.
		Encouraging students to use communication and problem-solving skills in personal settings.
		Teaching the value of teamwork in academic and social environments.
	Practical Exercises	Assigning tasks to practice skills outside the sports setting.
		Monitoring and evaluating the transfer of skills.
		Encouraging feedback on skill application in daily life.
Regular Evaluation and Feedback	Performance Monitoring	Continuously evaluating students' performance in sports.
		Providing feedback to address weaknesses.
		Recognizing and celebrating successes.

Figure 1
Themes



Theme 1: Supportive Environment and Social Development

According to teachers, a supportive environment and social development are critical to supporting students' learning. Accordingly, the effects of creating a supportive atmosphere that makes students feel valued and confident are emphasized. Supportive classroom environments can also increase teamwork and collaboration, allowing students to work effectively with their peers, resolve conflicts easily, and build strong relationships with each other.

Category 1: Creating a Supportive Environment

Creating a supportive classroom environment can foster mutual respect, acceptance, and physical safety for students. When students feel supported and valued in the classroom, they are more likely to participate actively, express themselves, and be confident, which can help them navigate challenges. Examples of quotations related to this are as follows: "Mutual respect and acceptance are key to creating

an environment where students feel valued and confident." "When students feel that they are treated fairly, with respect, they can easily apply their powers and participate in activities motivatedly."

Category 2: Teamwork and Collaboration

Creating an environment of cooperation and teamwork among students seems to be very important in terms of improving their communication skills and taking responsibility. Increasing cooperation opportunities is also very important in terms of resolving disagreements and increasing trust among students. Here are some quotes about this: "Teaching teamwork skills and how to divide responsibilities effectively among team members."

"I ensure that responsibilities are shared in group activities, so everyone gets involved, which enhances the team spirit and collaboration."

Theme 2: Personal Skill Development

This theme focuses on the importance of providing students with basic personal skills such as goal setting, stress management, and decision making. These skills are very important for students to cope with problems both in the sports environment and in their daily lives.

Category 1: Goal Setting and Planning

It is very important for students to set achievable short- and long-term goals, and to make plans to achieve these goals. Well-structured plans and goals can motivate students while providing feedback on these goals can support them to monitor their progress. Here are some examples of quotes: "Helping students design detailed plans to achieve their goals and revising them for continuous improvement." "I encourage students to set both short-term and long-term goals. These goals help them see their progress and stay motivated."

Category 2: Stress and Emotional Management

Having stress and emotional management skills seems to be very important to help students cope with pressure and maintain focus in high-stress situations. Mindfulness, breathing techniques, and relaxation exercises can be effective in supporting students in their stress and emotional management. Here are some examples of quotes: "Teaching students to recognize signs of stress and practice

mindfulness activities to stay calm and focused." "I teach stress management techniques such as deep breathing and relaxation exercises to help students manage their emotional responses during stressful situations."

Category 3: Problem Solving and Decision Making

Problem solving and decision-making skills are also very important for students, as are other skills. These skills can provide the ability to critically analyze different situations, produce creative solutions to problems, and analyze results. By applying these skills to real-life scenarios, students can effectively and safely deal with challenges. Here are some examples of quotes related to this: "Encouraging students to think critically about challenges and analyze potential outcomes." "I inspire students to brainstorm different solutions and select the best option when faced with a problem."

Theme 3: Bridging Sports and Daily Life

This theme focuses on transferring what they have gained from sports to their daily lives. By integrating teamwork, leadership, and evaluative feedback from sports into their daily lives, students develop the skills to cope with challenges in various contexts.

Category 1: Skill Transfer to Daily Life

Transferring skills from sports to daily life enables students to apply teamwork, communication, and problem-solving skills to real-world situations. This approach effectively prepares students to handle academic, social, and professional challenges. Examples of quotations related to this are as follows: "Demonstrating the real-life application of sports skills, such as teamwork and communication, in academic and social settings." "I always encourage students to reflect on how they will apply these skills in their personal life."

Category 2: Leadership and Responsibility

Leadership development emphasizes teaching students to take responsibility for their actions and manage teams effectively. Leadership development focuses on teaching students accountability and effective team management. These skills, as well as the ability to make decisions under pressure, prepare students to become responsible leaders in sports and life. These skills and decision-making under pressure help students become accountable leaders in sports and

life. Examples of quotations related to this are as follows: "Offering opportunities for students to lead teams and teaching how to guide groups during critical situations." "Whenever students take up leadership roles, they're responsible not only for their actions but also for the consequences of the entire team."

Category 3: Continuous Evaluation and Feedback

Continuous evaluation and structured feedback sessions are essential for helping students identify areas of improvement. Peer reviews and reflective feedback encourage self-awareness and collaborative growth, ensuring ongoing development. Examples of quotations related to this are as follows: "Regularly assessing students' progress toward their goals and providing constructive feedback to guide improvement." "Conducting structured feedback sessions allows students to reflect on their progress and identify areas of improvement."

Conclusion

The current research study highlights the pivotal role of coaching strategies in driving meaningful development of students' life skills, particularly within the context of sports. As such, creating a positive environment develops student self-esteem and therefore fulfills one of their significant social-emotional development features. With such promotion of mutual respect and acceptance among peers, a student is more likely to feel valued, confident, and interested in the learning process; it covers all aspects of general psychological well-being, further developing a positive attitude towards his or her personal development. It goes on by intentionally focusing attention on imparting the vital social-emotional skills in life that include teamwork, managing stress, and finding solutions to the different types of problems a student faces within academic and living environments. Moreover, these techniques will help these students perform successfully in pressurized situations, besides making them more resilient during various situations of life that they may experience.

Additionally, the introduction of such strategies as goal setting and planning proves to be very important for stimulating students and enhancing the development of self-management skills. By helping the students set both short- and long-run goals and providing them with tools to make structured action plans to achieve those

objectives, students are empowered to own their growth and success. With this, ongoing progress assessment with ensuing constructive feedback allows students to feel where they need to go to improve and observe themselves growing over some time. This continuous feedback loop, combined with revisions of their own action plans, helps students work out the confidence and competence that, in turn, positively reinforces their motivation and drive to achieve personal and academic goals.

Finally, the transfer of skills acquired through the practices involved within sports to other aspects, such as social relations in academia and future professional contexts, is relevant. Key competencies, such as leadership, problem-solving under pressure, and communicative skills developed with sport can be applied later and in real life. While students practice team leadership, critical decision-making, and effective communication in sports, these qualities are transferred into daily life for positive contributions to the community and workplace. This research underlines that coaching approaches should be supported by continuous assessment and relevant feedback, enabling students to reflect on their progress, set new targets, and continually strive for improvement. This dynamic and supportive process allows the students to apply the skills they have acquired in life better, hence personal growth and long-term success. This is advantageous not only in developing athletes but also in improving students' life skills, which will be helpful for them in the future.

This study highlights the critical role of coaching strategies in fostering the holistic development of students through school sports. By establishing a Supportive Environment, students gain confidence, feel valued, and learn to collaborate effectively, creating a foundation for social development. The emphasis on Personal Skill Development equips students with practical tools such as goal setting, stress management, and decision-making, enhancing their ability to navigate challenges in sports and life. Furthermore, the theme of Bridging Sports and Daily Life demonstrates the significant impact of transferring sports-acquired skills, such as leadership, teamwork, and reflective feedback, to real-world contexts. These findings underscore the importance of intentional and structured coaching approaches to develop athletic performance and empower students with essen-

tial life skills that prepare them for future academic, professional, and personal success.

In the future, research and practice need to be focused on broadening the evidence base that informs how coaching strategies within school sport could be best optimized to support life skills development. For example, a study can be done to ascertain the long-term effects of those skills in personal growth, career preparedness, and mental well-being. Moreover, exploring the possibility of applying life skills training to the physical education context in various educational systems across the world might provide a pragmatic avenue to further the search for best practices in nurturing students' all-rounded development. Future interventions would also consider the use of technology and digital platforms, coaching strategies, and virtual groupings that enhance the practice of life skills among students. Further, detailed study in the areas of diverse needs of students from different socio-economic backgrounds or learning styles will help devise inclusive and effective life skills training for all.

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YOU AND THE LAW

Review of Key Golf Cart Cases 2000-2016

Part 3[1]

Thomas H. Sawyer, EdD, Tonya L. Sawyer, PhD

Introduction

Golf carts today are a necessity for golf courses. The days of walking the course have almost vanished. With the declining rounds played, golf course operators/owners need more and more of the revenue generated by golf carts. Golf carts come with liability, as will be seen in the review of the cases below. These cases are those that have been appealed, which is about 10% of all cases brought to lower courts for a resolution. The following are case summaries of court records of key golf cart cases related to golf course incidents, 2000–2016.[2]

[1]This is the third of a three-part series reviewing key golf cart cases between 1960 and 2016.

[2]The following articles and book were used as resources to gather the case summaries in this manuscript: Robert D. Lang, A Good Ride Spoiled: Legal Liability and Golf Carts, 23, *Marquette Sports Law Review*, 393; Michael Flynn, Cart 54, Where are you? The Liability of Golf Course Operators for Golf Cart Injuries, 14 *University of Miami Entertainment & Sports Law Review, 127* (1997); and Thomas H. Sawyer (2005), *Golf and The Law: A Practitioner's Guide to the Law and Golf Management,* Carolina Academic Press.

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Mendoza v. Club Car, Inc., 96 Cal. Rptr. 2d 605, 609 (Ct. App. 2000)

The plaintiff suffered multiple fractures of the spinal vertebrae and a spinal cord injury after the parking brake on the golf cart involved in the accident released. In order to prove notice of the alleged defect, counsel for the plaintiff obtained, and succeeded at introducing into evidence for the limited purpose of showing notice of brake problem, five documents evidencing prior complaints of failure of braking systems in the golf carts. One of the documents was a letter from an individual claiming that his Club Car rolled after the parking brake failed, and the remaining four documents were Club Car warranty records indicating that parking brakes on carts would not hold. The Court grants summary judgement to the defendants.

Tidemann v. Schiff, Hardin & Waite, No. 03 C 988, 2005 WL 351772 (N.D. Ill. Feb. 14, 2000)

The plaintiff was severely injured when a Club Car golf car that she was attempting to operate suddenly lurched forward and crashed into a garage door. Nadler Golf Car Sales, Inc., which had reconditioned the car and sold it to her employer, was the defendant. Both strict liability and negligence theories were raised by the plaintiff. The district court dismissed the former as a matter of law; the jury returned a verdict for Nadler on the latter.

Ritenauer v. Lorain Country Club, Ltd., No. 01CA007811, 2001 WL 1044082 (OhioCt. App. Sept. 12, 2001)

The plaintiff was injured when the golf cart he was riding in slid down a hill and spun in circles, causing the plaintiff to fall out of the cart and to injure his shoulder. The spinout was due to wet grass. The plaintiff sued the golf club, which moved for summary judgment to dismiss the complaint. In granting the motion to dismiss, which was affirmed on appeal, the court noted that plaintiff admitted that, when playing the first twelve holes of the course, he noticed that the grass was wet from watering, and he stated, they were just watering the heck out of the course. The accident occurred after the plaintiff had teed off on the 13th hole, and he and his playing partner's balls went over a hill in the fairway. The plaintiff testified that "they drove

to the top of the hill and located the balls on the other side at the bottom" when the golf cart spun out of control. The court found that wet grass on the hill was an "open and obvious danger" and that the plaintiff's own deposition testimony indicated that he observed that the grass on the golf course was wet from watering. The Court grants summary judgement to the defendant.

Blake v. Cotter, No. CV010074912S, 2001 Conn. Super. LEXIS 3500 (Dec. 11, 2001)

The plaintiff and the defendant were playing golf together. After teeing off, the defendant was driving a golf cart to retrieve the hit balls and the plaintiff was a passenger in the cart. The plaintiff alleged that the defendant drove the cart negligently, which led to the plaintiff falling from the cart and sustaining personal injuries. In its decision, the court distinguished those cases that occur in golf from an errant golf shot from those where a defendant drives a golf cart in a negligent manner, causing personal injury and, therefore, sustained the complaint.

MacDonald v. B.M.D. Golf Assocs., Inc., 813 A.2d 488, 490 (N.H. 2002)

The plaintiff was injured while riding in a golf cart at Indian Mound Golf Club. The plaintiff's adolescent nephew was driving the golf cart, and when approaching a fork in the path, they accidentally went to the right when they were supposed to go to the left. When his nephew realized the mistake, he attempted to turn back to the left, causing the cart to overturn. As the plaintiff jumped out of the cart, the roof of the cart struck and injured his ankle. Within minutes of the accident, John Murphy, a member of the club, arrived at the scene. He saw the plaintiff injured on the ground. His nephew was nearby, trembling. The member asked the nephew if he was okay, and a few seconds later he responded, "I was not supposed to be driving." Supreme Court of New Hampshire reverses and remands for a new trial.

Massey v. Brueden Corp., No. CV030479151S, 2005 WL 2082987 (Conn. Super. Ct. Aug. 9, 2005)

The plaintiff was at the Yale University Golf Course as a corporate sponsor for a charity event. She was provided a golf cart to operate on the course, and while driving the golf cart between the 9th and 10th greens, she applied the brakes of the vehicle but they failed to work, which caused the cart to leave the travel path. In an effort to avoid going over a steep elevation change, the cart struck a tree head on causing the plaintiff injury. The plaintiff thereafter sued Textron, Inc., doing business as E-Z-Go, the owner and lessor of the golf carts used by Yale University at its golf course. In granting the defendant's motion for summary judgment, the court pointed out that the plaintiff could not and had not identified the cart involved in the accident.

Haeg v. Geiger, No. A06-1840, 2007 WL 2472545 (Minn. Ct. App. Sept. 4, 2007)

At the third tee, a golfer, Slater, shanked his first shot and decided to take a mulligan. The plaintiff and the defendant were in the same golf cart and were playing directly behind the struggling golfer. Just as the golfer was about to hit his mulligan, the defendant stopped the golf cart in front of the tee box, at about a 45- to 50-degree angle from the tee. The golfer's second shot angled sharply, hitting the roof of his own golf cart that was parked nearby, ricocheted off his golf cart, and struck the plaintiff in the left eye. The accident caused the plaintiff to lose her eye.

The defendant's motion for summary judgment was granted by the district Court but was reversed on appeal. The appellate court held that the defendant had a duty to operate the golf cart with reasonable care and that there were material issues of fact as to whether the defendant should have parked the golf cart in front of the tee box. The court held that:

> Positioning the golf cart at a 45- to 50-degree angle in front of the tee box, especially given respondent's knowledge that Slater was hitting a second shot from that tee, created the danger, not any additional act by appellant. It therefore concluded that respondent owed appellants a duty of reasonable care not to operate the golf cart in a negligent manner.

Pappas v. Cherry Creek, Inc., 888 N.Y.S.2d 511, 512 (App. Div. 2009)

The plaintiff was a passenger in a golf cart operated by his friend and golfing partner while playing at the Cherry Creek Golf Course in Suffolk County. While negotiating a U-turn on a path between the sixth green and the seventh tee, the cart tipped over, causing the plaintiff to sustain pe00frsonal injuries. He sued the operator of the golf cart and the owners of the golf course. The defendants moved for summary judgment. Judge Brandveen of the Nassau County Supreme Court granted the golf course's motion for summary judgment and denied the individual defendant's motion.

Poelker v. Swan Lake Golf Corp., 897 N.Y.S.2d 174, 175 (App. Div. 2010)

The plaintiff was a passenger in a golf cart that was making a turn on a golf course when it tipped over onto him, causing personal injuries. The plaintiff then filed suit against the owner of the golf course, arguing that there were dangerous or defective conditions in the accident area and in the cart, about which the defendant failed to warn him. The golf course owner moved for summary judgment but was denied by Judge Gazzillo of the Suffolk County Supreme Court. On appeal, the court reversed, granting summary judgment dismissing the complaint. The Court found that the defendant had met its burden of establishing that there was no dangerous or defective condition by tendering photographs of the accident area, which showed no defective or dangerous condition.

Sujoy v. Patel, No. 115917/2006, 2011 N.Y. Misc. LEXIS 2672 (Sup. Ct. May 31, 2011)

The plaintiff was injured in a golf outing organized by Deutsche Bank for its corporate tax department at a golf course operated by American Golf Corporation (AGC) at the South Shore Country Club. During the course of the outing, the plaintiff was injured when defendant Patel, who was also enjoying the outing, crashed into him with a golf cart. At his deposition, the plaintiff testified that, after teeing off while facing the back of his golf cart to return his golf club, he heard some sort of whizzing sound similar to the one of a golf cart approaching. The plaintiff turned and saw that Patel's cart was

barreling toward him. The plaintiff's right leg got pinned between the rear of his golf cart and the front bumper of Patel's cart. After the accident, Patel called the plaintiff and apologized for the incident. Patel testified that his golf cart was moving at a speed less than two or three miles per hour, but he admitted to apologizing to the plaintiff and told the police that the incident was an accident. The motion for summary judgement by the defendant is granted.

Bertin v. Mann, No. 328885, Court of Appeals of Michigan, December 16, 2016

While the parties were at the 17th hole, defendant hit his golf ball onto the green, and plaintiff' landed to the right of the green. Plaintiff then drove the cart toward his ball and parked it in nearby rough off the green. He exited the cart, while defendant remained in the passenger seat, and grabbed his putter and wedge, intending to use the latter to chip the ball onto the green. However, after laying his putter on the ground, plaintiff struck his ball too hard, it traveled further than plaintiff intended, and it stopped on the other side of the green. Plaintiff then picked up the putter from where he had set it on the ground and began to walk toward his ball. Plaintiff did not believe that he stepped in front of the cart while walking, as he was moving in the opposite direction of the cart. After he had gone about 10 to 15 feet, defendant drove the cart and struck plaintiff in the buttocks. Plaintiff was pushed forward and knocked to the ground due to the impact. After impact, plaintiff rolled to the right, and the cart struck him a second time, running over his leg. This case was remanded for further proceedings related to reckless misconduct.

The Last Word

After reviewing these cases dating back to 2000, it is easy to understand why golfers need to be very careful when using a golf cart. The golf course operator does not always hold the liability bag. Often times, the liability falls upon individuals as well as golf cart manufacturers. The golf course operator and/or owner must ensure that the golf carts are well maintained and in excellent working order before renting them to the golfer. Further the operator/owner must ensure the course is safe for golf carts and post warning signs about dangers for operation of golf carts (e.g., steep uphill or downhill grades, blind spots, etc.). Golf carts are great revenue generators, but they are also

liabilities. Golf course owners/operators must balance revenue generation with risks and liabilities attached to golf carts. In England and Scotland the vast majority of the players walk the courses as the game was originally played and the USGA does not allow golf carts to be used in tournament play.

Instructions for Authors

The Physical Educator

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