

Physical Education Programmes Improve Sportsman's Motivation, Attitude, and Self-Efficacy: A Mixed Methods Study in Germany

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Abstract

Physical education plays a crucial role in the holistic development of students; however, it presents a significant challenge for universities in Germany. In order to achieve this objective, a physical activity programme was developed with the intention of providing individualised assistance to enhance both the quantity and quality of physical education. Additionally, the programme aims to promote improvements in self-efficacy, attitudes, and motivation towards physical education, which are influential factors in enhancing athletic performance. Hence, this study investigates the impact of physical education on motivation, attitude, and self-efficacy in promoting physical activity among university students in Germany. In order to achieve the objectives of this study, a sample of 250 athletes from German universities was selected using a convenient sampling technique. The data collected from this sample was primarily quantitative in nature. Additionally, qualitative data was obtained by conducting 15 interviews. The researcher utilised a mixed-methods approach. The data was subjected to analysis using the Statistical Package for the Social Sciences (SPSS) software, employing pre-test and post-test phases. The results obtained from both qualitative and quantitative analyses unequivocally emphasise the significant advantages of the physical education programme for all individuals involved. Significantly, the anticipated effects were observed in terms of important outcomes such as the reduction of negative attitudes, the increase in desire for exercise, and the enhancement of opinions regarding physical ability. The study provided additional evidence that supports the effectiveness of personalised physical education interventions. These interventions have the potential to improve students' attitudes, motivation, and self-efficacy towards physical activity in school settings. The study's conclusion included a discussion on the limitations of the research and potential avenues for future investigation.

Keywords: physical education, attitude, physical education, Germany.

Introduction

The presence of physical education (PE) programmes within university environments holds a significant influence over the overall levels of physical activity (PA) exhibited by students (Gouveia et al., 2019). However, it is frequently noted that a significant number of students are unable to meet the recommended objectives for engaging in "moderate-to-vigorous physical activity (MVPA)" throughout their tenure in higher education. In order to effectively tackle this matter, it is commonly recommended to optimise physical education programmes at the university level in a proficient manner. These programmes have the dual objective of increasing both the quantity and quality of physical activity (PA) in the classroom while also seeking to enhance students' self-efficacy beliefs, attitudes, and motivation towards PA. Cognitive-affective factors play a crucial role in the prediction of heightened physical activity levels among students (Cornish et al., 2020).

While intervention programmes designed to enhance moderate-to-vigorous physical activity (MVPA) in physical education (PE) classrooms have yielded notable outcomes,

the transferability of these benefits to non-school environments poses a challenge (Dowda et al., 2005; McKenzie et al., 2009). The effectiveness of physical education at the university level is influenced by various factors. One such factor is the availability of well-qualified resources (Bevans et al., 2010). Additionally, the inclusion of wellness policies within the academic curriculum has been found to have an impact (Evenson et al., 2009).

Another factor is the assessment of teachers' self-efficacy in delivering physical education instruction (McKenzie et al., 2016). These are just a couple of examples of the factors that can affect the effectiveness of university-level physical education. The previously mentioned results highlight the complex array of factors that influence the quality of physical education (PE) programmes in higher education institutions. These findings emphasise the importance of gaining a comprehensive understanding of these factors and implementing measures to effectively address them, ultimately leading to improvements in the PE experiences of students.

Numerous scholarly sources have identified prevalent challenges encountered in the establishment of high-

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quality physical activity (PA) programmes within university environments. Several challenges can be identified in the context of physical education within university programmes. These challenges encompass insufficient support from university administration, limited availability of high-quality supplies, time limitations, and the underappreciation of physical education (Lawrence F. Locke & Kim C. Graber, 2008); (Lu & De Lisio, 2017; Sherman et al., 2010). In order to effectively promote physical activity (PA) among college students, any intervention must comprehensively acknowledge and eliminate the barriers that hinder engagement in PA. Gaining knowledge about the barriers to physical activity within an academic setting facilitates a comprehensive analysis of perceived effectiveness and behavioural strategies for promoting the objective of engaging in regular physical exercise. Ajzen (1991) proposed the "Theory of Planned Behaviour," which offers a pertinent conceptual framework for understanding exercise intentions.

This theory highlights three crucial elements that contribute to the prediction of exercise intentions: perceived behavioural control, individual attitudes towards engaging in exercise, and subjective norms (anticipated reactions from others). This approach emphasises the strong association between "perceived behavioural control" and Bandura (1977) concept of self-efficacy (SEE). Both concepts revolve around the perception of one's ability to successfully engage in a particular activity. To enhance self-efficacy and perceived control within physical education settings at universities, it is suggested that enhancements be made to the perception of physical capacity, which has been identified as a significant predictor of physical activity (Seabra et al., 2012; Timo et al., 2016). The physical self-efficacy of students is closely interconnected with their motivation for engaging in physical activity (Wright et al., 2005).

The interconnection and significance of positive perspectives on achieving fitness goals and self-efficacy in enhancing physical activity among college students have been highlighted in previous research (Bui et al., 2011). Attitudes towards physical activity (PA) have a substantial influence on both the intention to engage in exercise and the actual behaviours related to exercise (Conner et al., 2015). The development of positive attitudes and the reduction of negative attitudes have been shown to enhance exercise practices and overall enjoyment (Theodorakis, 1994). Furthermore, it has been observed that even after a decade, younger individuals with more positive attitudes are anticipated to exhibit higher levels of moderate-to-vigorous physical activity (MVPA) (Graham

et al., 2011). Professors and mentors have a significant impact on shaping students' academic performance.

There is a positive correlation between physical activity (PA) levels among students and their exposure to observational learning, specifically through the observation of professors and peers who demonstrate enthusiasm and positive attitudes towards exercise (Rostamian & Kazemi, 2016). Based on the principles of social cognitive theory, it can be posited that instructors who possess an elevated sense of self-efficacy in the domain of physical exercise are likely to engage in increased promotion of physical activity through the process of modelling (Abraham et al., 2016). The effect of this phenomenon can also be observed in the domain of motivation, as students are able to deduce a professor's inherent motivation during a teaching activity, subsequently influencing their own inherent motivation (Radel et al., 2010). The role of autonomy-supportive teaching behaviours, as outlined in Self-Determination Theory (Ryan & Deci, 2000), is vital in the transmission of motivation.

It is suggested that by promoting autonomy and competence within physical education settings at the university level, students' motivation for physical activity can be enhanced. In summary, physical education at the university level functions as a mechanism through which students can enhance their intrinsic motivation for physical activity by cultivating their physical abilities. When examining the variation in social environments, barriers to physical activity, and physical education teaching strategies among universities in a given district, it is evident that interventions designed to promote physical activity are most successful when customised to address the specific needs of each university. The University programme exemplifies a successful instance of a personalised physical education intervention, which has been observed to reduce barriers to physical activity, increase the amount of time devoted to physical activity, and yield additional advantages (Martin et al., 2010). The present study seeks to examine a customised physical education intervention programme at the university level, with the goal of providing evidence for the efficacy of personalised treatments. This inquiry encompasses the evaluation of student attitudes towards physical activity (PA) from both qualitative and quantitative perspectives, encompassing self-efficacy beliefs (SEE) and attitudes towards PA. The objective of this study is to investigate the impact of the programme on individuals' motivation to engage in exercise. The implementation of customised approaches may involve incorporating perspectives from respondents in both qualitative and quantitative dimensions.

This is necessary due to the predominant emphasis of previous studies on either quantitative or qualitative aspects (Dutrisac et al., 2023). Furthermore, prior research has primarily focused on countries other than Germany (Dutrisac et al., 2023; Gouveia et al., 2019), resulting in limited attention being given to the German context. Hence, this study primarily focuses on examining both qualitative and quantitative aspects of research analysis within the context of Germany.

Therefore, drawing upon prior research, this study aims to investigate the impact of physical education (PE) on the enhancement of motivation, attitude, and self-efficacy (SEE) in the participation of sports among university students in Germany. The study holds importance in its examination of the effects of physical education (PE) on athletes in Germany, specifically in relation to their motivation, attitude, and self-efficacy (SEE) when participating in physical activity (PA). The research contributes to the promotion of healthier and more active lifestyles among young adults by providing insights into how physical education (PE) can enhance these crucial factors.

The acquisition of this knowledge has the potential to provide valuable insights to educational institutions and policymakers in Germany regarding the significance of implementing comprehensive physical education (PE) programmes. Consequently, this could result in enhanced overall well-being and a decrease in sedentary behaviour within university environments, thereby effectively addressing pertinent public health issues. The findings of this research may also be valuable to policymakers and other researchers for informing and guiding their future research endeavours.

Literature Review

Self-Efficacy

Self-efficacy (SEE) is a significant factor in determining the level of engagement in physical activity (PA) among university athletes. It refers to an individual's belief in their own capabilities to successfully complete specific tasks and activities. Research has demonstrated that customised physical education (PE) programmes specifically developed for this particular group have a beneficial impact on self-esteem enhancement (SEE). Based on research conducted by McMullen et al. (2014) and Luszczynska et al. (2007), it has been found that the implementation of personalised exercise plans and goal-setting strategies in physical education (PE) courses can significantly improve self-efficacy beliefs among university students.

Furthermore, Zimmerman (2000) social cognitive theory emphasises the significance of self-efficacy beliefs as a crucial determinant of motivation and behaviour. By customising physical education programmes to align with the distinct requirements and objectives of university students, educators have the ability to empower them to cultivate enhanced self-efficacy in relation to physical activity. Consequently, this fosters more favourable attitudes and heightened motivation (Peers et al., 2020).

Attitudes toward Physical Activity

According to Guan et al. (2023), the attitudes of university students towards physical activity (PA) have a substantial impact on their level of engagement in PA. Customised physical education programmes have the potential to yield positive outcomes by shaping these attitudes. According to the studies conducted by Plotnikoff et al. (2009) and Trost et al. (2002), there is evidence to suggest that enhancing the supportive and stimulating learning environment within physical education (PE) classes could potentially have a positive impact on the attitudes of university students towards physical activity (PA).

Additionally, the findings derived from the studies conducted by Frederick-Recascino and Schuster-Smith (2003) as well as Vallerand (2007) To promote positive attitudes, it is crucial to emphasise the importance of cultivating self-driven motivation and a conscious recognition of one's abilities. The attitudes of university students experience positive changes, and their inclination to engage in physical activity (PA) increases when they perceive PA as enjoyable, relevant to their goals, and personally meaningful.

Motivation to Engage in Physical Activity

The level of physical activity (PA) among university students is greatly impacted by their motivation, and the implementation of tailored physical education (PE) programmes can yield noteworthy impacts on motivational levels. The concept of self-determination places emphasis on the significance of fostering self-motivation and provides a valuable framework for understanding the construct of motivation (Perlman & Webster, 2011). Likewise, Standage et al. (2006) conducted research that demonstrated how physical education (PE) programmes that meet children's needs for autonomy, competence, and relatedness can enhance their intrinsic motivation.

Similarly, Teixeira et al. (2012) found similar results in their study. The provision of individualised exercise plans, the ability to choose from a variety of activities, and the opportunity to enhance one's skills are factors that contribute to the development of feelings of autonomy and competence.

Additionally, the presence of a supportive social environment fosters a sense of relatedness. Consequently, it is observed that individuals enrolled in higher education institutions exhibit a higher propensity for intrinsic motivation towards participating in physical activities, a factor that has been linked to the continuation of involvement and the maintenance of long-term commitment.

Motivation encompasses various dimensions, one of which is the relative autonomy index. This index evaluates the extent to which an individual's motivation for a specific behaviour is driven by internal factors or influenced by external factors (Lavergne et al., 2010). In contrast, the lowest level of motivation is characterised by a lack of desire or urge to participate in a specific action. It denotes a state of complete apathy or lack of concern towards the behaviour. Individuals who possess a high level of motivation may experience a lack of perceived value or purpose in engaging in a particular activity, leading to a sense of disconnection from said activity. External regulation is a form of motivation that is influenced by external factors, such as the prospect of rewards, the threat of punishments, or societal expectations. Within this particular framework of motivation, individuals are driven to engage in a specific behaviour primarily with the intention of obtaining a reward or evading negative consequences, rather than being intrinsically motivated.

Finally, it was identified. Regulation can be understood as a motivational factor that drives individuals to engage in specific behaviours due to their personal identification with the significance and value associated with those behaviours. Individuals may acknowledge the advantages or significance of the behaviour in relation to their personal objectives and principles. In alternative contexts, introjected regulation can be defined as a form of motivation that is distinguished by internal pressure or self-imposed demands (Standage et al., 2005). Individuals may exhibit certain behaviours as a result of experiencing emotions such as guilt, shame, or ego involvement. The level of self-determination exhibited in this context is relatively higher compared to external regulation, yet it remains situated along the spectrum of controlled motivation.

The previously mentioned research provides evidence to support the notion that customised physical education programmes can significantly enhance university students' self-efficacy beliefs, attitudes towards physical activity, and motivation to engage in physical activity. University students can experience empowerment, belief in their abilities, the development of positive attitudes, and the fostering of intrinsic motivation for physical activity when programmes are designed to align with their individual preferences, goals, and autonomy (Sun & Chen, 2010). The

implementation of this comprehensive approach establishes the foundation for a lifelong dedication to maintaining a healthy and physically engaged way of life among individuals enrolled in higher education institutions (Grajek et al., 2021).

Objectives and material

The study utilised an experimental mixed-methods research design, incorporating both quantitative and qualitative approaches. The survey questionnaire was used to gather quantitative data from a sample of university physical education (PE) students. A random sampling technique is utilised in order to guarantee the representativeness of the sample. The study employed a pretest-post-test experimental design in the context of quantitative analysis. In order to assess the effectiveness of the customised programme, data was gathered using self-administered questionnaires that measured self-efficacy, attitudes, and motivation.

This data was collected both before and after the programme's implementation. A quantitative research study was conducted on a sample of 300 athletes who were randomly selected from universities in Germany. Out of a total of 300 questionnaires distributed, 250 were successfully retrieved. Conversely, a series of interviews were conducted with 15 athletes who possess knowledge in the field of physical education, hailing from various universities in Germany.

Research Instrument and interview guide

The Physical Perceptions Assessment (PPA), a widely recognised 10-item scale, was employed as a primary tool in this study to measure individuals' self-efficacy (SEE) in relation to agility, strength, and overall physical ability. The participants were requested to furnish their responses on a Likert scale consisting of five points, reflecting their level of agreement with statements such as "My body is strong." The PPA has exhibited strong internal consistency, as evidenced by a Cronbach's alpha coefficient of $\alpha=.82$, thereby establishing the reliability of this measure. Moreover, when employed in various assessments, it has exhibited exceptional reliability across tests, in accordance with the methodology employed in the study.

The validity of the PPA has been established in prior research, particularly by Ryckman et al. (1982). Based on their theoretical framework, the researchers found that individuals with higher scores on the Personal Perceived Agency (PPA) scale tend to exhibit higher levels of self-esteem, a stronger internal locus of control, and fewer indications of social anxiety. In a recent study conducted by Daugherty et al. (2019), it was found that higher ratings of perceived physical attractiveness (PPA) were significantly

associated with judgements of suitability and pleasure of physical activity (PA), as well as an increased likelihood of choosing PA, among elementary school children.

These findings highlight the importance and practicality of utilising PPA as a measure for assessing self-efficacy in the context of physical activity for this age group. Furthermore, this research examined individuals' general attitudes towards exercise by employing a modified iteration of the Negative Attitudes towards Physical Activity Scale, originally devised by Nelson et al. (2009). The instrument consists of a set of 14 items that require participants to indicate their level of agreement with a series of statements. This is done using a Likert scale ranging from one to five, with options ranging from "strongly disagree" to "strongly agree." The study sought to obtain a comprehensive understanding of participants' general attitudes towards physical activity through the use of this scale.

Furthermore, the researchers employed the widely used 19-item Behavioural Regulation in Exercise Questionnaire (BREQ 2) to assess participants' inclination to participate in physical activity. The assessment employs a Likert scale with five points and generates a "Relative Autonomy Index" that provides participants with a broad understanding of their motivation towards engaging in physical exercise.

Furthermore, this assessment facilitates the identification of five distinct subscale scores: "Motivation," which measures the degree to which individuals experience a lack of motivation and intention for engaging in exercise; "External Regulation," which evaluates the influence of external factors, such as parental or peer pressure, on individuals' exercise behaviour; "Introjected Regulation," which assesses the extent to which individuals engage in physical activity for reasons related to weight loss and illness prevention; and

"Identified Regulation," which measures the extent to which individuals exercise for reasons associated with weight management and disease prevention.

The utilisation of this comprehensive evaluation methodology facilitates a thorough examination of the various determinants that impact individuals' exercise behaviours. Qualitative data was collected through the use of an interview guide, which was developed with the assistance of academics and experts. A total of 15 athletes participated in the interviews.

Analysis and interpretation

The subsequent sections of this discussion will analyse the results from both qualitative and quantitative viewpoints. The findings presented in Table 1 indicate significant improvements in various key variables pertaining to physical activity (PA), attitudes, and motivation, as observed in the pretest and posttest assessments. The increase in the Relative Autonomy Index from an average of 7.12 in the pretest to an average of 9.33 in the posttest is notable because it shows that there was a significant shift towards improved intrinsic motivation. The decline in external regulation ratings from 2.14 to 1.78 suggests a decrease in motivation attributed to external factors. Similarly, the decrease in motivation scores from 1.56 to 1.42 indicates a decline in exercise indifference. The observed scores pertaining to the identified regulations exhibited an increase from 3.45 to 3.77, thereby signifying an enhanced level of understanding regarding the advantages associated with physical exercise. The scores for intrinsic regulation exhibited a significant increase from 3.56 to 3.87, indicating a heightened inherent motivation to engage in physical activity.

Table 1

Pretest and Post test outcomes

	Pretest mean		Posttest mean	
	Mean	Standard Deviation	Mean	Standard Deviation
BERQ-2				
Relative Autonomy Index	7.12	5.75	9.33	5.87
Amotivation Scores	1.56	0.78	1.42	0.56
External Regulation Scores	2.14	0.81	1.78	0.73
Identified Regulation Scores	3.45	0.89	3.77	0.81
Introjected Regulation Scores	2.23	1.02	2.25	0.96
Intrinsic Regulation Scores	3.56	0.89	3.87	1.03
Attitudes toward PA				
Negative attitudes toward PA ^c	15.58	5.05	15.21	5.14
Positive attitudes toward PA ^d	22.20	5.13	22.21	4.64
Perceptions of personal physical ability^e	35.12	6.01	40.12	5.03

However, the scores for introjected regulation remained unaltered. Regarding attitudes, there was a slight decrease in negative attitudes towards physical activity (PA) from 15.58 to 15.21, while positive attitudes remained relatively stable at 22.20

and 22.21. A notable improvement in perceptions of personal physical ability, which rose from 35.12 to 40.12, underlines the program's effectiveness in raising students' self-perceived athletic competence. The findings as a whole indicate that the

programme has effectively promoted intrinsic motivation, decreased external regulation and motivation, improved attitudes, and had a positive impact on students' self-perceived physical abilities. These factors are crucial in encouraging physical activity participation among elementary school students. Please refer to Figure 1 for a visual representation of the observed changes in important variables. The previously mentioned outcomes are anticipated and presented in Table 1 below.

The findings of the study reveal a number of significant alterations in student perspectives and attitudes pertaining to physical activity and exercise. Initially, it is important to note that there has been a significant improvement in students' subjective evaluations of their physical aptitude, as evidenced by an increase that is of statistical significance between the pretest and post-test (“(M = 38.12, SD = 6.00 and M = 40.21, SD = 5.04, respectively), t (116) = 3.69, p .001”). As a result of an increase in their physical self-esteem and perceived physical capabilities, this suggests that students experienced an increased level of self-assurance. The findings pertaining to positive attitudes towards exercise are particularly noteworthy given their tendency towards statistical significance, t (“(116) = 1.89, p =.062”, even if they did not achieve conventional statistical significance from pre- (“(M = 21.30, SD = 5.12)”) to post-intervention (“(M = 22.23, SD = 4.65)”). This observation suggests that students are cultivating increasingly favourable attitudes towards physical activity, which can be regarded as a favourable advancement. Furthermore, the survey revealed that there has been a significant change in perceptions regarding physical activity. With a noticeable change from the “pretest (M = 16.58, SD = 5.06) to the post-test (M = 15.20, SD = 5.14)”, unfavourable attitudes regarding exercise particularly considerably

decreased, t (116) = 2.82, p =.006. This decrease in unfavourable views reveal a beneficial effect on students' general assessment of PA, showing a more optimistic viewpoint.

The findings suggest a significant enhancement in motivation to engage in physical activity with regards to behavioural regulation. The Relative Autonomy Index demonstrated a notable increase in student motivation “baseline (M = 7.22, SD = 5.65) to post-test (M = 9.34, SD = 5.12), t (116) = 4.11, p .001”. In addition, a reduction in emotions of apathy as well as a rise in drive to exercise are shown by motivation scores, which reduced from “pre- (M = 1.66, SD = 0.70) to post-test (M = 1.41, SD = 0.56), according to t (116) = 3.46, p =.001”.

Additionally, the decrease in External Regulation ratings from baseline (“(M = 2.22, SD = 0.091) to post-intervention (M = 1.87, SD = 0.72), t (116) = 3.79, p .001”, shows a decreased dependence on outside influences as PA motivators. This shows that students' inherent motivation to participate in PA is growing.

The study found no significant variations in Interjected Regulation and Intrinsic Regulation scores, but the results demonstrate “a significant rise in Identified Regulation from pre- (M = 3.56, SD = 0.79) to posttest (M = 3.79, SD = 0.80), t (116) = 2.63, p =.010”. The increase in scores observed can be attributed to a heightened understanding of the beneficial impacts of physical exercise and the importance attributed to physical activity. Based on the findings of the study, there was a notable enhancement in students' perceptions of their physical abilities, attitudes towards physical exercise, and motivation to engage in physical activity. These modifications possess the capacity to foster a student population that is progressively engaging in physical activity and prioritising their health.

Table 2

Independent Sampling Test Results

Variable	Pretest Mean (M)	Pretest SD (SD)	Post test Mean (M)	Post test SD (SD)	t-value	p-value	Interpretation
Perceptions of Physical Ability	38.12	6.00	40.21	5.04	3.69	< .001	Students' perceptions enhance in physical self-efficacy
Positive Attitudes toward Exercise	21.30	5.12	22.23	4.65	1.89	.062	Significance increases in anticipated direction
Negative Attitudes toward Exercise	16.58	5.06	15.20	5.14	2.82	.006	Significant minimized in the attitude of negatives towards their exercise.
Relative Autonomy Index	7.22	5.65	9.34	5.12	4.11	< .001	Enhanced in exercise motivation
Amotivation Scores	1.66	0.70	1.41	0.56	3.46	.001	Students' motivation decreased in exercise.
External Regulation Scores	2.22	0.091	1.87	0.72	3.79	< .001	Reduction in extrinsic motivation to engage in PA
Identified Regulation Scores	3.56	0.79	3.79	0.80	2.63	.010	Better accepting of the benefits of implementation and valuing of PA
Introjected Regulation Scores	2.33	1.01	2.21	0.97	1.25	.214	No significant change in motivational factors to exercise
Intrinsic Regulation Scores	3.96	0.92	3.98	1.02	0.20	.841	No significant change in reported intrinsic motivation to exercise

Qualitative Analysis

The study also employed qualitative analysis, identifying multiple themes.

Impact of the physical Program

The programmes' impact can be categorised into four subthemes: improved motivation, enhanced self-efficacy, changes in attitude towards physical education. These subthemes will be discussed in detail below.

Improved Motivation (IMP-MOT)

The previously mentioned theme suggests that the customised programme had a notable influence on augmenting the motivation levels of physical education students. The observed rise in motivation indicates that the programme effectively stimulated students to participate more actively in physical activity, a key factor in fostering a healthy and dynamic way of life.

Enhanced Self-Efficacy (IMP-SE)

The observed enhancement in self-efficacy among the student population suggests that the implemented programme has effectively contributed to the cultivation of a heightened sense of confidence in their physical capabilities. The enhancement of self-confidence holds significant value as it has the potential to foster increased participation and engagement of students in physical activities and sports with a greater sense of assurance.

Changed Attitudes towards PA (IMP-ATT)

The programme has demonstrated a positive impact on students' attitudes towards physical activity as well. The alteration in attitudes has the potential to foster a more positive perspective towards physical exercise, thereby increasing students' voluntary engagement in such activities.

Motivation

The motivation summarized into two following themes which are discussed below.

Intrinsic Motivation (MOT-INTR)

The finding that students exhibited a rise in intrinsic motivation suggests that they started to perceive exercise as personally gratifying and captivating for its inherent value. The observed trend is indicative of a positive change, as it implies that students are increasingly motivated from within to engage in physical activity, potentially resulting in sustained involvement over time.

External Pressure (MOT-EXT)

Despite the persistence of external pressure on certain students to participate in physical activity, it appeared that the program's influence had the effect of diminishing this

external impetus. This observation indicates a progressive shift among students towards a reduced reliance on external motivators, which can be regarded as a favourable advancement.

Attitudes toward PA

The attitudes towards physical education divided into next further two themes which are discussed below.

Positive Attitudes (ATT-POS)

The programme's influence on cultivating favourable attitudes towards physical activity is promising. When students possess a positive attitude, they are more likely to perceive the advantages and pleasures associated with engaging in physical activity, thereby enhancing the probability of sustained involvement.

Decreased Negative Attitudes (ATT-NEG)

The decrease in unfavourable attitudes towards physical activity represents a noteworthy accomplishment. This implies that the programme facilitated the students in overcoming any hesitations or unfavourable attitudes they might have harboured towards physical activity, thereby fostering a mindset that is more receptive and accommodating.

Self-Efficacy (Confidence in Physical Abilities (SE-CONF))

The observed rise in self-efficacy among students enrolled in German universities indicates a growing sense of confidence in their physical abilities. The significance of self-confidence in a physical education setting cannot be overstated, as it has the potential to positively impact students' engagement and achievement in diverse physical activities.

External Regulation (Reduced Reliance on External Factors (EXT-RED))

The observed decline in dependence on external stimuli as incentives for engaging in physical activity suggests a growing trend towards intrinsic motivation among students. The observed transition indicates a progression towards a heightened sense of self-determined motivation, potentially resulting in prolonged involvement in physical exercise.

Identified Regulation

The identified Regulation physical education divided into next further two themes which are discussed below.

Understanding Benefits of Exercise (ID-UNDERSTAND)

The influence of the programme on students' understanding of the benefits of exercise underscores the imperative for education and awareness. When students acknowledge the significance of physical activity in

relation to their overall well-being, they are more likely to prioritise it.

Valuing Physical Activity (ID-VALUING)

The observation that students are increasingly recognising the importance of engaging in physical activity is indicative of a favourable trend. This alteration has the potential to enhance their comprehension of the significance of exercise in their lives, thereby fostering a sustained dedication to maintaining a physically active lifestyle.

The above-mentioned themes suggest that the implementation of a customised programme in Germany had a beneficial influence on physical education (PE) students at the university level. This intervention resulted in enhanced motivation, attitudes, self-efficacy, and regulation among the students, all of which play a crucial role in fostering a physically active and healthy student community. Table 3 provided below presents a forecast of the aforementioned themes.

Table 3

Thematic analysis

Theme	Code	Frequencies
1. Impact of the Program		
- Improved Motivation	IMP-MOT	11
- Enhanced Self-Efficacy	IMP-SE	9
- Changed Attitudes towards PA	IMP-ATT	8
2. Motivation		
- Intrinsic Motivation	MOT-INTR	10
- External Pressure	MOT-EXT	5
3. Attitudes Toward PA		
- Positive Attitudes	ATT-POS	12
- Decreased Negative Attitudes	ATT-NEG	7
4. Self-Efficacy		
- Confidence in Physical Abilities	SE-CONF	9
5. External Regulation		
- Reduced Reliance on External Factors	EXT-RED	6
6. Identified Regulation		
- Understanding Benefits of Exercise	ID-UNDERSTAND	8
- Valuing Physical Activity	ID-VALUING	7

Discussion

A pretest-posttest experimental approach was employed in a study conducted in Germany to investigate the impact of a customised programme on various factors related to physical activity (PA), such as self-efficacy (SEE), attitudes, and motivation. The participants of this study were university physical education (PE) students who were engaged in sports activities. The findings from both the quantitative and qualitative studies offer valuable insights into the effectiveness of the programme. The quantitative results indicate significant alterations in students' assessments of their physical abilities and confidence in their own capabilities. This finding holds significance as self-efficacy has been identified as a robust indicator of engagement in physical activity. The increase in self-efficacy observed indicates that the individualised programme facilitated the development of greater self-confidence in students' physical abilities.

This conclusion aligns with established psychological theories that posit that individuals with higher levels of self-efficacy are inclined to establish ambitious goals and exhibit persistence when confronted with obstacles, as exemplified by Bandura's Social Cognitive Theory. The programme also resulted in a notable increase in intrinsic motivation, indicating that students now perceive exercise as being more personally gratifying. The aforementioned trend exhibits a positive nature as it is associated with intrinsic motivation (Dutrisac et al., 2023), which emphasises the importance of consistent and purposeful engagement in physical activity.

However, despite the lack of statistical significance, it is noteworthy to observe the trend towards more positive attitudes towards exercise. The attitudes of individuals play a crucial role in shaping their perceptions of physical exercise. Based on empirical evidence, individuals who possess positive attitudes are more inclined to initiate and maintain fitness regimens. The observed positive

trend indicates that the programme may have a significant impact on students' perspectives, potentially influencing their long-term exercise behaviour, despite the lack of statistical significance (Dutrisac et al., 2023; Gouveia et al., 2019).

In alternative contexts, previous studies have demonstrated a decrease in external regulation and a significant decrease in negative attitudes towards physical activity, both of which are favourable outcomes. The reduction of negative attitudes towards physical activity holds promise as it can effectively overcome barriers to participation. Moreover, the decline in external regulation suggests that students possess a heightened intrinsic motivation to engage in physical activity, a crucial factor for sustaining long-term adherence. The results presented in this study are consistent with the principles of Deci and Ryan's Self-Determination Theory, which places significant emphasis on the role of autonomous motivation in facilitating long-term changes in behaviour (Dutrisac et al., 2023; Gouveia et al., 2019).

Moreover, the perspective of students regarding the impact of the programme on enhancing their understanding of the benefits of exercise and their appreciation for physical activity holds considerable importance. When individuals acknowledge the favourable influence of physical activity on their overall welfare and regard it as a fundamental component of their existence, they are more inclined to prioritise and sustain a habitually active way of life. These findings align with previous research that highlights the significance of perceived benefits and personal values in influencing behaviour modification (Gouveia et al., 2019). Additionally, the qualitative analysis serves to strengthen the quantitative results by elucidating four significant themes: heightened motivation, increased self-efficacy, altered attitudes towards physical education, and modifications in regulation. The aforementioned themes offer a comprehensive comprehension of the impact of the customised programme on the perceptions and behaviours of the students. The theme of improved motivation, specifically, was found to be significant, suggesting that the programme effectively stimulated students to increase their level of involvement in physical activity. The inclusion of qualitative data enhances the quantitative findings by capturing the subjective experiences and perspectives of the participants.

Therefore, the aforementioned findings from the study's mixed-method approach offer a comprehensive evaluation of the effectiveness of the customised programme on German university students studying physical education. The findings from the quantitative analysis indicate notable enhancements in self-efficacy, motivation, and

attitudes. The qualitative examination further enriches these results by revealing the underlying themes and experiences associated with these improvements.

The findings of this study hold significance for both practical and theoretical aspects of promoting a healthy and active student population. They underscore the importance of implementing customised programmes that specifically address self-efficacy, motivation, and attitudes in order to facilitate long-term behavioural changes among physical education students at German universities. For example, the efficacy of customised programmes in enhancing students' confidence in their physical abilities and promoting their intrinsic motivation is evidenced by notable advancements in self-efficacy and internal drive to participate in physical activity. The results of this study indicate that educational institutions and physical education programmes should contemplate the adoption of interventions that prioritise the development of self-efficacy and intrinsic motivation as means to cultivate enduring involvement in physical activity.

Moreover, although the rise in favourable attitudes towards exercise did not achieve statistical significance, the observed upward trend implies that endeavours aimed at enhancing students' perceptions of physical activity can yield positive outcomes, potentially influencing their exercise habits in the long run. Therefore, it is imperative for educators and policymakers to persistently underscore the significance of fostering favourable dispositions towards physical activity.

In conclusion, the decrease in unfavourable attitudes, external control, and the improved comprehension and appreciation of physical activity underscore the potential of programmes to establish a more favourable setting for students to adopt a physically active way of life. In practical application, it is advisable for institutions to give precedence to strategies that aim to mitigate negative perceptions, mitigate external pressures, and underscore the diverse advantages of exercise in order to foster student motivation and promote their sustained engagement in physical activity.

Conclusions

A mixed-methods study was conducted on university students in Germany, utilising a quantitative approach with a pretest-post-test experimental design. This quantitative study was further complemented by a qualitative analysis. The findings of this study demonstrate the significant and positive effects of a customised programme on key factors associated with physical activity (PA). The results indicate significant enhancements in self-efficacy, specifically in students' assessments of their

physical capabilities, implying heightened assurance and congruity with psychological frameworks such as Bandura's Social Cognitive Theory.

In addition, the programme significantly increased individuals' inherent motivation, decreased negative attitudes towards physical activity, and reduced reliance on external regulation, thereby aligning with the principles outlined in self-determination theory. The aforementioned results highlight the efficacy of the programme in motivating students to actively participate in physical activity, cultivating favourable attitudes, and improving their belief in their own abilities, all of which are essential for maintaining a healthy and active way of life.

The findings are further supported by qualitative analysis, which emphasises the emergence of themes related to increased motivation, enhanced self-efficacy, altered attitudes towards physical activity, and changes in regulation. These findings provide significant insights for educational institutions and physical education programmes aiming to foster a culture of physical activity and well-being among university students in Germany and other regions.

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Limitations and Future Directions

The study has identified several significant research findings, yet it is important to acknowledge the limitations inherent in this research. These limitations present opportunities for future research to explore and expand upon the current findings. This study focused exclusively on Germany, a developing nation, which may limit the generalizability of the findings. Future research could consider investigating other developed economies to enhance the overall generalizability of the research.

Additionally, it is important to note that the reliance on the quantitative research approach limits current research. To enhance the robustness of future research, it is recommended that a mixed-methods approach, incorporating both qualitative and quantitative methodologies, be employed. This would allow for a more comprehensive investigation of the subject matter. Finally, it is recommended that future studies investigate additional moderating and mediating variables in order to enhance the robustness of the research findings.

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