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# Evaluating the impact of innovative sports curriculum on student motivation and physical fitness

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**Abstract.** This paper compares the effect of a novel sports curriculum on undergraduate student motivation and physical activity at a large university. In the mixed-methods study, both quantitative and qualitative data from pre- and post-intervention tests and questionnaires are analyzed. This showed that the new curriculum had a strong effect on intrinsic motivation: in the experimental group, students scored their motivation levels after intervention as 4.5 on a 5-point scale, as opposed to 3.2 at baseline. Fitness measurements were also up: average VO2 max grew from 32.5 to 38.7 ml/kg/min and flexibility scores from 18.2 cm to 24.6 cm. Differences in sex and major also indicated that male students did best on strength-based tasks and female students had better flexibility gains. It was also true that students in physically demanding subjects like sports science performed better than students from non-physical disciplines. These results demonstrate the efficacy of new approaches to instruction in terms of student engagement and physical health, and that it is crucial to adapt sport curricula to different student groups. The report provides information that can be useful for universities if they want to enhance physical education courses for longer-term health and fitness practices.

**Keywords:** innovative sports curriculum, student motivation, physical fitness, undergraduate students, curriculum evaluation

## 1. Introduction

Higher education's physical education was an essential component of student success for many reasons – both physically, mentally and socially. Yet traditional physical education regimens simply aren't tailored to the variety of needs and interests of today's undergraduate students, which can be the source of distraction and poor health. The recent technological advancements and the change in education methods opened the door to innovative sports programmes with wide range of activities, customized exercise regimens and tech-based instruction. These new strategies are designed to make students more involved, more fit, and healthier for life. Research in motivation theory like SDT or Social Cognitive Theory gives us solid insights into how creative sports programs can enhance student engagement. SDT is focused on intrinsic motivation – psychological needs of autonomy, competence and connectedness, which can be met by carefully structured curricula. Meanwhile, Social Cognitive Theory emphasises self-efficacy, goal-setting and observational learning as motivational and performance factors. By applying these theories to pedagogy, physical education programs will be able to better motivate students and promote their physical performance. As promising as the possibilities of new sports programmes might be, there's not much research on their precise application in university contexts [1]. The studies have mostly examined factors such as general motivation or fitness and not looked into the effects of curriculum changes. Nor do differences by gender, school, and existing fitness levels. The goal of this paper is to try to fill these holes, through a study of how a newly developed sports curriculum has fared in a university. Through analyses of motivation, physical activity, and demographic differences, this research will help us learn lessons that we can apply to making higher education physical education programs more modern.

## 2. Literature review

### 2.1. Theoretical framework

The school setting also affects motivation to learn – even in physical education. Old theories such as Self-Determination Theory (SDT) and Social Cognitive Theory have much to say about how motivation can be created. SDT places greater emphasis on

 

intrinsic motivation: it targets three psychological needs: autonomy (freedom to act), competence (a sense of being competent in one's ability) and relatedness (feeling linked to others). All three of these are graphically expressed in Figure 1, which reveals the role that each of these psychological demands plays in motivation as a whole. When it comes to physical education, these requirements can be met through curriculum design where students control what activities they engage in, assign appropriate challenging tasks, and create positive social relationships with other students. Social Cognitive Theory, however, focuses on observational learning, self-control and self-efficacy as drivers. Students become more likely to do physical activity if they are asked to identify their own goals, watch others (or models) succeed, and track their achievements over time [2]. They are ways to become more effective in themselves and be better at physical education. With the philosophies of both theories combined, sport programmes can be tailored not only to inspire students but also to promote long-term physical activity for their own health and wellbeing. Figure 1 is a useful starting point to get an idea of how these essential psychological demands are a source of motivation and motivational involvement in schools.

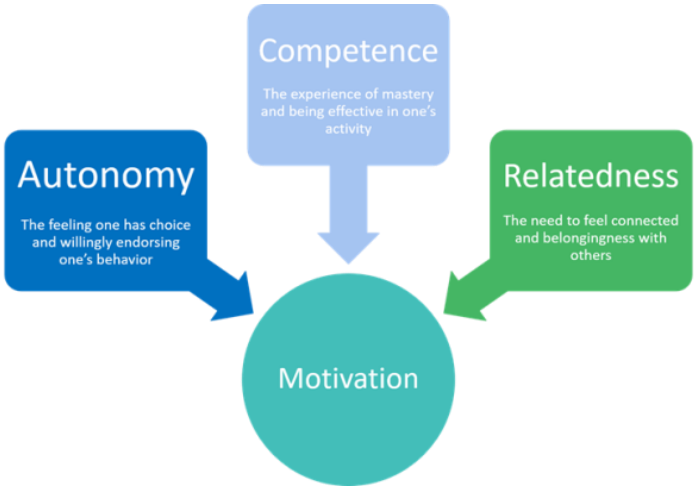


**Figure 1.** Self-determination theory in education (source: ELA source)

## 2.2. Creative exercise instruction models

Due to changing student demands and new learning technology, p.e. has adapted to create more and more personalized instructional strategies. These are digital enhanced learning where digital resources such as fitness apps, online fitness exams, and online learning solutions are brought to the learning program to engage and customize learning. Instructors can give individualized feedback, track progress in real-time and modify exercises to accommodate different fitness levels with technology which can motivate students. Secondly, student-specific exercise plans – developed for each student based on their own fitness profile and needs – have become more common in today's sport instruction. These regimens teach students to own their own exercise plan, improving their natural motivation for exercise. Diversity in sport selections – including new, non-mainstream sports (yoga, ultimate frisbee, rock climbing) – gives students new and different interests and abilities that can fuel motivation by offering something new and interesting. And yet, these innovations don't always work in higher education [3]. Although some research shows that technology and personalised learning help students' learning, others mention technical challenges, lack of personalisation or student aversion to new activities. Research on the topic explains why we need to be sensitive to the situation, the students' needs and the teacher's abilities when introducing these innovative models of instruction in higher education.

## 2.3. Motivation and exercise for academic colleges higher education

Motivation and fitness in university are topics that have attracted a multitude of researchers. In general, they have observed that the more motivated students are when it comes to physical activity, the better their physical fitness levels are – greater strength, endurance and health. Motivation in physical education, however, isn't always internal – there can be external influences including peer pressure, social support and educational demands. Research before has also revealed that university exercise motivations can be complex and are subject to a combination of individual, social and environmental influences. For instance, intrinsically motivated students (those who prefer to move for the fun of it) perform better physically and will remain fit longer. Conversely, extrinsic motivation (working out to get a grade or be liked by others) can make one stay compliant in the short run but isn't necessarily conducive to long-term fitness gains [4]. Intriguingly, there's not been much written about the specific impact of curriculum reform on motivation and physical fitness at universities. Most have examined one-on-one or a generalisation between age cohorts, so there is still scope to explore the ways in which changes to the sporting curriculum (such as more diverse sports, using technology, or giving students more agency to select activities) can be profoundly beneficial to student motivation and fitness.

These are research gaps that this study will fill in by examining how a new sports curriculum can improve physical activity and motivation of college students and help to contribute to the nascent debate in higher education and sport education.

## 3. Methodology

### 3.1. Research design

The new sports curriculum was assessed comprehensively using a mixed method to explore the influence of the new sports curriculum on student motivation and fitness. It blended quantitative and qualitative approaches to deliver quantifiable results and insights into students' experience. The quantitative portion included a pre-test/post-test experimental approach to measure changes in physical fitness and motivation prior to and after the curriculum [5]. Physical fitness was tracked via objective performance testing and motivation using validated psychometric scales. The qualitative component was intended to capture the participants' own subjective experiences and insights. This was done using semi-structured interviews and open-ended questions in the post-intervention questionnaire, and provides deeper context on students' ways of interacting with and navigating the curriculum. These methods, together, made it possible to understand the curriculum's impact in all its ramifications, allowing for triangulation of data to confirm conclusions and make results more robust. It was done during the entire semester, to ensure that fitness or motivational improvements were due to the curriculum intervention rather than to anything else. In addition, random sampling of participants was applied to different academic disciplines to provide sample representativeness and generalisability of findings [6].

### 3.2. Participants

The experiment included 200 undergraduate students at a large university, recruited by stratified random selection to achieve diversity in gender, academic field and fitness. The participants were randomized into an experimental group (the new curriculum) and a control group (the old curriculum). Each group had 100 students, roughly evenly distributed. These students, spanning science, the humanities and business, were drawn from different academic backgrounds to determine if the curriculum had an impact on each area. The study's participants ranged from 18 to 24 years of age, making it a fairly traditional undergraduate study. They obtained written informed consent from all subjects and obtained ethical approval from the university's IRB. Participants' identities and privacy were kept confidential throughout the study [7]. Additionally, baseline factors, including prior physical activity levels, fitness levels and motivational preferences, were recorded to ensure comparable outcomes between the experimental and control groups prior to intervention.

### 3.3. Data collection tools

Data collection tools to measure the efficacy of the new sports curriculum, which included objective fitness testing, motivational surveys and qualitative feedback to give a comprehensive view of the intervention, were all used. Fitness was assessed using standardised tests – VO2 max, flexibility, muscle power and endurance. VO2 max was used for aerobic fitness and sit-and-reach tests for flexibility. Then there were hand-grip dynamometers for upper-body strength and one-minute push-up and sit-up tests for muscular endurance. These physical fitness tests were performed in controlled settings by professionals before and after the curriculum intervention to guarantee consistency and reliability of outcome [8]. Motivation was measured with a validated Likert-scale survey from Self-Determination Theory and included intrinsic, extrinsic and amotivation motivation. This survey had twenty items scored out of five, with a higher score signalling more motivation. The survey showed the effect of the curriculum on attitudes towards physical education: enjoyment, interest, external incentives, etc. For a further assessment of engagement, another bespoke survey was constructed to ask students about the relevance of the curriculum, how much they enjoyed the exercises, and the challenges. These were all instruments providing a full picture of the inspirational power of the new curriculum. In addition to the quantitative findings, qualitative research was used to gather the participants' subjective perceptions. Semi-structured interviews were conducted with a group of twenty students from the experimental group, randomly chosen for perspective variation. In these interviews, we talked about whether the curriculum was a benefit to students, what students struggled with, and what could be done better [9]. And then open-ended results from the post-intervention questionnaire were screened to highlight themes and give the research even more depth. Last, experimental group students were handed wearable fitness trackers like Fitbits, and given a way to track how active they were throughout the semester.

## 4. Results

### 4.1. Motivation Outcomes

From the survey data, we found a clear increase in student motivation after the innovative sports curriculum. Compared with baseline, students in the experimental group showed greater interest and participation in physical education. The mean motivation on the Likert-scale questionnaire rose from 3.2 (pre-test) to 4.5 (post-test), suggesting a substantial increase in intrinsic motivation.

Students mentioned that incorporating variety of activities and technology helped to make physical education sessions more fun and meaningful. Table 1 shows that 85% of students in the experimental group assessed their motivation as "high" or "very high" after intervention compared with only 40% of students in the control group. This indicates that the curriculum-based teaching strategies (including technology and individualized activities) successfully enhanced students' motivation to engage in physical education.

**Table 1.** Motivation scores pre- and post-intervention

| Group | Pre-Intervention Motivation (Mean) | Post-Intervention Motivation (Mean) | Percentage Reporting High Motivation Post-Intervention |
|---|---|---|---|
| Experimental Group | 3.2 | 4.5 | 85% |
| Control Group | 3.1 | 3.3 | 40% |

### 4.2. Physical fitness improvements

The pre- and post-curriculum fitness measures showed significant changes in physical health indicators in students in the experimental group. There were significant improvements on the VO2 max, flexibility and muscular strength measures. The mean VO2 max, for instance, increased from 32.5 ml/kg/min (pre-test) to 38.7 ml/kg/min (post-test), suggesting higher aerobic capacity. Likewise, flexibility, as measured by the sit-and-reach test, rose from an average of 18.2 cm to 24.6 cm. Strength tests, such as the one-minute push-up test, also showed a boost, from 22 average push-ups to 30 average push-ups. By contrast, the control group performed little or none of these improvements, as illustrated in Table 2 [10]. The results shown in Table 2 also demonstrate that the new curriculum has improved students' aerobic, flexibility, and muscular fitness. These findings support the benefits of including novel and interactive exercises in improving physical fitness.

**Table 2.** Physical fitness improvements pre- and post-intervention

| Metric | Experimental Group (Pre-Test) | Experimental Group (Post-Test) | Control Group (Pre-Test) | Control Group (Post-Test) |
|---|---|---|---|---|
| VO2 Max (ml/kg/min) | 32.5 | 38.7 | 32.8 | 33.2 |
| Flexibility (cm) | 18.2 | 24.6 | 18.5 | 18.9 |
| Push-Ups (1 Minute) | 22 | 30 | 21 | 22 |

### 4.3. Gender and discipline variations

When the impact of the curriculum was further investigated, it became clear that it differed by gender and academic discipline. Male students exhibited greater increases in fitness, particularly strength-training exercises (average up 10 push-ups, compared to 6 push-ups more among female students). Yet women students showed the highest improvements in flexibility: on average, students gained 7.8 cm in the sit-and-reach test, compared with 5.4 cm for men. Similarly, there were differences across disciplines. College students in high-stress streams like sports science or engineering showed stronger gains in fitness and motivation. For instance, the VO2 max increase for students of sports science averaged 8.5 ml/kg/min compared with 5.2 ml/kg/min for non-physical students of business or humanities. That indicates that pre-exposure physical fitness and experience with exercise may have shaped the results. This showed that although the new curriculum benefited everyone, it was dependent on individual and social characteristics, including gender and education. This research might later be used to identify ways to tailor the curriculum to specific demographic groups to achieve the maximum benefit.

## 5. Conclusion

This research points to the transformational potential of creative sports courses to boost student motivation and physical fitness in higher education. These findings suggest that combining different activities, technology and personalised training can make a big difference to intrinsic motivation and physical health. The experimental group had significant improvements in motivation (after the intervention their score increased to 4.5 from 3.2) and fitness measurements including VO2 max, flexibility and muscular endurance. Analysis by gender and academic subject also found that the effectiveness of the curriculum was influenced by individuals and their environment, and programs should be designed for different student groups. These findings highlight the importance of university shifts away from rote physical education models, and into modern methods that meet the needs of

students. Bringing psychological motivators (autonomies, competence, relatedness, etc) into play, as well as self-efficacy (goals-setting and tracking), can motivate individuals to continue exercising over time. Future studies would need to investigate how such programmes work across time and include other demographic and environmental factors to maximise the impact. Overall, this research gives universities a good starting point to redesign physical education programmes to attract healthier and more engaged student bodies.

## References


[1] Welch, R., Alfrey, L., & Harris, A. (2021). Creativity in Australian health and physical education curriculum and pedagogy. *Sport, Education and Society, 26*(5), 471-485.

[2] O'Connor, J., & Penney, D. (2021). Informal sport and curriculum futures: An investigation of the knowledge, skills, and understandings for participation and the possibilities for physical education. *European Physical Education Review, 27*(1), 3-26.

[3] Kryshtanovych, S., et al. (2021). Study of the experience of the formation of professional competence in future managers of physical education and sports. *Revista Romaneasca Pentru Educatie Multidimensionala, 13*(1Sup1), 162-176.

[4] Büning, C., Jürgens, L., & Lausberg, H. (2021). Divergent learning experiences in sports enhance cognitive executive functions and creativity in students. *Physical Education and Sport Pedagogy, 26*(4), 402-416.

[5] Gong, X. (2024). A study on talent cultivation strategies for film and television photography and production professionals oriented to sports specialty students in an interdisciplinary context. *Higher Education and Practice, 1*(3), 69-73.

[6] Guidotti, F., et al. (2023). Relevant sport management knowledge, competencies, and skills: An umbrella review. *Sustainability, 15*(12), 9515.

[7] Pill, S., et al. (2022). Conceptualising games and sport teaching in physical education as a culturally responsive curriculum and pedagogy. *Sport, Education and Society, 27*(9), 1005-1019.

[8] Wanless, L. A., & Naraine, M. (2021). Sport analytics education for future executives, managers, and nontechnical personnel. *Sport Management Education Journal, 15*(1), 34-40.

[9] Komatsu, M., Matsumoto, T., & Prowant, C. (2021). Learning through esports in innovation practice on electrical technology. *Procedia Computer Science, 192*, 2550-2557.

[10] Anderson-Butcher, D., & Bates, S. (2021). Social work and youth sport. *Child and Adolescent Social Work Journal, 38*(4), 359-365.