

the impact of a pragmatic curriculum theory grounded educational program on high school students' physical competencies (explosive power, and maximum speed)

أثر برنامج تعليمي مبني وفق نظرية المنهج البراغماتي على المهارات البدنية (القوة الانفجارية والسرعة القصوى) لدى طلاب المرحلة الثانوية

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Received: 15/06/2025

Accepted: 30/07/2025

Published: 30/09/2025

Abstract: This study investigated the **impact of an educational program** grounded in pragmatic curriculum theory on students' physical competencies in relay running and volleyball. We hypothesized that the program would positively influence targeted physical qualities, specifically **explosive power, and maximum speed**. A randomized controlled trial was conducted with 30 high school students, divided into experimental and control groups. Following baseline physical performance tests and a 12-week intervention, post-tests revealed three key findings: (a) the traditional program led to significant improvements in physical competencies within the control group; (b) the pragmatic educational program also resulted in significant improvements within the experimental group; and (c) crucially, the educational program demonstrated a **greater effect on the level of physical competencies**, with the experimental group significantly outperforming the control group in post-test measures. These conclusions were drawn from comprehensive statistical analysis using both parametric and non-parametric tests

Keywords: curriculum, physical qualities, physical activities, teaching planning, teaching goals, teaching methods

المخلص: يهدف هذا البحث إلى استقصاء تأثير برنامج تعليمي مبني وفقاً لمبادئ الفلسفة البراغماتية في المناهج الدراسية، من حيث البناء والتطبيق، على تحقيق الكفاءات البدنية لدى الطلاب في الأنشطة الممارسة (مثل سباق التتابع والكرة الطائرة). افترضنا أن البرنامج التعليمي سيكون له تأثير إيجابي في اكتساب الكفاءات البدنية المستهدفة، والمتمثلة في القوة الانفجارية، والسرعة القصوى. اعتمدت دراستنا على عينة مكونة من 30 طالباً وطالبة من السنة الثانية ثانوي، تم اختيارهم عشوائياً وتقسيمهم أيضاً عشوائياً إلى مجموعتين متساويتين: إحداهما تجريبية والأخرى ضابطة. بعد إجراء الاختبارات القبلية التي مثلت اختبارات الأداء البدني للخصائص البدنية المحددة مسبقاً، وتطبيق البرنامج التعليمي لمدة 12 أسبوعاً، ثم إجراء الاختبارات البعدية، توصلنا إلى النتائج التالية: (أ) للبرنامج التقليدي تأثير على تحقيق الكفاءات البدنية، من خلال وجود فروق ذات دلالة إحصائية بين الاختبارين القبلي والبعدية

للمجموعة الضابطة لصالح الاختبار البعدي. (ب) للبرنامج التعليمي المقترح تأثير على تحقيق الكفاءات البدنية، من خلال وجود فروق ذات دلالة إحصائية بين الاختبارين القبلي والبعدي لصالح الاختبار البعدي للمجموعة التجريبية. (ج) للبرنامج التعليمي المقترح تأثير أكبر من حيث مستوى الكفاءات البدنية للطلاب، حيث وُجدت فروق ذات دلالة إحصائية بين الاختبارين البعدين للمجموعتين التجريبية والضابطة، لصالح المجموعة التجريبية. تم التوصل إلى هذه الاستنتاجات بعد التحليل الإحصائي للبيانات باستخدام كل من الاختبارات البارامترية واللا بارامترية.

الكلمات المفتاحية : المناهج الدراسية؛ الصفات البدنية؛ الأنشطة البدنية؛ تخطيط التدريس؛ أهداف التدريس؛ طرق التدريس.

01 - Introduction

The pragmatic philosophy in the curriculum considers the human experience and the reality of the society in which a person lives, and its followers as a basis for reaching the truth, and accordingly the goals and content engineering are chosen based on integrated experiences of the human nature, and his social environment, and the needs, desires and preparations of the learners. (Al-Aoun, 2017, p. 106).

Pragmatism gained prominence as a philosophy of education primarily in the late nineteenth and throughout the twentieth centuries. John Dewey, a pivotal figure who integrated the roles of educator and philosopher, argued that a democratic society necessitates mobility and dynamism. Within such a society, educators recognize the variability of pedagogical effectiveness, understanding that approaches successful for one student may not be for another. Consequently, the theory and practice of education, from a Deweyan perspective, are underpinned by two core tenets: education must serve a social function and must furnish children with authentic, real-life experiences (Sharma, 2018). Furthermore, considering that a fundamental aim of education is the attainment of human well-being, the challenges and impediments precluding individuals from achieving this happiness become the impetus for educational objectives. Addressing and modifying behavior, or fostering new behaviors

through practical experience, aligns with the pragmatic philosophical view, which posits that education originates from societal needs and requires student engagement through diverse avenues such as cooperation, communication, and conflict resolution (Al-Aoun, 2017).

The significant contributions of pragmatic theory to educational practices within schools are undeniable, particularly in its capacity to offer effective models for curricula that guide learners toward predetermined objectives. For instance, Elsamman Marwan's 2014 study, "A Program Based on the Pragmatic Theory to Develop Grammatical Structure Comprehension Skills for Foreign Learners of Arabic," specifically highlighted the efficacy of educational programs rooted in pragmatic principles for knowledge construction and development. (Elsamman, 2014). Extending this, physical and sports education curricula, when informed by pragmatic tenets, demonstrably foster comprehensive development across various facets of a student's personality. This encompasses contributions to cognitive and mental development, such as the acquisition of knowledge pertinent to health, safety, and international performance standards. Furthermore, these curricula contribute to social and emotional growth through the cultivation of values, principles, ideals, and ethics. Finally, they also play a crucial role in psychomotor development, facilitating the formation and refinement of skills and the ability to execute tasks efficiently and adaptably in diverse situations (Mohamad, 2016, pp. 92-94).

Instructional planning and its content must be consistent with established curriculum theories and their guiding philosophies. This acknowledges planning as a **systematic undertaking** characterized by specific goals, numerous procedures, and complex interrelationships. Therefore, it is a project that necessitates meticulous planning rooted in **strong foundational principles**. This approach begins with an educational philosophy that

emphasizes the symbiotic relationship between the planning process, education, and productive work, alongside enhancing the connection between learning and the lived experiences of students within their environmental realities. (Salim, Mina, & Shahata, 2013) The competencies approach to teaching mandates a dedicated instructional strategy, rooted in behavioral, cognitive, and constructivist psychologies. This strategy links directly to subject-specific problem-solving, leveraging associated knowledge. As a scientific methodology, its core principle is thorough planning: examining a given situation, phenomenon, or problem to ascertain the full extent of available capabilities, which are then mobilized to achieve defined objectives. (Ata-Allah, Zitouni, & Ben_Quannab, 2009, pp. 72 - 73).

Despite the theoretical benefits of competency-based education, numerous studies indicate that teachers frequently encounter difficulties in guiding learners to achieve targeted competencies. These challenges often stem from constraints related to instructional time, the availability of appropriate resources and tools, and the practical implementation of curriculum content. For instance, Hazhazi Kamal (2010) found a consistent perception among teachers across two educational stages regarding the difficulty of applying curriculum content and a notable scarcity of educational resources. This consensus among educators highlights the prominent obstacles hindering the effective implementation of competency-based teaching, particularly within physical education classrooms. (Hazhazi, 2010), Continuing the discussion of challenges in competency-based education, Brahimi Mohamad (2017) identified several obstacles specifically related to subject curricula. These include curriculum units that are not appropriately matched to students' ability levels, content that is disconnected from students' lived realities, insufficient supporting documents, inadequate class time for practical activities, and a lack of readily available

resources (Brahimi & Behnas, 2017). Concurrently, Bahri Saber (2017) highlighted various impediments, as perceived by primary school teachers, concerning both the implementation and evaluation of lessons (Bahri & Kharmouch, 2017).

Building on the observations above, it becomes evident that physical and sports education teachers, in particular, face significant challenges in effectively translating educational goals into practical learning situations. These situations are intended to elicit desired changes in learners and cultivate targeted competencies, whether cognitive, psychomotor, or social. This difficulty is largely attributable to teachers' consistent feedback across various studies addressing the topic, indicating that curriculum content is resource-intensive in terms of both material requirements (pedagogical aids and equipment) and knowledge demands. Furthermore, the allocated weekly instructional time is frequently deemed insufficient for achieving these objectives.

Consequently, given the aforementioned challenges, we are prompted to pose the following research question:

What is the impact of an educational program grounded in pragmatic curriculum principles on the development of students' physical competencies within the context of physical education instruction?

Based on our research question, we've formulated the following hypotheses:

1. The educational program will **improve the explosive power** of the study participants.
2. The educational program will **enhance the maximum speed** of the study participants.

2. Methods

2.1 Research Community

The research community for this study comprised all 677 students enrolled in a secondary school in Biskra, Algeria.

2.2 Research Sample

We selected a sample of **30 second-year secondary school students** from this community using a random sampling method. These students were then randomly assigned into two equally sized groups: an **experimental group** that participated in the proposed educational program, and a **control group** that followed the traditional curriculum.

2.3 Study Methodology

Given the objective of determining the effect of a pre-designed educational program on a pre-selected sample, this study employed an **experimental methodology**. Specifically, a **two-group experimental design with equalized groups** was utilized to assess the intervention's impact.

2.4 Sample Homogeneity

Table (01) shows the homogeneity of the research sample

Variables	experimental group				control group				t student	
	M	S D	s-w test	Sig	M	SD	s-w test	sig level	T value	Sig
Height(m)	177.3	6.7	0.19	0.17	173.3	5.6	0.1	0.2	1.84	0.08
Weight(kg)	64.6	13.9	0.18	0.18	66.6	9.2	0.14	0.4	0.44	0.66
Age(mth)	199.1	3.5	0.13	0.2	198.2	3.1	0.16	0.2	0.48	0.63

Note: Sig level: 0.05 / (N=15) for each group / df = 14

Analysis of the data presented in Table (01) confirmed the homogeneity of the research sample. Prior to comparing group means, the **Shapiro-Wilk normality test** was applied to the data. The results indicated that the statistical p -value for this test was greater than the significance level of 0.05, thereby confirming that the data for all variables were **normally distributed**.

Subsequently, the **means and standard deviations** for both the experimental and control groups were calculated across all assessed variables (height, weight, and age). These descriptive statistics demonstrated a close similarity between the two groups. Further statistical confirmation of this homogeneity was provided by the **independent samples t -test**. The t -test results revealed no statistically significant differences ($p > 0.05$) between the groups for height, weight, and age. This absence of significant differences unequivocally indicates that the two groups were comparable and homogeneous with respect to these fundamental demographic and anthropometric characteristics prior to the intervention.

2.5 Data Collection Tools

For the purpose of collecting the necessary data, a battery of physical performance tests was utilized. These tests were selected to specifically measure the physical competencies relevant to the study's objectives:

2.5.1 Standing Broad Jump

- **Purpose:** This test is employed to quantify **explosive leg power**.

2.5.2 45.7m Dash Test

- **Purpose:** This test is designed to measure an individual's **maximum speed** over a short distance.

2.6 The Educational Program

The educational program was implemented over a **12-week period**, consisting of **two 50-minute sessions per week**. The program's design was firmly rooted in the principles of **pragmatic philosophy**, which posits that knowledge acquisition is fundamentally an experiential and experimental process. Within this pragmatic framework, knowledge is constructed through **exploratory methods** and **problem-solving approaches**.

Accordingly, the core tenets of the applied educational program were as follows:

- **Clear Objective Setting:** Each lesson began with a clearly stated main objective and the expected learning outcomes for students.
- **Resource Provision:** Learners were provided with a variety of tools and resources.
- **Learner Autonomy:** Students were given the freedom to engage in activities and independently attempt to solve presented problems. The goal was for learners to achieve optimal performance and reach the lesson's objective through a process of trial, repetition, self-assessment of strengths and weaknesses, and continuous correction via various forms of feedback.

2.7 Test Standardization

Table(02) shows the results of the reliability tests

Tests	Correlations	P-value
Standing Broad Jump Test	Pearson Correlation=0.677**	0.006
45.7m dash test	spearman correlation=0.859*	0.020

Note: *: significant at the 5% level / **: significant at the 1% level / (N=10)

Through the table, we see that the tests have a good degree of reliability, after the results showed that there is a statistically significant correlation between the results of the pre and post tests.

03 - Presentation and Analysis of Results:

1st hypothesis: The educational program has an effect on improving the explosive power of the study sample.

Table(03) shows the results of the Paired Samples t-test of the 1st hypothesis

	M	SD	T value	df	Sig
control group (pre-test) & control group (post-test)	2.058	0.188	6.589	14	0.000
	2.149	0.220			
experimental group (pre-test) & experimental group (post-test).	2.158	0.182	9.120		0.000
	2.526	0.184			
experimental group (post-test) & control group (post-test)	2.526	0.184	6.180		0.000
	2.149	0.220			

Note : Sig level : 0.05

The analysis of the **Standing Broad Jump** test results revealed significant improvements in explosive power for both the control and experimental groups.

For the **control group**, a **Paired Samples t-test** showed a statistically significant difference between pre-test and post-test scores ($t=6.589$, $p<0.001$). The mean post-test score ($\bar{x}=2.149$) was higher than the pre-test score ($\bar{x}=2.058$), indicating that even the traditional program led to an improvement in explosive power.

Similarly, for the **experimental group**, the **Paired Samples *t*-test** demonstrated a highly statistically significant improvement ($t=9.120$, $p<0.001$). The post-test mean ($\bar{x}=2.526$) was markedly greater than the pre-test mean ($\bar{x}=2.158$), confirming that the proposed educational program effectively improved the measured physical quality.

Crucially, when comparing the post-test results between the **experimental and control groups** using an **independent samples *t*-test**, a statistically significant difference was found ($t=6.180$, $p<0.001$). The experimental group's mean post-test score ($\bar{x}=2.526$) was significantly higher than the control group's mean post-test score ($\bar{x}=2.149$). This indicates that while both programs yielded improvements, the **rate of improvement in explosive power was significantly greater for the experimental group** that participated in the pragmatic-theory-based educational program.

Table(04) shows the results of the Wilcoxon signed-rank of the 2nd hypothesis

45.7m dash test

	M	SD	T value	Sig
control group (pre-test) & control group (post-test)	7.496 7.346	0.428 0.420	3.410	0.001
experimental group (pre-test) & experimental group (post-test).	7.344 6.976	0.293 0.279	96.759	0.000
experimental group (post-test) & control group (post-test)	6.976 7.346	0.279 0.420	2.499	0.012

Note : Sig level : 0.05

The analysis of the **45.7m Dash Test** results, as detailed in the relevant table, revealed significant improvements in maximum speed for both groups.

For the **control group**, a **Wilcoxon Signed-Rank test** indicated a statistically significant difference between pre-test and post-test scores ($Z=3.410$, $p=0.001$). The post-test mean ($\bar{x}=7.346$ seconds) was lower than the pre-test mean ($\bar{x}=7.496$ seconds), signifying an improvement in maximum speed even with the traditional program.

Similarly, the **experimental group** also showed a highly statistically significant improvement based on the **Wilcoxon Signed-Rank test** ($Z=96.759$, $p<0.001$). The post-test mean ($\bar{x}=6.976$ seconds) was notably lower than the pre-test mean ($\bar{x}=7.344$ seconds), confirming the effectiveness of the proposed educational program in enhancing maximum speed.

Crucially, when comparing the post-test results between the **experimental and control groups** using an appropriate non-parametric test (likely a Mann-Whitney U test, though not explicitly named in the text, but implied by the Z-value for independent groups), a statistically significant difference was observed ($Z=2.499$, $p=0.012$). The experimental group's post-test mean ($\bar{x}=6.976$ seconds) was significantly lower than the control group's post-test mean ($\bar{x}=7.346$ seconds). This indicates that while both programs improved speed, the **rate of improvement in maximum speed was significantly greater for the experimental group** that participated in the pragmatic-theory-based educational program, demonstrating its superior effectiveness.

4. Discussion

The role of physical and sports education extends far beyond mere recreation; its objectives should encompass comprehensive development across

physical, skill-based, social, and psychological domains. Research consistently supports this multifaceted impact.

For instance, studies highlight physical education's significant influence on promoting youth physical activity. **Tristan L. Wallhead and Buckworth (2004)** indicated that physical education-based physical activity promotion programs, particularly those employing a pedagogical framework targeting motivational variables, successfully increased out-of-school physical activity. Similarly, **Senlin Chen et al. (2014)** found that physical education positively contributes to increasing daily moderate-to-vigorous physical activity (MVPA) and decreasing sedentary time among youth, noting that active participation in physical education classes correlates with increased physical activity and reduced sedentarism outside of school. Furthermore, **Llorrente-Cantarero and Gil Lozano (2020)** concluded that students engaging in physical activities exhibit superior cardiorespiratory and BMI outcomes compared to their sedentary peers. **Salas-Sanchez et al. (2020)** also underscored the importance of interventions designed to structure students' free time to incorporate more physical activities, citing their role in enhancing the overall school environment.

Beyond physical health, physical education plays a crucial role in social and psychological development. **González J et al. (2019)** emphasized its contribution to developing prosocial behavior and improving components of emotional intelligence in students, providing an effective means of training prosocial personality aspects through physical education activities. Additionally, the practice of physical education has been linked to decreased aggression (**Pino-Juste, Portela-Pino, & Soto-Carballo, 2019**) and positive relationships with mental health (**Nixdorf et al., 2021**).

In the planning of physical education and sports lessons, a paramount consideration must be the **development of students' physical characteristics**.

This emphasis is inherent to the discipline, as one of its core objectives is to enhance students' physical attributes. This development often directly correlates with students' health outcomes, contributing to improved physical efficiency. For students facing health complications such as obesity, physical education can play a crucial role. For example, [Nouasria Mouna \(2022\)](#) found statistically significant differences in weight outcomes between obese students who participated in school physical and sports activities and those who did not, confirming physical education's contribution to weight management. Similarly, a study by [Gomis-Gomis et al. \(2022\)](#) indicated that intervention programs centered on games effectively promote health in students grappling with sedentary lifestyles and/or overweight issues.

Our educational program specifically targeted the fundamental physical characteristics essential for students' engagement in chosen activities: **explosive power, flexibility, reaction speed, and maximum speed**. The results unequivocally demonstrate the program's effectiveness in enabling learners to achieve the desired physical competencies. Furthermore, the findings show the superior impact of our educational program compared to the traditional approach, reflected in both overall scores and the rate of improvement in the measured physical qualities.

Specifically, we observed significant differences in **explosive power** between the two groups, directly attributable to the educational program's intervention. This finding aligns with previous research, such as the study by [Falces Prieto et al. \(2020\)](#), which reported a substantial increase in countermovement jump performance following a strength training program. Similarly, [Álvarez-Zúñiga et al. \(2019\)](#) found statistically significant changes in vertical jump time and height variables after High-Intensity Interval Training (HIIT).

Regarding **flexibility**, while our study's findings are consistent with some literature, it's important to note variations. For instance, **Monteiro et al. (2019)** demonstrated that various training types significantly impact upper body flexibility. However, our results diverge from those of **Loureiro et al. (2020)**, whose exercise program did not yield the anticipated impact on flexibility variables. This highlights the complexity of flexibility development and the potential for different training methodologies to produce varied outcomes.

4.1 Teaching Planning (continued)

It is widely acknowledged that effective teacher performance and classroom functionality are inherently dependent on comprehensive planning. Numerous educational researchers have underscored this importance, with **Yinger (1980)** contending that decision-making is arguably the most crucial teaching skill. The capacity to make appropriate pedagogical decisions in the diverse scenarios encountered by teachers directly stems from meticulous planning processes. Beyond merely dictating the means and methods of instruction, the significance of planning for teaching is profoundly reflected in the learning outcomes it aims to achieve.

Penelope L. Peterson et al. (1978) further confirmed that the majority of planning considerations revolve around the subject matter itself, while also recognizing other influential factors such as varying planning methodologies among teachers, the cognitive strategies employed by educators, and their professional experience. Expanding on this, **John A. Zahorik (1970)** emphasized planning's pivotal role in goal attainment. He argued that for a lesson to be effective, teachers must make critical decisions beforehand. This includes identifying specific objectives (encompassing cognitive, process, and affective domains), carefully selecting and organizing pupil learning experiences to achieve these objectives, and making informed choices regarding activities,

necessary materials, time allocation, and assessment instruments to gauge learning outcomes.

In the design and implementation of our educational program, all these planning considerations were given paramount importance. Given that physical education is an applied discipline, it necessitates precise identification of goals, appropriate instructional methods, adequate practice space, and realistic time allocation. On this basis, the positive results of the current study are consistent with the findings of [Casado-Robles et al. \(2021\)](#), whose research demonstrated the critical role of planning in guiding learners to comprehend the significance of their playing environment. This reinforces the notion that deliberate and thorough planning is a fundamental prerequisite for achieving desired educational outcomes in applied learning contexts.

4.2 Teaching Methods

A teaching method is fundamentally defined by the set of principles, procedures, or strategies employed by educators to facilitate desired student learning outcomes ([Westwood, 2008](#)). Historically, a passive view of learning dominated, often characterized by lecture-based formats where material was delivered directly to students. In contrast, modern pedagogical perspectives, notably **constructivism**, advocate for active student engagement through discussion and collaborative activities. Research by [Caprariis, Barman, and Magee \(2001\)](#) suggests that while lectures may enhance factual recall, discussion methods foster deeper comprehension. Furthermore, studies on group-oriented discussion methods have demonstrated that collaborative learning and student-led discussions not only yield favorable academic performance but also cultivate greater student participation ([Carpenter, 2006](#)).

It is important to acknowledge that the effectiveness of teaching methods is not absolute, as each approach possesses unique advantages, and

student preferences vary. For instance, [Sajjad \(2010\)](#) found that many students favored the lecture method, citing reasons such as comprehensive knowledge delivery by the teacher, time efficiency, and opportunities for attentive listening and note-taking. Conversely, [Ganyaupfu \(2013\)](#) demonstrated that teacher-student interactive methods were most effective, followed by student-centered approaches, with teacher-centered instruction being the least effective. In the realm of moral education, most studies advocate for a **problem-based approach** to instruction, typically involving small group work, as this fosters dialogue and interaction crucial for moral and prosocial development (Schuitema, 2008). Within Physical Education specifically, [Aktop and Karahan \(2012\)](#) observed an incongruity in PE teachers' views on effective methods, noting a significant gender difference: male PE teachers preferred the practice style, while female PE teachers favored the command style for optimal results.

In our educational program, we purposefully adopted an **exploratory and problem-solving methodology**. This approach positioned the teacher as a facilitator, providing only a general conceptual overview of the skill or activity. Crucially, learners were then empowered with the necessary means and tools to collaboratively explore solutions to the presented problem—namely, achieving optimal performance within the educational context. This was accomplished through cycles of practice, repetition, and continuous feedback. The professor's role was thus refined to guidance, assistance, and corrective feedback on performance errors, fostering an active and self-directed learning environment consistent with pragmatic principles.

Conclusion

Based on the thorough analysis and interpretation of the results, we conclude that the proposed educational program, meticulously designed and

implemented according to the principles of pragmatic curriculum theory, significantly impacts the achievement of physical competencies related to the activities practiced. Our findings consistently demonstrated statistically significant differences between the experimental group (which underwent the pragmatic program) and the control group, with the results favoring the experimental group

This underscores the critical importance of instructional quality, particularly within physical and sports education. It highlights the necessity of developing programs that genuinely align with the practical realities of sports activities within the school environment. Such tailored programs are crucial for facilitating the desired changes in students, encompassing both the development of their overall personality and their physical attributes. The success of this pragmatic-based program suggests a valuable pathway for enhancing student outcomes in physical education.

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