

Full Length Research Paper

The necessity for note-taking during teaching-learning process in Sports and Physical Education

Carlos Emery Hyacinthe Atoun¹, Yaovi Olivier Audrey Attikleme¹, Basile Agbodjogbe¹, Wilson Dossou¹, Kossivi Attiklemé¹ and Georges Kpazai^{2*}

¹National Institute of Physical Education and Sports University of Abomey-Calavi, Porto-Novo, Bénin.

²School of Kinesiology and Health Sciences, Laurentian University, Sudbury, Ontario, P3E 2C6 Canada.

Received 15 May, 2024; Accepted 24 June, 2024.

Sports and Physical Education (SPE), like any other discipline, contributes to students' education. These students, for a good acquisition of teaching content, should be invited to take notes of the theoretical and technological knowledge conveyed by Physical and Sport Activities (PSA), subject of teaching. This quantitative and qualitative study aims to identify the usefulness of the implementation of theoretical knowledge and note-taking of the information taught in the training of students in Physical Education classes at the secondary school level. To achieve this objective, certain key concepts from *The Anthropological Theory of Didactics* by Chevallard were employed. In accordance with this theoretical framework, a methodological approach was adopted that focuses on administering questionnaires to students in the second cycle. These students meet the criterion of regular attendance at physical education courses in two secondary colleges. This approach includes recording three sessions of physical education courses and conducting interviews with each teacher at the course's conclusion. The results indicated that the students do not have a favorable relationship with the theoretical knowledge transmitted in PE during the practice of the different Physical and Sports Activities (PSA). This is due to the fact that the teacher does not focus the student's attention on what he or she has really learned and what he must retain in order to facilitate the practice of the different Physical and Sports Activities. To summarize, the essential finding derived from this study was that students in PE would greatly benefit from an introduction of theoretical courses combined with written documentation of the pedagogical information provided. The integration of both elements could foster the development of citizens who are proficient both physically and intellectually.

Key words: Physical and sports activities, physical education practice, note-taking, theoretical knowledge.

INTRODUCTION

Physical Education (PE) is a teaching discipline which suggests knowledge acquisition and construction allowing physical life organization and management at all ages as well as access to cultural area that constitutes sport practice by promoting organic and land

maintenance and development (Lamotte, 2005). It allows everyone to improve their possibilities of motor adaptation, action and reaction to their physical and human environment. It provides physical and mental health to the child, offers them (gender-neutral term)

*Corresponding author. E-mail: gkpazai@laurentian.ca. Tel: 1-705 6751151.

Author(s) agree that this article remain permanently open access under the terms of the [Creative Commons Attribution License 4.0 International License](https://creativecommons.org/licenses/by/4.0/)

well-being and confidence for their total development. It also contributes to the intellectual, moral, and social formation of the child and encourages integration into the environment in which he or she lives. Recently in this sense, Munger and Johnson (2023) further emphasized that beyond the development of the student's psychomotor dimension, the physical education class must allow the development of the affective dimension and especially the cognitive dimension. To do this, physical education teachers must provide writing opportunities to students during the teaching-learning process. This is because "when physical educators don't do it, they might miss opportunities to help their students think critically about, evaluate, reflect on, and appreciate the psychomotor skills they are learning" (Munger and Johnson, 2023).

Through the practice of PSA at the school level, the teaching of PE guarantees all students a common cultural experience and since the 1970s, they have been at the heart of PE instruction (Pontais, 2015). Indeed, the skills acquired in physical education relate primarily to the development of motor skills, which refers to a practical execution of tasks which is underpinned by an oral theory. Just as there are principles in physics, theorems in mathematics, rules in French, and ways of thinking, PE entails knowledge, skills, theories, and technologies that are expressed in terms of principles, rules, relations, or operations. It is to spare us from such ignorance that Gréhaigine et al. (2017) raise the question of equal access for all to the fundamentals of school and sports culture. But why are the students unable to recount in a theoretical way what they have learned after the PE course sessions?

Admittedly, the aims and application of this discipline are practical. However, it is believed that additional theoretical clarification on the various PSA taught would also prove beneficial. Theory is considered absurd without practice, and blind practice without theoretical underpinnings, as articulated by Kant (1724-1804). This rationale has prompted consideration of introducing theoretical courses in EPS at the high school level, along with systematic note-taking of the transmitted information.

In general, this study aims to demonstrate that although physical education is a practical teaching discipline, it is based on notions or theoretical knowledge to achieve its objectives. Specifically, this study will allow us to identify the usefulness of the institutionalization of theoretical knowledge and the documenting of information during instruction of students in PE. The choice of this analysis model is linked to the fact that this theory makes it possible to highlight the teacher knowledge underlying teaching practices (Attiklémé et al., 2006) and to address the problem of the existence or non-existence of knowledge. It is a theory that results from the expansion of several concepts, including praxeology, which is the focus of this study. Its ambition is to account for the conditions of

existence of the didactic system, or the subsystems that make it up, by adapting an ecological problematic, inspired by the work of Goulart et al. (2021). The aim is to explain why such and such a system exists or does not exist, but also under what conditions it might exist, and thus to account for the environment in which it lives as the primary explanatory factor for its existence. Its object of study is didactics. Didactics is the manipulation of knowledge with didactic intent, in particular teaching. It is the set of human situations coextensive with the study and consubstantial with the didactic intention, those that a subject Y has to bring about or change the relationship of another subject X to an object O. These situations are commonly modelled in the form of a didactic system S (X, Y, O), where X is the student, Y the study aid or study director (teacher) and O the didactic issue (knowledge) (Goulart et al., 2021).

Sports and Physical Education, as a school discipline, relies on contributing sciences to optimize its didactic practice. The teaching and learning of physical and sporting activities thus necessitate theoretical insight, enabling students to interpret the technical gestures taught for effective practice. Practice represents the practical application, the action itself. It's true that in relating practice and theory, as proposed, the former is more familiar to teachers due to its direct relevance to their daily professional reality. Conversely, defining theory may initially appear challenging, as it involves "thinking instead of acting." However, such challenges are ultimately futile, as education fundamentally involves action.

As such, scientific and epistemological support in the sciences of education and training would make it possible to nourish praxeologies at the level of logos, not to replace existing professional knowledge, but to point out their origin (historical, scientific, epistemological, etc.), for example, and thus more solidly establish their reason for existence with a view to better relevance and effectiveness in practice. For the vast majority, the praxeological ingredients at the logos level identified in the field of education for sustainable development (ESD) are recurrent and common to other fields of practice, in particular those involving nature or the environment in the context of their educational implementation (Redondo, 2021). Although the primary objective of the Physical Education (PE) course is the learning of sports techniques and movements, the worrying physical condition of an ever-increasing number of students has however encouraged teachers to promote healthy physical activity and to educate children and young people in this direction. Improving well-being is one of the essential points of education. Too often, students are provided with little information regarding their position, performance, and progress. It has been noticed on several occasions that if the students take great pleasure in practicing a particular Physical and Sports Activities, therefore a displayed presence of the

practical- technical block linked to the knowledge done in return, they do not consider the PE as a discipline where they learn and where they progress (the technological-theoretical block is hidden). After the practical session of the PSA(s), the answers given to the questions asked by the teachers during the feedback and projection phase shows that the student is unaware of the notions concerning the PSA practiced. They have an unfavorable personal relationship with theoretical knowledge. Why are the students unable to verbally express what they have learned following physical education sessions?

It therefore seems useful to us to introduce theoretical courses in PE in secondary school, an ambition that the "School" institution must take into account in order to link know-how to knowledge. This is what drives us to this study, which will make it possible to understand or show the effectiveness of the transmission of theoretical knowledge and their note-taking on the training of learners in PE. The learner must be in contact with the sources of knowledge to build their knowledge as effectively as possible, by experimenting so that they can put them into practice later. The mission of the school is to provide society with individuals who have methodology and know-how, anchored in theoretical knowledge.

Would the introduction of theoretical courses or even the written recording of information taught in PE be an asset in the instruction of students? Learners have a weak relationship with the theoretical knowledge addressed during the practice of PSA. The introduction of theoretical courses or even the taking of notes of the material taught in PE could allow learners to really have a favorable relationship with the theoretical knowledge transmitted in PE in order to better approach practice.

To verify this hypothesis and conduct the study effectively, we have adopted a methodological approach that encompasses the study's subjects, data collection techniques and tools, survey procedures, and data processing methods.

METHODOLOGY

This qualitative study involved recording three PE sessions led by three teachers with varying levels of professional experience. Additionally, a questionnaire was administered to students in the 3rd, 5th, and lower sixth forms. The observed sessions focused on gymnastics instruction in their respective classes. The study aimed to analyze the correlation between the session objectives set by the teachers and the responses provided by students during the post-learning feedback and projection phase.

Subjects of the study

This study was conducted within a didactic framework that emphasizes three primary parameters: knowledge, students, and teachers. The target population included both teachers and learners, specifically:

1. Physical Education (PE) teachers with established personal and

professional experience to ensure effective knowledge transmission, as defined by Loizon and Carmus (2014), and Atoun et al. (2018). Three teachers were selected because they had: over 5 years of experience; were currently teaching gymnastics; and demonstrated acceptable course progress during the data collection period.

2. Students (both boys and girls) in the 3rd, 5th, and lower sixth forms of two different secondary schools (private and public), who actively participated during PE classes. These students were selected based on their existing experience in PE classes, which enabled them to provide insightful responses to the study's inquiries.

Data collection techniques and tools

Three investigation techniques were used: observation of the session, survey by questionnaire, and post-session interview.

Observation of sessions

This is an instrumented observation. It allowed us to film the didactic actions and the teacher's interventions to collect relevant information on the planned and performed actions as well as the knowledge learned from the students. As a result, the experimental protocol took into account the teacher's plan announced at the beginning of the session (introduction), the content actually taught in situ (production) and the feedback and projection provided at the end of the session in order to analyze the link between the objective of the session targeted by the teacher, information taught, and the answers given by the students to the various questions of the feedback and projection phase after learning. Since this is a case study, a total of three courses were filmed, that is to say only one per participant in the study.

Survey by questionnaire

The completion of the survey aimed to gather as accurate information as possible. The questionnaire provided us with an opportunity to reach a broad audience and compile a comprehensive database due to its diverse range of questions. For this survey, we approached students in the 3rd, 5th, and lower sixth forms who attended physical education classes, as they possessed the necessary experience in the discipline to address our inquiries. This approach helped us gain insights into the students' understanding concerning the integration of physical and sports activities, the content taught, and the importance of note-taking during physical education classes. In total, 150 students participated in the survey.

Post-session interview

This interview, intended only for the teachers, was carried out at the end of the session. It allowed us to determine if the teacher was satisfied with the answers of their pupils during the implementation of the feedback and projection in accordance with the knowledge taught. It is a question of analyzing the coherence of the answers obtained in connection with the content taught it having as its source the objective of the session announced in the introductory phase. It is therefore the moment to judge whether or not the initiative of taking notes by the learners of the knowledge taught is relevant. The post-session interview lasted between 2 and 5 min. A total of three interviews were conducted.

Table 1. Knowledge of PSA.

Answers	Effectiveness	Percentage
Yes	82	123
No	27	18
Total	150	100

Table 2. Justification of knowledge of PSA.

Number of PSA cited	Effectiveness	Percentage
1-3	18	12
4-5	101	67.33
More than 5 and for other class	31	20.66
Total	150	100

Investigative tools

The didactic actions and the interventions of the teacher, as well as the audiovisual recording of the post-session interviews, were filmed using a tablet camera. The questionnaire was sent to the students to obtain broader and more complete information.

Investigation procedure

The investigation procedure consisted of: seeking out PE teachers who were available to participate in this study and taking charge of at least one class among the three concerned (3rd, 5th, and lower sixth forms) for this study; obtaining the timetable of these teachers in order to know the days and times during which the classes were scheduled; examining their schedules to see the days when the sessions were scheduled; recording exchanges between teachers and students using a recorder; drawing up the questionnaire to be submitted to the pupils; and submitting the questionnaire to the students in order to collect the information sought.

Data processing

The analysis of the data collected proceeded in two stages:

1. The first stage involved transcribing the recorded sessions (results of the observations). This step focused on cross-referencing students' responses to the teaching practices of the three observed PE teachers, aiming to identify instances where theoretical concepts were applied.
2. The second stage entailed analyzing, coding, and statistically processing the questionnaire data using Excel software.

Following these steps, both qualitative and quantitative analyses were conducted, including frequency calculations based on the questionnaire responses. During this process, certain elements were identified that indicated students do not perceive a favorable relationship with the theoretical knowledge imparted to them in PE.

RESULTS

This part is devoted, on the one hand, to the presentation

of the results resulting from the field investigations and, on the other hand, to their analysis. The results of this analysis will be presented in the form of tables followed by an analysis of the data. This presentation will focus on the following main points: taking into account the Physical and Sports Activities taught; the nature of the information taught; and consideration of taking notes during PE.

Taking into account the PSA taught

Subjected to the questionnaire, these students expressed their knowledge on the PSA object of teaching in PE. Table 1 explains the students' answers. Table 1 presents the results from the question, "Do you know all the PSA that you have learned this year?" Table 1 shows that 123 pupils, that is to say 82% of the sample, answered YES and 18% responded NO. According to the analysis of the questionnaires after data collection, the negative response given by the 27 other students was justified with the statement, "I forgot". These results led us to say that the teachers therefore fulfilled their duties and spoke about the different PSA to the learners during the year. In order to be certain that the latter actually know the PSA practiced, they were asked to name the PSA they had to practice during the year. The results are summarized in the Table 2.

Table 2 presents the results regarding students' ability to cite APS (Action-oriented Pedagogical Situations) they have learned. It was found that 67% of the sample could cite between four and five APS, 12% cited between one and three APS, and surprisingly, 20.66% cited more than five APS. The significant number of students citing between four and five APS confirms that teachers did indeed cover APS in the classes selected for the research. However, the 20.66% who cited more than five APS raises questions about their actual understanding of the APS learned

Table 3. Learning situations title statement and grouping of PSA by SA.

Appreciation	Effectiveness	Percentage
Was able to give a title	9	6
Could not give a title	141	94
Total 1	150	100
Was able to put away	57	38
Could not put away	93	62
Total 2	150	150

throughout the school year. This discrepancy highlights a personal connection or link between these students and their grasp of the APS being taught. This report aims to ascertain whether students are knowledgeable about the categories or types of APS practiced. To explore this further, student were asked to provide the titles of the Learning Situations (LS) and classify APS by their respective Action Situations (SA).

Table 3 presents the figures collected following the request to give a title to the different learning situations and the request to group the PSA by SA which was sent to the students on the questionnaire. It appears from this Table 2 that only 6% of the sample was able to give a title to the SA and only 38% were able to rank the APS by AS. Based on these results, which indicated a high percentage of students unable to provide the titles of the learning situations and unable to categorize PSA by LS, it can be concluded that PE teachers did not adequately address this aspect in their course progressions. This lack of coverage left students unaware of essential information, contributing to their unfavorable relationship with PSA knowledge. Therefore, there is a clear need for theoretical input.

Similar to other teaching disciplines in schools, PE teachers should present a program or lesson plan. A lesson plan helps teachers understand learning objectives, student needs, and enables them to enhance their teaching practices. In PE, this planning work is typically facilitated by curriculum designers who provide guidance documents and programs. It is crucial for students to understand the yearly program, as this enables them to follow along with teachers and gain clarity on their progress throughout the year.

Nature of the knowledge taught

For this point, the sources of success for the realization of the PSA were asked. These are: exercises, tasks proposed by the teacher and techniques explained, theoretical or technological notions provided by the teacher. The analysis of the data collected led us to count 12 responses out of 150 questionnaires. The other 138

show "no idea" responses; "I don't know" or no response (Table 4). It emerges from the analysis of Table 4 that only a minority of the study sample was able to provide information in relation to a given PSA. This information is largely related to the phases or procedures and the instructions that the teacher gives for the practice of PSA. No response highlighted a technique apart from responses n° 2, 3 and 4, which could be assimilated to a technique for successful PSA when considering the definition of the technique according to Sigaut (2009) who says that "the technique is everyone of composition of elements of an activity of which one represents the effects". In essence, a technique represents my understanding of how to perform an action—it's not just knowledge but the method of execution itself. When discussing theoretical concepts, consider the response from student 5, who mentioned twisting and untwisting. Initially, it seemed the teacher had transmitted this notion. However, out of curiosity during data collection, we asked the student to explain these concepts further. Their response was, "I don't know, I just saw it on the board (teaching aid)." This indicates that no theoretical explanations were provided.

Based on these observations and the number of students unable to respond adequately, it can be inferred that while teachers transmit knowledge through APS practices, students do not fully grasp or lack a solid foundation in the knowledge being imparted. This confirms our initial hypothesis. Students simply follow instructions in the field without mastering the underlying knowledge. While PE is primarily practical, omitting theoretical understanding of fundamental concepts can leave individuals disoriented and unable to perform even basic actions effectively. The student should then have more information about what they are practicing. There is a necessity for praxeology in action. Physical education class sessions ended with the feedback and projection phase where the teacher and the learners took stock of what had been done in the implementation phase. The aim of this research led us to verify whether this phase was actually implemented and what results were obtained.

Table 4. Theoretical notions of PSA.

Pupils	PSA targeted	Information
	Speed and endurance race	Stages of a sprint race: start, action, race proper, finish. Speed and endurance are contained in the race, all in proportion to the distance.
1	Long jump	4 phases: run-up, impulse, suspension, and reception
	Shot put	Throwing is a type of athletics discipline characterized by the throwing of a particular object.
2	Gymnastics (tripod)	The gentleman tells us to draw a triangle on the ground and put our head on the top and the arms on the sides opposite the top.
3	Relay race	Transmit or receive the baton in the transmission zone to win a race under regulatory conditions, do not leave his lane, do not jostle his opponent, do not transmit the baton outside the transmission zone.
4	Gymnastics (tripod)	To start, draw an isosceles triangle on the ground then place the two knees on the two sides of the triangle.
5	Shot put	Weight gain, weight near the neck, twist untwists, and throws.
	Gymnastics (single back roll)	The teacher tells us to push our feet backward with power.
7	Gymnastics	The teacher performs the action to help students understand.
8	Basketball	Do not run with the ball.
	Handball	Do not enter the semicircle of the goalkeeper before shooting.
9	Triple jump	To succeed in this PSA we must run well, keep our balance, and jump as far as possible. You have to take support on the line before jumping.
	Gymnastics	This activity includes flexibility, posture, rotation, and balance.
10	Gymnastics (standing start bridge)	When we are standing, we lean back and wanting to touch the ground, we stretch out our arms
11	Football	Oral and practical explanations and some examples (demonstration)
12	Handball	The ball carrier is a king, we do not attack him, but we counter him to intercept his passes.

Consideration of taking notes

It emerged from the analysis of this histogram that in 9% of the selected sample, the assessment or a summary was not done before the end of each session. There are three main components to a PE session: the introduction, the realization phase, and the feedback and projection phase where the teacher gives feedback on the session with the learners and asks them questions in relation to what whether they were able to succeed or

not, the causes of their failure if, in the meantime, during the practice of a PSA the latter had encountered difficulties. Also, the teacher seeks to know the situations of life to which the pupils could link or assimilate what they have learned. The results from the analysis of Figure 1 lead us to conclude that this part of the session is actually done by the teachers. It emerges from the analysis of Figure 2 that only 12 pupils out of the 150 questioned took notes and 138 pupils, that is to say 92% of the sample, did not take notes at all.

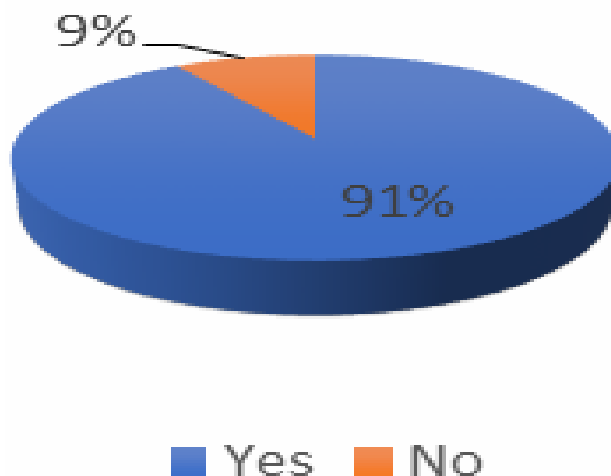


Figure 1. Summary before the end of the course.

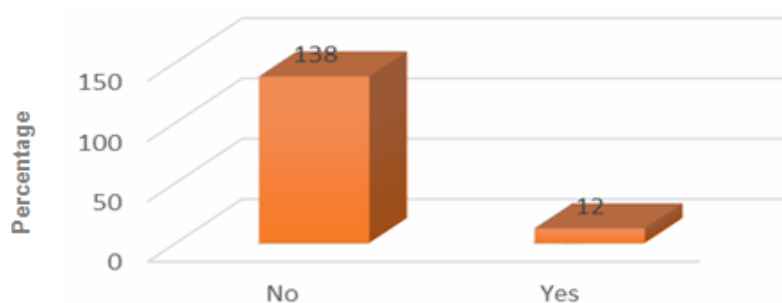


Figure 2. Note taking of concepts during the course.

In PE, no part of the teaching/learning process is reserved for taking notes. These results led us to review the survey forms completed by the students. It was found that the twelve students who took notes were those who were able to recount the information present in Table 4. It could therefore be said that note taking plays a role in student learning in PE. The writings are imprints of the language that open up the learning of new concepts. In PE, the appropriation of these concepts is expressed in terms of notions, rules, and principles which are essential for the construction of skills. This knowledge is what makes it possible to learn new motor actions, which is useful for practice in a social environment, where, according to Magro and Hemptinne (2015), a fertile ground is created to provide theoretical elements which contribute to formalizing and explaining the observed phenomenon. He who wishes to have one thing, surely thinks that what he wants is useful or important for him”, that is the reason why it is necessary to know the will of the learners about note taking in PE.

From the analysis of Figure 3, it appears that 90.67% of the sample chosen for this study would like to take note or write on media (notebook) the concepts that could emerge during the teaching of the different PSA. From these results, which show a significant percentage of students expressing a desire to take notes on the concepts taught in PE, it is clear that students feel the necessity of recording the knowledge conveyed in these classes. While spoken words can fade and practical skills may be forgotten, written notes endure, serving as a tangible reminder of what has been learned. This underscores the importance of the technological-theoretical concept.

In addition to the learner questionnaire, we found it pertinent to record PE sessions, particularly the introductory and feedback phases. This allowed us to verify whether the responses given by students during feedback align with the session objectives set by the teacher initially, and whether these responses reflect the concepts addressed by the teacher.

Table 5 presents the interactions between three

Table 5. Condensed synopsis of what teachers and students said at the start of the session and during the feedback and projection phase.

Class	Introduction	Return and projection
4th form	This morning we will do the first sequence of the gymnastics class where we will first learn to perform one gymnastic element per family based on the motor operations of each gymnastic element, and then compose a mini sequence with the elements learned. We will learn how to organize a self-learning triangular tournament.	<p>Teacher: What did you learn? Pupil: I learned to do the arabesque, the bridge and the high front roll to the split. Pupil: we did high forward roll, tripod, backrest (rather transition from face support to back support)</p> <p>Teacher: How much physical activity did we do today? Pupil: three, tripod, roll... Pupil: Those are the gymnastic elements. We did two activities, gymnastics and speed.</p> <p>Teacher: What is the basis for making the elements? Pupil: We base ourselves on the operations...</p> <p>Teacher: You forgot; motor operations (MO). And what are motor operations? Pupil: MO are the principles without which the elements cannot be realized.</p> <p>Teacher: You did a mini chain instead. Pupil: We did a sequence.</p> <p>Teacher: What couldn't you achieve? Pupil: The roulade, because I wasn't used to it.</p> <p>Teacher: How can you relate what you did today to your daily activities? Pupil: No concrete answers</p>
5th form	Last session we learned to perform an element of the rotation, hold and jump, step and turn families. Today we will go back to the unmastered elements and learn two new elements.	<p>Teacher: What did you learn? Pupil boy: We first reviewed what we had done in the previous lesson. This is the pike jump, forward roll with arrival legs apart, square legs together, today we did crowning (crown ½ turn). Pupil girls: We did rotation and flexibility (gymnastics family). Together: Rotation and flexibility are gymnastic families and in these different families we find the gymnastic elements.</p> <p>Teacher: What couldn't you achieve? Pupil: The bridge, splits. The reason given for failure is "I eat a lot."</p> <p>Teacher: In what life situation can you apply what you have learned? Pupil: No response</p> <p>Teacher: Some may be wondering if we will go on the track and do the rolls, no. Know that the objective is to develop your motor skills such as balance for example, through the elements of the posture family.</p>
6th form	Today we are going to learn how to organize a triangular tournament and to fill in this form (the teacher showing the result form to the students) in the triple jump and then we will go to an initiation to gymnastics where we will first learn to perform the gymnastic elements and then we will learn how to compose a mini sequence by linking the gymnastic elements in such a way that there is coordination.	<p>Teacher: Tell me what you learned today Pupil: Today I learned the five families of gymnastics which are flexibility, rotation, jump step and turn, athlete (Reverse handstand corrected by the teacher) and maintenance. Pupil: I learned that we rely on motor operations to do gymnastics.</p> <p>Teacher: What is a motor operation? Pupil: The motor operations are the elements on which we base ourselves to carry out the element (principles instead of elements; notification given by the teacher).</p>

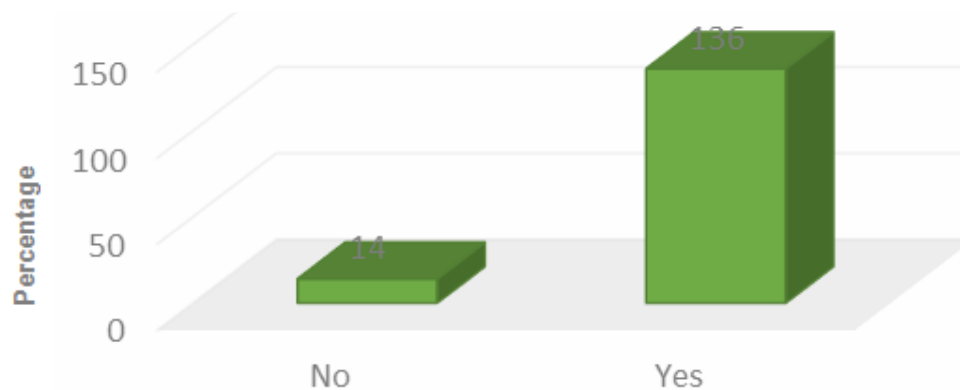


Figure 3. Willingness to take notes of concepts taught during physical education.

physical education teachers and their students during sessions focused on gymnastics. An analysis of this table reveals that all three teachers stated the session objectives before the implementation phase, aligning with pedagogical recommendations and demonstrating a solid institutional grasp of knowledge.

During the feedback and projection phase, our observation showed that questions focused solely on objectification and projection. However, effective feedback and projection ideally encompass four aspects: objectification, self-assessment, improvement, and projection. Despite this, our analysis of Table 5 indicated that important concepts related to APS were conveyed, such as gymnastic families, motor operation, and sequences. It appears that the teachers imparted the essential knowledge necessary for students.

Further analysis of Table 5 also revealed that the teachers did not provide specific techniques for successfully performing APS. While they presented situations intended to guide students in executing gymnastic elements, none of the teachers utilized technological concepts or directed students' attention to techniques that could enhance their performance of these gymnastic elements.

During the post-session interview, these teachers all perceived the relevance of a need to take notes at this stage of the session. For one of the teachers

"It is really a mistake, an error on our part to think that the experience of the practice is enough to understand the procedure. Our students really need us to make them feel the essentials they have learned." According to the 1st year teacher, *"our pupils do not pick up on the notion learned, they only mention the name of the gymnastic elements without being able to say the motor operations that made it possible to carry them out. So, it's important to make them take notice."*

The 3rd grade teacher even made a comparison with what was done in mathematics where theorems were

discussed:

"Motor operations are like theorems and properties as in other teaching disciplines. The success of motor skills through the acquisition of the technical gesture depends on it. This study makes us aware of the need to make a summary of theoretical knowledge."

DISCUSSION

From the analysis and interpretation of the results, it appears that the students have an approximate knowledge of the PSA subject of teaching, of the knowledge taught, and also of the PE program despite word sparsity of the course materials made available to them. This could be explained by the fact that the PE teaching subject is not perceived in the same way by the students as the other teaching subjects which require lesson recitation and note taking of the content taught. Physical activity-based physical education uses physical education as an object and means of education. As a result, its teaching content is not only focused on bodily gesture, but also on know-how and life skills. This refers to the notion of content according to Reuter et al. (2013) as things as diverse as knowledge, know-how or skills which are the objects of teaching and/or learning which are most immediately identifiable in a didactic system but also values, practices, "relationships to" and even behaviors or attitudes.

The results of the present research study indicated that despite the announcement of the objective of the session in the introductory phase and the use of the established term during the construction of knowledge, students have difficulty in the phase of return and projection to make a restitution of the knowledge taught both of the production process and of the technical elements on which their attention has been focused. This raises the question as to whether one should not review the methods and tools used in situ. These must be the

subject of explicit learning in situation in all courses. Explicit teaching for students is now an imperative that involves explaining content in all areas of the common core of knowledge, skills and cultures (Huot, 2017). Explaining the content means first specifying what the content is and then formulating the different expressions to make them accessible to all.

In PE, everything is practical since the major objective is to improve the possibilities of motor adaptation, action and reaction to the human environment. But this does not allow the learner to have much information on what he practices as APS. Focusing on practice limits the teaching of theory. Certainly, while some game rules are provided and teachers suggest scenarios for students to practice APS, this alone may not suffice, especially considering that "theory and practice remain inextricably linked" (Dietrich and Weppe, 2010). Theory provides practitioners with a deeper understanding that enhances practical application. Therefore, incorporating theoretical courses could enable students to better engage with APS and enhance their participation in PE classes. This approach would help students develop a stronger foundation of knowledge that supports their practical skills and overall performance in physical education.

The results from these questionnaires allowed us to discover that although the PE course is practical, some students take notes of what they remember from the sessions followed and this allows them to keep certain notions that the teacher had to address. The intention is not to theorize the discipline, but rather to comprehensively highlight theoretical and technological notions through theoretical courses to make the practice of APS and consequently the PE courses more interesting. These results refer to the studies of Ladage (2016) who indicates that the notion of praxeology makes it possible to "designate any structure of knowledge and possible action" (2016, p. 3) by modeling it in the form of the association of know-how (type of tasks and technique) and knowledge (justifying and explanatory speech, relating to know-how).

Lets admit that having students write is culturally impractical because it could be perceived as a waste of time because priority is given to action. The recorded sessions show us that first of all, everything that must be asked of the student in order to allow him to know that he has built new skills is not asked efficiently. The three teachers, by implementing the skills linked to objectification and projection, were not able to allow the students, through the questions asked, to capture their attention on (theoretical) knowledge and what should really be remembered. According to the expectations of the study program, this phase should allow the student to review the activity experienced and become aware of the new knowledge constructed. All this could make it possible to justify the answers given by the students following the various questions asked during data collection and which show that they lack knowledge,

information. Normally PE is already part of the notion of praxeology, organization or praxeological complex, the techniques taught should thus be described in connection with their theoretical foundations. The argument is based on a theorized, interesting, and operational approach that allows for articulation (more or less complex) between epistemological foundations underlying practices, which sometimes manifest as "beliefs" (Gaussel, 2021) and at other times as more theoretical references, alongside the practices themselves. Evidence shows that when asked about the theoretical or technological knowledge teachers use to effectively teach APS, only twelve learners, or 8% of the study sample, were able to provide an answer.

Using the graph reflecting students' willingness to take note of knowledge, we find support for the idea that this approach is welcomed. Highlighting results from Table 4 and Graph No. 2, it becomes apparent that those who reported taking notes were able to respond effectively to questions in Table 4. This indicates that note-taking plays a role in student learning in PE. Moreover, it underscores the influence of personal determinants in the didactic choices of PE teachers, emphasizing the subjectivity inherent in teaching physical activities (Loizon and Carnus, 2014).

Consequently, integrating moments within the teaching, learning, and evaluation process where theoretical and technological knowledge can be effectively applied to explain APS is deemed necessary. The feedback and projection phase is viewed as crucial in achieving this objective through theoretical instruction and encouraging note-taking of knowledge.

These students, aware of their deficiency and not being accustomed to taking notes in PE, expressed the wish and the will that they be required to take written notes of the notions taught during PE. Teachers, having realized the importance of this, went in the same direction as their learners. These results urge us to initiate theoretical courses in EPS as indicated by the work of Lihan (2013) on the theoretical teaching of PE in secondary schools in the city of Yaoundé and the nature of the theoretical knowledge taught.

Conclusion

The study was initiated with the aim of demonstrating, on one hand, the utility of institutionalizing theoretical knowledge in EPS student training, and on the other hand, the importance of note-taking in this discipline. To effectively report and analyze the results, concepts from Chevillard's (2018) *The Anthropological Theory of Didactics (TAD)* were employed, including the object of knowledge, institution, personal relationship to the object, knowledge, and praxeology. This framework helped to elucidate that theoretical knowledge establishes the framework for technological-theoretical

particularly its "theory" component.

To address the issue of students' unfavorable relationship with theoretical knowledge, we employed a methodological approach based on this theoretical framework. This approach involved administering questionnaires to students in the second cycle who met the criterion of regular attendance at physical education courses in two secondary schools. It was followed by recording three physical education sessions and conducting interviews with each teacher at the conclusion of the course.

Thus, from the analysis of all the results, it appears that the majority of students do not have a favorable relationship with the theoretical knowledge transmitted in PE. This is perhaps due to the fact that at the level of the phases of introduction, realization (construction of new knowledge) and feedback and projection, the teacher does not really capture the attention of the learner and motivate them to practice the various PSA. Summarize, the essential finding derived from this study was that students in PE would greatly benefit from an introduction of theoretical courses combined with written documentation of the pedagogical information provided. The integration of both elements could foster the development of citizens who are proficient both physically and intellectually.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

REFERENCES

- Atoun CEH, Agbodjogbe B, Attikleme K, Sedode G, Kpazaï G (2018). L'influence de l'épistémologie sur la pratique enseignante du volleyball au Bénin. *Journal of Sport and Physical Education* 5(5):27-40.
- Attikléme K, Tito MA, Gouda S, Assogba A, Richard R (2006). Didactic problem of the integration of a specific physical activity in the teaching of physical education and sports in high schools and colleges in Benin: the case of judo. *eJRIEP* 10:4-15.
- Chevallard Y (2018). A Teoria Antropológica do Didático Face ao Professor de Matemática. In: Almouloud et al. *A Teoria Antropológica do Didático: princípios e fundamentos* (pp. 31-49). Curitiba Editora: CRV Edição. Curitiba PR: CRV.
- Dietrich A, Weppe X (2010). Les frontières entre théorie et pratique dans les dispositifs d'enseignement en apprentissage. *Management et Avenir* 10(40):35-53.
- Gaussel M (2021). Croyances et connaissances pour enseigner. *Edubref*. ENS de Lyon. <http://veille-et-analyses.ens-lyon.fr/EB-Veille/Edubref-mars-2021.pdf>
- Goulart JSS, Farias LMS, Chaachoua H (2021). An Analysis of the Influences of a Hybrid Learning Environment in the Solution of Vector Tasks according to the Anthropological Theory of the Didactic (ATD). *The Montana Mathematics Enthusiast* 18(3):669-700.
- Gréhaigne J-F, Poggi M-P, Zerai Z (2017). L'enseignement et l'apprentissage des connaissances et des compétences motrices utiles en sport collectif *eJRIEPS* 40:143-162.
- Huot F (2017). Explaining teaching content. *Revue EPS* 1-5. <https://www.revue-eps.com/numeros/revue-eps-600>.
- Ladage C (2016). Les fondements épistémologiques de la pédagogie de l'enquête en question. *Penser l'éducation* (38):1-28. <https://hal-amu.archives-ouvertes.fr/hal-01444596/document>
- Lamotte V (2005). Conception, organisation et intervention en EPS. In Lamotte, V. (Ed), *Lexique de l'enseignement de l'éducation physique et sportive* (pp. 13-83). Presse Universitaire de France (PUF).
- Lihan A (2013). Theoretical education of PE in secondary schools in the city of Yaoundé in Cameroon. [Master degree Long essay in Staps at INJEPS of University of Abomey-Calavi (published)].
- Loizon D, Carnus M-F (2014). L'influence des déterminants personnels dans les choix didactiques des enseignants d'EPS. *eJRIEPS*. *Ejournal de la recherche sur l'intervention en éducation physique et sport* (33).
- Magro A, Hemptinne JL (2015). Practical ecology work: From the field to the laboratory, experimenting to understand scientific ecology. Educagri Editions.
- Munger R, Johnson TG (2023). Using writing to promote understanding in physical education. *Journal of Physical Education Recreation and Dance* 94(8):22-28.
- Pontais C (2015). Point of view- The challenges of physical education and sports as a school discipline. *Social information* 187:67-71.
- Redondo C (2021). La notion de «praxéologie» pour soutenir l'articulation entre fondements épistémologiques et pratiques enseignantes dans le champ des pédagogies de l'éducation au développement durable. *Phronesis* 10(2):194-215.
- Reuter Y, Cohen-Azria C, Daunay B, Delcambre I, Lahanier-Reuter D (2013). Teaching and learning content, [Cairn.info/dictionary](http:// Cairn.info/dictionary) of fundamental concepts of didactics. pp. 43-48.
- Sigaut F (2009). Technique, technology, learning and pleasure at work. *Technique and culture* pp. 40-49
URL:<http://journals.openedition.org/tc/4770>