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## RESEARCH ARTICLE

# INVESTMENT OF CONGOLESE MIDDLE SCHOOL STUDENTS IN MOTOR TASK IN PES: PRACTICE TIME MAIN INDICATOR OF MOTOR ENGAGEMENT

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### ABSTRACT

The student's motor engagement reflects his personal investment in achieving a goal that he has set for himself, or that has been assigned to him. The motor task is the main lever allowing the teacher to mobilize the student's resources, motivate him and promote his progress. This study is based on the theories of self-determination and contextual motivation. The objective of this study is to evaluate the practice time of middle school students during their engagement in motor tasks, to compare the motor investment between girls and boys in scheduled physical and sports activity and to analyze the impact of motor tasks on their engagement. The methodology is based on systematic observations made among students at Bernadette Bayonne in Brazzaville. The results show that the actual time devoted to the motor task represents on average 23.34% of the official time of the main part of the lessons. This investment depends directly on the quality and richness of the tasks proposed. Furthermore, the analysis shows that girls and boys present identical levels of engagement, contradicting gender stereotypes in PE.

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## INTRODUCTION

Physical and Sports Education (PES) occupies an original place where the body, motor skills, action and self-commitment are at the heart of learning (E. Paulmaz, 2012, p.4). It is the only discipline that favors the expression of the body (JG Caumel, 2000). Consequently, it constitutes an effective educational vector in the same way as other school disciplines and is mandatory for all study courses (Law No. 11/2000 of January 20, 2000 making the practice of EPS mandatory in schools, in the Republic of Congo). Indeed (M. Travert, 2018) states that:

Generally, learners have difficulty engaging in the motor tasks proposed in EPS; maintaining a sufficient level of investment and achieving the desired transformations. The motor engagement of the learner is at the heart of teaching issues in PES where the body is mobilized in its entirety (p.1).

As a result, François Dubet in his preface, in (M. Travert, 2018, p.1), certifies that "without engagement of the subject, there is simply no learning". Thus, in the school context, engagement has long been considered the main facilitator of academic success and student learning (K. Bevens *et al.*, 2010). However, a divergence of concepts related to engagement has been analyzed in the literature, such as participation or involvement", without it always being easy to target their distinctions. In particular, engagement is often relative to the concept of motivation. As such, "individuals are inclined to integrate experiences that allow them to express their fundamental

psychological needs: needs for competence, social relationship and self-determination" (RM Ryan and EL Deci, 2017). At the opposite end of the continuum, the individual is extrinsically motivated to the extent that he or she engages in order to achieve a goal external to the activity itself (O. Petiot and J. Saury, 2021, p.81). Like J P Famose in (D. Délégnières 2004), "the motor task is a series of conditions prior to the implementation of the skill, which trigger and organize the motor behavior". The author continues by specifying that "these conditions are imposed on the practitioner and have an objective existence independent of his resources and the way he behaves". Here, the motor task is part of a learning process that aims to force the student to mobilize his resources or reorganize them. Nevertheless, the student's progress involves the search for the creation of new resources or better management of existing resources. However, this new organization of resources can be observed by better motor engagement. In this vision, we understand by resources, all the knowledge, capacities, aptitudes, mechanism that the subject possesses and that he can modify and use to his advantage to accomplish the task. Furthermore, academic success is often presented, explicitly or implicitly, as the automatic result of a student's personal work effort. It is in this perspective that D. Siedentop *et al*, in (A. Durussel and J. Klima, 2018, p.6) demonstrate a close relationship between the time allocated to a task, the student's commitment and investment, and a high success rate. However, and depending on the physical and sporting activity (PSA), there are differences in the students' practice time (C. Mottu and M. Mühlthaler, 2016). However, the time spent on the field between girls and boys in a learning situation is almost similar (D. Bernard, 1980). To do this, we used the stopwatch to evaluate the practice

time, proportional to the investment of Congolese middle school students in the motor task in physical and sports education. The choice to consider this expertise is explained on the one hand by the setting of practice time which occupies an important place in the activity of designing the teacher's intervention and is often one of the first concerns of the physical education and sports teacher. On the other hand, the official texts set the weekly duration of PES teaching by class level, and the subject programs, with regard to this teaching duration, determine the minimum expected learning that students must have developed at each stage of their secondary schooling. In the context of this article, the investment or the quantity of work is measured during the time when the learner is active in learning a motor task during the main part of the lesson, in order to evaluate the practice time relative to the investment and / or motor engagement. Indeed, the primary idea that this contribution defends is that the useful time of the lesson is the time reserved for learning that must guide choices and determine the structural organization. Quantifying time in a general way means associating a number, a unit with time. And the unit of time chosen would determine learning and would have effects on the transformations of students' motor behaviors. Noting that in the Republic of Congo, learners are the eternal beginners in physical and sports education, we sought to analyze the time of investment and motor engagement in a school context according to the programmed APS.

Assuming that learning in physical education and sports involves the investment and commitment of the learner, what observations can we make? Although the official time of the main part of a physical education lesson is 35 minutes, is the learner's practice time less than this? Is the learner's investment in the motor task in physical education and sports proportional to the scheduled physical activity? Who invests and commits more, when and why? A boy spends more time engaged and the intensity of his investment is probably higher, allowing him to mobilize himself physically more and for longer compared to a girl? These are the questions addressed in this article, the objective of which is, in a first context, to determine the practice time of middle school students during the investment in the motor task; in a second moment, to compare the motor investment time of the learner following the programmed APS on the one hand and, to examine the engagement time between girls and boys according to the motor task proposed in physical and sports education on the other hand. In this thought, four parts structure this article. After presenting the commitment in PES and the theory of self-determination, the components of the commitment and its relations with motivation; some classic typologies of motor tasks will be spread out. In a second part we will introduce the essential problem of the study by leaning on a double theoretical mooring: the theory of self-determination of (RM Ryan and EL Deci, 2017) and the theory of motivation of (Kukla, 1972) contextualized by (H. Ripoll 2004, p.14). A third part will justify the methodological choices concerning the sampling, the procedure and the tools for collecting, processing and analyzing the data. A fourth will discuss the results and highlight the variables on which the PE teacher can play in order to increase the investment of the learner in the motor task and to obtain a high practice time in the student, relative to his effective motor commitment.

### ***Theoretical framework***

***Student engagement in PE and self-determination theory:*** In PE as in other school subjects, student engagement is multifaceted. It can refer to their physical investment, their performance, their level of attention and listening to instructions, the enthusiasm they show in class, etc. In light of these different dimensions, encouraging student engagement seems to be a complex task, and we can question the intervention strategies that are favorable or not. In order to propose answers, we will rely on self-determination theory (SDT), a contemporary theory of human motivation widely used in the educational context in general (RM Ryan and EL Deci, 2017), and that of PES in particular (L. Van Den Berghe et al., 2014; P. Sarrazin et al., 2006), to account for student motivation and engagement. This theory considers that all students, regardless of their age, gender, background or socio-economic background, have a natural tendency

towards development and internal motivational resources that imply quality motivation and engagement in learning activities. Also, and in this clear-sightedness, self-determination theory recognizes that students can sometimes lack autonomous motivation, show a lack of interest, or even disengage from school activities. Its originality is to consider that this occurs when the student's motivational resources, in particular their fundamental psychological needs, are not stimulated, but rather neglected or threatened.

***The components of engagement and its relationship with motivation:*** In the school context, the term "engagement" is generally used to characterize the active investment of a student in a learning situation (Christenson et al., 2012). Specifically, it corresponds to the quality of students' investment in school activities, that is, with the people, activities, goals, values, and places that are related to them (K. Wentzel and D. Miele, 2009). Like (JA Fredricks and P C Blumenfeld, 2004), engagement is a multidimensional concept made up of three distinct but highly inter-correlated components: behavioral engagement (the effort, concentration, and attention demonstrated by the student); emotional engagement (the presence of facilitating emotions such as interest, curiosity, and enthusiasm and the absence of emotions associated with abandoning the task such as helplessness, anger, anxiety, fear, or frustration) and cognitive engagement.

***Classical typologies of motor tasks:*** The open task is characterized by unstable environmental conditions. Uncertainty can come from the material environment (for example in outdoor activities), or from other players (opposition activities). On the other hand, the closed task is characterized by stable and certain environmental conditions (gymnastics, etc.). These two types of tasks impose differentiated constraints on the information processing system: open skills require perceptive and decision-making activity, often under time pressure. Closed skills, on the contrary, assume that complete advance planning of the action is possible (RA Schmidt et al., 2019).

In the technical task, the goals and sub-goals are certain, determined only by regulatory, environmental and biomechanical constraints. In the strategic task, the relevance of the sub-goals depends at any time on the evolution of the situation, under the influence of the subject himself, the opponent or the environment. This categorization has been used to account for the differentiated use of declarative knowledge in the control of motor skills (B. Abernethy et al., 1993; D. Delignières, 1991; KE French and JR Thomas, 1987).

The topokinetic task is finalized by the achievement of spatially located objectives (sending a ball into a target, catching a horizontal bar, etc.). The subject's activity can in this case be regulated according to the evolution of the relationships between the individual and the environment. The morpho-kinetic task is, on the other hand, characterized by goals of (re)production of a gestural form (performing an arabesque in dance). In this fact, many activities sports activities simultaneously involve both dimensions, insofar as the imposed gesture form must be integrated into precise spatiotemporal constraints (gymnastics, etc.).

The discrete task can be described as having a well-defined beginning and end. Many sports activities offer tasks of this type (archery, penalty shooting, etc.). These tasks generally allow for correct preparation of the execution. The continuous task can be defined as the sequence of different discrete tasks. This type of task is found in most opposition sports, but also in activities such as gymnastics. These tasks pose specific problems of sequence and anticipation. Then, the cyclic task refers to the prolonged repetition of the same movement pattern (running, walking).

The manipulative task consists of reaching the goal by manipulating objects. The transformations revealing the achievement of the goal are therefore centered on the environment. While, in posturo-kinetic tasks, the transformations revealing the achievement of the goal concern either the body itself (dance), or the body-environment relationships (high jump). This distinction is important, as regards the possibilities of representation, awareness and planning of the action. -

The closed-loop task is characterized by the possibility of regulating the movement during the action. This is the case, for example, when the task consists of pointing with the hand at a target: the subject can, at the end of the movement of the hand, finely adjust his gesture in a logic of reducing the gap. The subject can therefore have feedback to regulate his activity. Conversely, the open-loop task only allows ballistic-type movements, which must be entirely programmed in advance. This is the case, for example, of basketball shooting, in which any recourse to feedback is impossible for the current trial (H. Vom and R. Simonnet, 1987).

**Problem:** Within schools and at all levels of education, physical and sports education (PES) aims for the success of all students and contributes, along with other disciplines, to the instruction, training and education of each individual. It contributes to the acquisition and mastery of the common core and allows students to share the values of the Republic, to make them "cultured, lucid, autonomous, physically and socially educated citizens" (INRAP, 2005). By offering a school form of Practicing Physical, Sports and Artistic Activities (PPSA), it allows all students to "develop and mobilize their resources to enrich their motor skills and make them effective", to "know how to manage their physical and social life", and to "access a cultural heritage" that constitutes all the PPSA, the rules and values that run through them. But since physical education makes it difficult to define the success of a task and to observe it live, in the heat of the moment, Siedentop et al, in (A. Durussel and J. Klima, 2018, p. 6) then defined that the time allocated to the task could be the main marker of learning in PES. Our first idea is to think that boys are the ones who invest the most. Indeed, the fact of liking physical activity should encourage students to be more engaged in the proposed activities. Better motor engagement should be visible in the practice time with a high investment. However, an invested learner would spend more time in the motor task, but it is possible that this learner also spends more time practicing the proposed physical activity. On the other hand, investing abundantly does not mean engaging effectively, and a lower practice time does not mean less investment but can be explained by a better motor engagement yield.

Following this logic (C. Tudor-Locke et al., 2006) demonstrate using pedometers used during school hours over several days that boys walked or moved more than girls significantly. Despite this gap, PES lessons do not lead to significant differences in motor investment and engagement between girls and boys during the motor task. Conversely, (B. Cheval et al., 2016) illustrate a difference in primary school between girls and boys in the percentage of the PE lesson spent in moderate to intense physical activity. It is in this perspective that this article, under the cover of a double theoretical anchoring, namely, the self-determination theory of (RM Ryan and EL Déci, 2017) which defines engagement as the visible manifestation of students' motivation and the motivation theory of (Kukla,1972) contextualized by (H. Ripoll, 2004, p.14) which explains how the investment of effort is proportional to the perception of the difficulty of the motor task, is carried out. In other words, it is a question of quantifying the practice time of middle school students, through the observation of PES lessons, in the investment of programmed PPS. Considering, like (ML Maehr and LA Braskamp, 1986), that student motivation translates into personal investment, this investigation questions the amount of practice time that Congolese middle school students devote to it in their investment following the proposed task, as the main indicator of their motor engagement. In view of this problem, this study addresses the following research questions:

- What is the actual time of motor engagement of middle school students in the investment of the motor task in physical and sports education?
- Is the investment of middle school students in physical and sports education proportional to the scheduled physical activities?
- Does the motor engagement of boys differ from girls according to the motor task proposed in physical and sports education?

**Methodological framework:** In the context of this study, we opted for the systematic observation method based on quantitative data. This approach is best used to determine the practice time of middle school students during investment in the motor task, the main indicator of motor engagement in physical and sports education. The audiences concerned by this experiment are students from the Bernadette BAYONNE general education middle school in Brazzaville, of all genders and levels. They were selected according to the criteria defined by (E. Salès-Wuillemin, 2006, p.12) and therefore constitute the target population of this investigation.

**Sampling:** To select the subjects in our sample, we used the blind sampling technique according to the non-probabilistic method. This is a sampling based on the observation of students during the learning of the scheduled physical and sports activity, during the main part of the physical education and sports lesson. Only 50 students who met the selection criteria were involved here, including 25 girls and 25 boys from the 6th; 5th; 4th and 3rd grades. The biological age of the subjects varies between 12 and 21 years.

The table below presents the sample size (total number of study subjects).

**Table 1. Sample Summary**

Level of education	Female	Male	Number
6 <sup>ème</sup>	2	3	5
5 <sup>ème</sup>	5	4	9
4 <sup>ème</sup>	7	9	16
3 <sup>ème</sup>	11	9	20
Total	25	25	30

Source: observation, 2024

**Data collection:** It is done thanks to a research authorization from the Higher Institute of Physical and Sports Education(HIPSE), Marien NGOUABI University. It allowed to conduct an experiment by observation with middle school students, who experience these facts of investment in the motor task in Physical Education and Sports in the school context on a daily basis. Also, we had the agreement in principle of the teachers of the levels concerned who were willing to help us in this investigation. Finally, a last step consisted of explaining to the participants, the absence of any value judgment of their motor investment and especially the respect of the anonymity of the different results.

**Data collection technique and tool:** Here, observation was used as a research technique which amounts to observing a reality caused or not by the researcher, for data collection. For it to be effective, it was important to first construct the observation grid in order to identify, quantify and qualify what is observed. In this observation technique, the SEWAN SW8-3060 brand electronic stopwatch with 60 beats was used as the necessary data collection tool, inspired by (J. Klima and A. Brunner, 2017).

**Data analysis instrument:** Data were entered using Epi info software and analyzed using SPSS software (version 25.0; IBM., Chicago, IL, USA). Descriptive and inferential statistics were used to compare means and generalize the entire population, the conclusions drawn from the results from the sample. The difference in means is significant at  $p < .05$ .

## RESULTS

It emerges from the analysis of the results recorded in this table that the investment time of middle school students in PES varies between  $7.53 \pm 0.42$  and  $8.62 \pm 0.66$ ; and is proportional to the motor task. This indicates that the effective time of motor engagement in investment in PE during learning the motor task in middle school is 8.17 minutes; contrary to that expected by the teacher (35 minutes). The commentary of these results reveals a very significant difference in the averages of motor engagement time between girls and boys at the level of the physical activity triple jump, with  $t = 4.46$ .

**Table 2. Time spent by middle school students in PE according to the motor task**

APS	N	Minimum	Maximum	Average	Standard deviation
Gymnastics	10	7.16	9.33	8.24	.66
Weight	5	7.25	9.16	7.78	.78
Speed (80m)	9	7.03	8.25	7.53	.42
Triple jump	8	8.08	9.16	8.52	.42
Football	6	7.16	9.58	8.24	.85
Long jump	7	7.38	9.16	8.62	.66
Relay	6	7.16	9.58	8.24	.85

Source: observation, 2024

**Table 3. Comparison of the averages of motor engagement of middle school students between girls and boys according to the motor task**

Gender APS	Female		Male		t	Significance
	N	X ± δ	N	X ± δ		
Gymnastics	5	8.22 ± .57	5	8.26 ± .80	.09	NS
Weight	4	7.91 ± .83	1	7.25 ± 0	.72	NS
Speed (80m)	3	7.44 ± .48	6	7.57 ± .42	.42	NS
Triple jump	5	8.25 ± .13	3	8.97 ± .33	4.46	S**
Football	1	8.16 ± 0	5	8.27 ± .68	.14	NS
Long jump	5	8.76 ± .43	2	8.27 ± 1.26	.85	NS
Relay	2	8.95 ± .88	4	7.89 ± .67	1.69	NS

Source: Observation, 2024

While it demonstrates no significance of the averages concerning gymnastics, weight, speed race (80 m), football, long jump and relay race. These results show that the triple jump is a physical activity with masculine connotations whose dominance is strength and power.

## DISCUSSION

A person engaged, invested and motivated in a given activity will use learning strategies. They will plan their practice time and develop task objectives. However, at the beginning of this work we thought that the time allocated to the task could be the main marker of learning in physical education and sports. Despite this, practice time probably cannot be retained as the only indicator of motor engagement in the investment of the motor task. This examination was carried out using a quantitative study which is a valid and accepted approach in educational science. The fact that our results as a whole are consistent with those of the literature reassures us insofar as they give credibility to our hypotheses. Indeed, our general hypothesis which stipulated that "the effective time of motor engagement of the learner in the investment of the motor task in middle school is not up to the time prescribed by the teacher during the PE lesson", was confirmed by our results. The postulate supporting this hypothesis confirmed the rule according to which: although the official time of the fundamental part (main part) of a physical education lesson is 35 minutes, the effective time of motor investment is less than this. According to (P. Seners, 1998), the lesson constitutes the operationalization phase of teaching which occurs after the essential didactic phase which concerns the determination of the contents. Thus, it is the set motor tasks devoted to learning the tactical and technical notions of Physical and Sports Activities taught for a set time. Nevertheless, we appreciated in this work, the strong points that reveal the averages of practice time of our learners during their investment in the main part of a lesson following the proposed motor tasks, and which determine the way in which PE teachers go about motivating their students in the practice of programmed physical activities. The results obtained indicate precisely that there is a very significant difference in the averages of motor engagement time between girls and boys only in the investment in the triple jump (Table 3). Consequently, this very significant difference can be explained by the fact that the triple jump is perceived more as a physical activity with masculine connotations, sometimes experienced as "traumatic", characterized by phases of strength and power. Also, by the role of the teacher who did not allow to positively influence the motivation of the girls, they have the idea of experiencing the activity as demotivating or non-motivating.

In addition, these girls experienced during the practice an average, very low degree of self-determination, a very extrinsic motivation or even amotivation. These results corroborate those of (A. Chalabaev and P. Sarrazin, 2009) and (V. Lentillon, 2009), when they state that, "students are less motivated in activities that convey a stereotype that does not correspond to the gender group to which they adhere (feminine or masculine) and vice versa". To reinforce this thought, (P. Fontayne and P. Sarrazin, 2001) showed that individuals tend to prefer activities that correspond to the social roles to which they adhere, that is to say that girls will more easily prefer activities that convey a feminine stereotype and boys will more easily prefer activities that convey a masculine stereotype. For this, the degree of adherence of the student to the stereotype also influences his level of self-determination. Indeed, the more the student adheres to the stereotype, the more his motivation is self-determined in the activity that conveys a stereotype corresponding to his gender. Also, they allow us to affirm that the motor engagement of girls may have decreased because of the motor task proposed during the PES lesson which is rather masculine in nature. Because, a less important motor investment due to a gender activity could explain the low engagement of girls compared to boys. Moreover, the literature shows a difference in engagement and/or investment between girls and boys depending on the type of activity proposed. A physical activity rather considered masculine decreases motivation in girls and vice versa (P. Fontayne and P. Sarrazin, op.cit.). In this perspective, (K. O'Donnell and AL Reschly, 2020) believe that, "engagement is the visible manifestation of student motivation and is defined as the active investment of a student in a learning situation". Furthermore, the non-significance of the average duration of practice (motor engagement) between girls and boys observed in gymnastics, weight, sprint (80 m), football, long jump and relay race (Table 3); may be due to various factors. Because, students each have their own different sources of investment, they come to PES lessons with varied expectations and to achieve goals specific to each through their personal intentions. Whether mediated by intrinsic or extrinsic motivation, students become engaged and invested, and the teacher must therefore establish a climate that allows them to flourish in order to remain motivated and, ideally, strengthen their degree of self-determination. Understanding investment through this multidimensional and dynamic approach allows us to escape the fatalism that can still be heard in the verbal interventions of some teachers talking about the lack of commitment and/or investment of their students. On the contrary, teachers must become aware that it is possible to activate a series of levers to promote forms of positive motivation and combat the phenomena of external regulation and amotivation (JP Dupont et

al., 2010). In the context of this study, the results recorded (Table 2) reveal that the average investment time of middle school students in the practice of scheduled physical and sports activities varies between  $7.53 \pm 0.42$  and  $8.62 \pm 0.66$ . These results indicate that all students, whether they are in PES classes, in a club or in leisure practice, have a certain number of resources of a different nature, each of which can vary in duration or quantity. This is why learners can invest them in various ways in the accomplishment of a task or in the practice of physical and sports activities. As a result, attention span, energy and mental effort, available time, and knowledge, skills, motor skills, abilities constitute the most requested personal resources. The inference work that we have undertaken has made it possible to note that there is a lack of a real "debate" within the community of PES teachers, a debate that would have the merit of allowing a profession working on the same subject to agree at least on the principle of the evolution of this teaching discipline. The results obtained have also shown the weaknesses of practitioners in optimizing the learner's practice time in investing in the motor task. However, it remains to be determined whether these weaknesses are due to the fact that teachers have stopped asking themselves the fundamental questions about the essence of their profession. Several arguments would argue in favor of a lack of space for debate within schools and at the national level.

## CONCLUSION

The objective pursued in this investigation was to evaluate the practice time of middle school students during their engagement in motor tasks, to compare the motor investment between girls and boys in scheduled physical and sports activity and to analyze the impact of motor tasks on their engagement. To achieve this, we formulated a problem based on a composite theoretical anchor based on the self-determination theory of (RM Ryan and EL Déci, 2017) and the motivation theory of (Kukla, 1972) contextualized by (H. Ripoll, 2004, p.14). This problem allowed us to formulate three research questions to which we answered from a methodological approach based on the systematic observation of middle school students during the PES lesson. The originality of the established protocol lies in the orientation of our investigations towards a more natural context, by measuring the investment time as the main indicator of motor engagement, during the moment when the learner is active in learning a motor task during the main part of the lesson.

**From the results, it appears that:** The actual time of motor engagement in middle school in the investment of the motor task is 23.34% of the official time of the main part of a physical education and sports lesson. Which is to say that the practice time as the main indicator of motor engagement is less than the time prescribed by the teacher. The investment of middle school students in physical education and sports varies according to the physical and sports activities programmed, in other words proportional to the motor task chosen. The motor engagement between boys and girls in a learning situation is almost similar. Despite this, it reveals a difference according to the motor task conveying the gender stereotype in physical education and sports. The weak point of our expertise concerns, on the one hand, the analogy of investment and engagement times following the proposed motor task, which limits the significance of the results. On the other hand, quantitative variables such as repetitions (dosage), the number of partners and opponents in relation to the programmed physical and sports activity are not among our measures: however, they would enrich the content of the analyses. With a view to further studies, we plan to invest in two main areas: first, we plan to measure the quantity of movement as the main gauge of the investment and / or engagement of learners in PES in secondary school, the aim being to compare the quantity of movement with the sports and non-sports profiles of the students, while seeking to know if there is a link between these two collected measures. The second ambition concerns the analysis of the quality and styles of teaching according to the quantity of movement.

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## REFERENCES

- Abernethy, B. K T Thomas et J TThomas (1993), Chapter 17 Strategies for Improving Understanding of Motor Expertise [or Mistakes we Have Made and Things we Have Learned!]. In *Advances in Psychology* Vol. 102, pp. 317-356). Elsevier. [https://doi.org/10.1016/S0166-4115\(08\)61478-8](https://doi.org/10.1016/S0166-4115(08)61478-8)
- Bernard D. (1980), *Distribution du temps d'apprentissage offert à des étudiants du niveau primaire dans des "activités" spécifiques inscrites au programme, pendant des séances d'éducation physique (Doctoral dissertation, Université Laval)*.
- Bevans, K. LA Fitzpatrick, B. Sanchez et C B Forrest (2010), Individual and Instructional Determinants of Student Engagement in Physical Education. *Journal of Teaching in Physical Education*, vol.29, n° 4, PP. 399-416. <https://doi.org/10.1123/jtpe.29.4.399>
- Caumel JG (2000), *Contribution à une épistémologie de l'éducation physique et sportive et scolaire*.
- Chalabaev A. et P. Sarrazin (2009), Relation entre les stéréotypes sexués associés aux pratiques sportives et la motivation autodéterminée des élèves en éducation physique et sportive. *Movement & Sport Sciences*, vol. 66, n° 1, pp. 61-70. <https://doi.org/10.3917/sm.066.0061>
- Cheval, B. D S Courvoisier et J Chanal (2016), Developmental trajectories of physical activity during elementary school physical education. *Preventive Medicine*, 87, pp. 170-174. <https://doi.org/10.1016/j.ypmed.2016.02.043>
- Cury F. et P. Sarrazin (Éds.). (2001), *Théories de la motivation et pratiques sportives : État des recherches*. Presses universitaires de France.
- Delignières D. (1991), *apprentissage moteur et verbalisation*.
- Delignières D. (2004), *L'approche dynamique du comportement moteur*. In J. La Rue & H. Ripoll (Éds.), *Manuel de Psychologie du Sport, tome 1* (pp. 65-80). Paris : Revue EP.S. 65-80.
- Dupont, J P G Carlier, C. Delens et P. Gérard (2010), La motivation auto-déterminée des élèves en éducation physique : État de la question. *Staps*, 88(2), 7-23. <https://doi.org/10.3917/sta.088.0007>
- Durussel A. et J. Klima (2018), *La quantité de mouvement comme indicateur principal de l'engagement des élèves en EPS au secondaire 1* [Ressource électronique]. <https://doi.org/10.22005/bcu.245337>
- Fredricks J A et P C Blumenfeld (2004), School Engagement : Potential of the Concept, State of the Evidence. *Review of Educational Research*, vol. 74, n° 1, pp. 59-109. <https://doi.org/10.3102/00346543074001059>
- French K E et J R Thomas (1987), The relation of knowledge development to children's basketball performance. *Journal of Sport Psychology*, vol. 9, n° 1, pp. 15-32.
- INRAP. (2005), *Programmes des collèges d'enseignement général : Education Physique et Sportive, Brazzaville-Congo*.
- Klima J. et A. Brunner (2017), *Étude de cas au secondaire II sur le temps d'apprentissage en éducation physique : Existe-t-il des différences de temps d'apprentissage chez les élèves en fonction de leur profil sportif et de l'ancienneté de l'enseignant dans le métier?* <https://doi.org/10.22005/BCU.16327>
- Lentillon V. (2009), *Les stéréotypes sexués relatifs à la pratique des activités physiques et sportives chez les adolescent(e)s français et leurs conséquences discriminatoires*. <https://doi.org/10.3917/BUPSY.499.0015>
- Maehr M L et L A Braskamp (1986), *The motivation factor : A theory of personal investment* (p. xvi, 283). Lexington Books/D. C. Heath and Com.
- Mottu C. & M. Mühlethaler (2016), *La qualité des leçons d'éducation physique : D'une recommandation irlandaise à nos salles de sport*. <https://doi.org/10.22005/bcu.16502>
- O'Donnell K. et A L Reschly (2020), Assessment of Student Engagement. In A. L. Reschly, A. J. Pohl, & S. L. Christenson (Éds.), *Student Engagement : Effective Academic, Behavioral, Cognitive, and Affective Interventions at School* (p. 55-76). Springer International Publishing. [https://doi.org/10.1007/978-3-030-37285-9\\_3](https://doi.org/10.1007/978-3-030-37285-9_3)

- Paulmaz E. (2012), *Les attitudes, composantes fondamentales de la construction des compétences*.
- Petiot O. et J. Saury (2021). Favoriser l'engagement des élèves dans les activités d'apprentissage en éducation physique et sportive: Modalités d'intervention des enseignant-e-s et dispositions à agir. *Revue des sciences de l'éducation*, vol. 47, n° 1, pp. 80-109. <https://doi.org/10.7202/1081473ar>
- Ripoll H. (2004), *Manuel de psychologie du sport. 1, Les déterminants de la performance sportive / sous la dir. De Jacques La Rue et Hubert Ripoll*. Ed. «Revue EPS». Paris. <https://e-changes.cholet.fr/Default/doc/SYRACUSE/123721/manuel-de-psychologie-du-sport-1-les-determinants-de-la-performance-sportive-sous-la-dir-de-jacques->
- Ryan R M et E L Deci (2017), *Self-determination theory: Basic psychological needs in motivation, development, and wellness* (p. xii, 756). The Guilford Press. <https://doi.org/10.1521/978.14625/28806>
- Salès-Wuillemin E. (2006), Méthodologie de l'enquête, in: M., Bromberg et A., Trognon (Eds.) *Psychologie Sociale 1*, Presses Universitaires de France, 45-77. In *ResearchGate* (p. 12). [https://www.researchgate.net/publication/263849642\\_Sales-Wuillemin\\_E\\_2006\\_Methodologie\\_de\\_l'enquete\\_in\\_M\\_Bromberg\\_et\\_A\\_Trognon\\_Eds\\_Psychologie\\_Sociale\\_1\\_Presses\\_Universitaires\\_de\\_France\\_45-77](https://www.researchgate.net/publication/263849642_Sales-Wuillemin_E_2006_Methodologie_de_l'enquete_in_M_Bromberg_et_A_Trognon_Eds_Psychologie_Sociale_1_Presses_Universitaires_de_France_45-77)
- Sarrazin, P. D. Tessier et D. Trouilloud, (2006), Climat motivationnel instauré par l'enseignant et implication des élèves en classe: L'état des recherches. *Revue française de pédagogie. Recherches en éducation*, 157, Article 157. <https://doi.org/10.4000/rfp.463>
- Schmidt, R A T D Lee, C J Winstein, G. Wulf, et H N Zelaznik (2019), *Motor control and learning: A behavioral emphasis* (Sixth edition). Human Kinetics.
- Seners P. (1998), *La Leçon D'Eps. Gravitation Autour De L'Eleve, 2eme Edition*. <https://www.decitre.fr/livres/la-lecon-d-eps-9782711415946.html>
- Tudor-Locke, C. S M Lee, C F Morgan, A. Beighle et R P Pangrazi (2006), Children's pedometer-determined physical activity during the segmented school day. *Medicine and Science in Sports and Exercise*, 38(10), 1732-1738. <https://doi.org/10.1249/01.mss.0000230212.55119.98>
- Van Den Berghe, L. M. Vansteenkiste, G. Cardon, D. Kirk, et L. Haerens (2014), Research on self-determination in physical education: Key findings and proposals for future research. *Physical Education and Sport Pedagogy*, vol. 19, n° 1, pp. 97-121. <https://doi.org/10.1080/17408989.2012.732563>
- Vom H. et R. Simonnet, (1987), *Recherches en psychologie du sport. Acte du Congrès International de Psychologie du Sport. Paris 22 au 25 oct. 1986*. <https://www.livre-rare-book.com/book/5472410/14641>
- Wentzel, K. et D. Miele (2009), Engagement and Disaffection as Organizational Constructs in the Dynamics of Motivational Development. In *Handbook of Motivation at School*. Routledge.

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