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Teaching-Learning of the Reverse Tense Support (RTS): A Descriptive and Comparative Analysis of the Skills Developed by Emery Patrice Lumumba High School's Students in Brazzaville (Republic Of Congo)Yvette Bakingu Bakibangou*¹, Hubert César Mviri¹, & Fulbert Ekondi³¹Enseignante Chercheure, Maitre-Assistant, Université Marien Ngouabi, République du Congo, Congo²Enseignant Chercheur, Maitre de Conférences, Université Marien Ngouabi, Congo**Article History**

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Abstract: All teaching and learning aim at developing knowledge, skills and attitudes. However, this simple pedagogical principle is not obvious in the field of Physical Education and Sports. This study which reports the experience of the students during the learning of the Reverse Tense Support (RTS) /Roll, purports to check the skills developed by the students and to examine how much these skills are associated with the gender of the practitioner. To this end, a quantitative study was conducted in Brazzaville with 161 students from the Emery Patrice Lumumba High School. The data was collected by means of a questionnaire. The results showed that the students developed knowledge, skills and attitudes, but with different fortunes. Indeed, it appears that abilities and attitudes were more developed than knowledge. Also, the analysis of the relationship of skills according to the gender of the students, carried out using the Chi-square test, indicates that, regardless of gender, no relationship was observed with knowledge. However, a focus on attitudes was visible in the girls and abilities in the boys. As a result, the skills developed by the students in handstand/roll are limited. Therefore, in order to allow each student to access a better base of skills, a reflection on teaching practices is desired.

Keywords: Reverse handstand, knowledge, attitudes, abilities, skills

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INTRODUCTION

The acquisition of skills by students is the greatest and most common concern of all school disciplines. Indeed, traditionally, the goals assigned to Physical and Sports Education (PSE) revolve around the following objectives: to ensure the mastery of knowledge in the field of the discipline, to develop skills (abilities) and attitudes.

By the way, Seck (2010, p.11) wrote that in PES, the teaching-learning aims to form the cultured, lucid, physically and socially autonomous citizens. Also, Gréhaigine *et al.* (2017, p.171) stated that:

“Teaching physical education then consists in putting the student in a situation of double activity: to bring him to do, to act, to practice in interaction with his environment, and at the same time or in another time, to reflect, to wonder, to reason about what he is doing or has done”.

Unfortunately, analysis of previous research (Poggi, 2016; Sevrain, 2014; & Robitaille, 2019) points to a divide between the intended goals and the skills developed by students. Numerous research studies attempt to explain this inadequacy by the perceptions that students have of the objects of learning in PES, the

meanings that they attribute to the purposes of learning, the student's sense of self-efficacy in relation to the object of learning...It is in this perspective that Papa (2009); Sarr (2014); & Kpatcha (2011) have shown that PE is discredited, students often shine by disengagement, absenteeism, requests for exemption...Also, Avisse & Farger (2002); & Sevrain (2014) have noted that students have a negative perception of learning in PES and do not appropriate the related knowledge. From the foregoing, it appears that there is a real problem of relationship to knowledge with the objects of learning in PE.

Although the question of the relationship to knowledge in PE has been widely discussed in the literature, in the Congolese school context, there is still little research on the analysis of students' opinions about what they say they have learned at the end of a PES learning cycle. This observation incites us to explore this research axis. The aim here is to evaluate the skills developed by the students and to examine the link between each skill and the variable gender in gymnastics, specifically in the Reverse Tense Support Roll (RTS/Roll).

The paper is structured around the following points: presentation of the conceptual framework, problematic, methodology used, results obtained and discussion. The study ends with a conclusion.

CONCEPTUAL FRAMEWORK AND PROBLEMATIC

Learning comes from the verb 'to learn', which in its etymological sense means to acquire skills. Syllamy (1999) considers it to be an adaptive change observed in an individual's behaviour. In the broadest sense of the term, learning refers to the process of acquiring knowledge, skills and attitudes as a result of observation, training or practice. Learning therefore presupposes the acquisition of an experience. This experience is thought by Charlot *et al.* (1992) in terms of a relationship with knowledge. The author considers the relationship to knowledge as:

"The set of relations that a subject has with an object, a content of thought, an activity, an interpersonal relation (...), linked in some way to learning and knowledge..." (Charlot, 1977, p. 94).

In order to make this study more concrete, we have chosen to explore the relationship of knowledge to a gymnastic object: the handstand/roll, in order to account for the singular position of the student with regard to PSE.

The handstand, also known as 'plank', is a gymnastic exercise that consists of holding the body straight and horizontal, in a plank position, while leaning on the hands and feet. To perform an inverted handstand, place yourself in a pump position with your hands on the floor at shoulder height, arms straight and fingers pointing forward. The feet are placed at a distance slightly greater than the width of the shoulders, with the toes pointed towards the ground. The body should be aligned, keeping the abs tight and the glutes contracted to maintain the position. The reverse deadlift is a strength and stability exercise that engages the muscles of the entire body, especially the arms, shoulders, abs and legs. It is important to note that the ability to perform this exercise depends on the strength and coordination of the muscles involved, as well as the flexibility and range of motion of the joints. In the Congolese educational system, this Physical and Sports Activity (PSA) is included in the secondary school curriculum, especially in the first year.

What do students learn at the end of a teaching/learning cycle in PSE? This question has been explored by several researchers. Papa (2009) in his study noted that 45% of students consider the teaching/learning of PSE as a subject inferior to other so-called 'intellectual' subjects. Poggi & Murad (2014) interviewing 65 elementary students about what they had learned and what they said they undertook to learn during physical activity and sport, found that 38% of the units of meaning related to general motor learning and 24% of the units of meaning to specific motor learning. 17% of the units of meaning of the girls did not associate PSE

with learning at all and 10% of the units of meaning referred to PE as a place for exercising citizenship and responsibility and often less as a time of learning, of appropriation of knowledge specific to PE. Finally, Sevrain (2014), in his analysis of students' learning representations regarding volleyball, badminton and French boxing, obtained the following results: in volleyball, 8.51/10 representations are given to attitude learning, 7.45/10 to ability learning and 6.95/10 to knowledge learning. In badminton, 7.96/10 of learnings concern the abilities, 7.66/10 the learnings of attitudes and 6.72/10 the learnings of knowledge. In French boxing, 7.97/10 of representations are given to the learning of abilities, the learning of attitudes represents 7.95/10, while the knowledge is 6.82/10 on average.

The research presented so far shows the complexity for the student to develop skills. One point of agreement is that skills do not develop so simply. This finding suggests that there is likely a problem in the transformational dynamics of skills.

The theoretical framework for this research is based on the philosophical premise of motivation. According to this approach, student motivation is dependent on one hand on expectations of success and on the other hand on the value attributed to learning (Barron & Hulleman, 2015; Gaspard *et al.*, 2018; & Plante *et al.*, 2013). With respect to expectations of success, they are the beliefs that the student has about his or her ability to succeed at a task (Barron & Hulleman, 2015; & Schunk & Usher, 2014). This concept related to that of feeling or perception of competence, is considered the evaluation that the individual makes of his or her abilities to succeed in a task or activity (Viau, 2009; & Wigfield & Eccles, 2000). Task value, on the other hand, is made up of four indicators, including interest, utility, perceived importance, and cost (Eccles & Wigfield, 2002; & Wigfield *et al.* 2008). Interest refers to the pleasure a student derives from completing a task (Barron & Hulleman, 2015; Eccles, 2005; & Gaspard *et al.*, 2018). This would be individual and intrinsic. The second indicator of value is the perceived usefulness of the activity or task (Barron & Hulleman, 2015; & Gaspard *et al.*, 2018). It is known that when the presented task or activity is perceived as useful for everyday life or for success in other subjects, the perceived value of that task or activity increases (Schunk & Usher, 2012). The third indicator of value is the perceived importance of a task, that is, its relevance to the achievement of personal goals. It is based on the relative cost of the task. This one corresponds to the perceived negative aspects related to its realization (Gaspard *et al.*, 2018; Schunk & Usher, 2012; & Wigfield *et al.*, 2018). When the cost is perceived to be too high relative to the expected benefits, the value assigned to the task decreases, thereby reducing subsequent academic behaviors, such as effort, engagement, or achievement (Barron & Hulleman, 2015).

Building on these previous studies and the above theory, in the present study we question students' relationship to knowledge in RTS/Roll, i.e., what they report learning at the end of the teaching-learning cycle. Two questions underlie this research: What skills did students develop at the end of the teaching/learning cycle in handstand/roll? Are the skills developed a function of the student's gender or not?

Echoing this questioning, two hypotheses are put forward, namely that students would develop all the skills, but with different fortunes. The different skills developed would be linked to the student's gender variable.

METHODOLOGY

To verify our theoretical postulates, we conducted a quantitative survey of students in the first year of secondary school at the Emery Patrice Lumumba public high school in Brazzaville. The study population consisted of 161 students, unequally distributed according to gender, i.e. 90 (55.9%) girls and 71 (44.1%) boys. These students were selected using a purposive sampling technique. The following criteria were used for this selection: they were students of the Emery Patrice Lumumba high school; they were effectively participating in the teaching-learning cycle in ATR/roulade; and they agreed to participate in the research. The data for the study were collected from a questionnaire consisting of closed and open questions, which the participants were asked to answer individually. It should be noted that this data collection tool was validated by the scientific committee of the Institut Supérieur d'Education Physique et Sportive (ISEPS) of the Marien Ngouabi University. The students filled out the question immediately, especially at the end of the learning cycle.

The data collected were subjected to a double statistical analysis (descriptive and inferential statistics), using SPSS version 25.0 software. The results are

presented as a mean or as a percentage. To verify the nature of the relationship between each skill developed and the variable gender of the participants, we used the chi-square test. A difference was considered significant when $p < .05$ or when the calculated chi-square statistic (χ^2) was greater than the theoretical value read from the chi-square table.

Method for calculating the chi-square statistic: The chi-square statistic is given by the formula:

$$\chi^2 = \sum_{i=1}^n \sum_{j=1}^m \frac{(Eff_{ij} - Théo_{ij})^2}{Théo_{ij}}$$

Where

Eff_{ij} : Observed count in the table at the intersection of row i and column j ;

$Théo_{ij}$: Theoretical headcount calculated at the intersection of row i and column j ;

With $Eff_{ij} = \frac{N_i * N_j}{N_{ij}}$

Where

N_i : Total headcount of row i regardless of column;

N_j : Total number of employees of the column j whatever the row;

N_{ij} : Total number of the table.

RESULTS

Our analysis is structured around the two research questions formulated, while maintaining the order proposed above. Thus, we present the results of the descriptive and inferential analyses respectively.

Results of the Descriptive Analyses

This first analysis is based on the exploitation of the participants' answers concerning the skills developed after the teaching-learning of RTS/Roll. The results obtained are presented in Tables No 1, 2 and 3.

Table 1: Cognitive skills or knowledge developed by the students

Items	Yes	No
Interest in learning the RTS	29%	71%
What he knows about segmental alignment	24%	76%
What he knows about the importance of a good roll	16%	84%

Source: Field survey

Decoding the data in the table above reveals negative perceptions of student learning. Indeed, 71% do not know the value of learning the handstand/roll. More

than half did not know the fundamentals of the handstand/roll: 76% did not know segmental alignment and 84% did not know the correct roll.

Technical Skills or Abilities

Table 2: Distribution of students' responses regarding the performance of the handstand

Items	Yes	No
Technique of execution of the RTS	67%	33%
Exécution of the roll	58%	42%
Successful completion of the RTS	63%	37%

Source: Field survey

It is clear from the above results that the students have sufficiently developed the skills. Indeed, 67% have acquired the technique of execution of the

handstand/roll, 58% have executed a good roll and 63% have perfectly executed the handstand/roll.

Social Skills or Attitudes

Table 3: Distribution of students' responses about the relationship with others in the process of performing the handstand/roll

Items	Alone	Others people
How to perform the RTS	21%	79%
Contribution of the other in the realization of the ATR	26%	74%

Source: Field survey

These results show a strong need for assistance from others. In fact, 79% of the participants carried out

the RTS with the help of their peers. 74% mentioned that contact with others was a source of motivation.

Results of the Inferential Analysis

Table 4: Analysis of the relationship between ATR knowledge and gender

Knowledge		Gender		χ^2
		Girl n(%)	Boy n(%)	
KSA	Yes	24 (27%)	14 (20%)	1,063
	No	66 (73%)	57 (80%)	
KR	Yes	21 (23%)	6 (8%)	6,298**
	No	69 (77%)	65 (92%)	

Source: Field survey

KSA: Knowledge of Segmental Alignment; **KR:** Knowledge of the Roulade

The results in Table 4 indicate that, regardless of gender, the majority of participants had no knowledge about segmental alignment. Furthermore, because the calculated Chi-square statistic (1.063) was smaller than the theoretical value (χ^2 1; 0.05 =3.84), the hypothesis that knowledge of segmental alignment depends on the gender of the student is rejected.

Regarding the knowledge of the roll, it appears that the proportion of affirmative answers is higher among girls (23%) than among boys (8%). Moreover, the calculated Chi-square statistic (6.298) being largely superior to the theoretical value (χ^2 1; 0.05=3.84), we retain the hypothesis according to which the knowledge of the roll depends on the sex of the student. Thus, this knowledge is favourable to girls than to boys.

Table 5: Analysis of the relationship between abilities, attitudes and gender

Skills and Attitudes		Gender		χ^2
		Girl n(%)	Boy n(%)	
ATP_RTS	Yes	49 (54%)	59 (83%)	15***
	No	41 (46%)	12 (17%)	
AT-Ro	Yes	45 (50%)	49 (69%)	6***
	No	45 (50%)	22 (31%)	
ATO	Yes	58 (88%)	43 (45%)	30***
	No	8 (12%)	52 (55%)	

Source: Field survey

ATP_RTS: Ability to Perform the RTS; **AT-Ro:** Ability To Roll; **ATO:** Attitudes Towards the Other.

The analysis of Table 5 above, shows that the proportions of students who have developed skills in performing the handstand and the roll are higher for boys than for girls. These differences are significant at the 5% level, because the chi-square statistics (15 and 6)

calculated for each of these variables respectively are higher than the theoretical value (χ^2 1; 0.05=3.84). To this end, the hypothesis that the acquisition of the ability to perform the handstand and the roll depends on the gender of the student is retained at the 5% threshold, and

this in favour of boys. This trend is also observed with respect to attitudes towards others. The results show that the proportion of "yes" responses is higher for girls than for boys. Thus, since the chi-square statistic is significant at the 5% level, we reject the hypothesis that this difference in proportion is due to simple chance. Therefore, girls have developed more attitudes towards others than boys.

DISCUSSION

At the beginning of this article, we asked about the skills developed by students and examined their relationship to gender. We mentioned the hypotheses that students would develop all the skills, but with varying fortunes and that the skills would be linked to the students' gender.

Regarding the first hypothesis, namely to verify the skills developed by the students, this expectation was partially verified. In fact, it was found that 71% of the participants were unaware of the interest of learning the handstand/roll, and more than half were unaware of the fundamentals of the handstand/roll, i.e., 76% of the segmental alignment and 84% of the correct roll (Table 1). However, significant gains were recorded in terms of skills, with 67% having acquired the technique of performing the handstand/roll, 58% having performed a good roll and 63% the handstand/roll (Table 2). In addition, a strong need for assistance from others was observed, with 79% performing the handstand with the help of peers and 74% mentioning contact with others as a source of motivation (Table 3).

Here we discuss findings regarding participants' low level of knowledge development. We have found similar results in a different cultural and institutional context, notably in Sevrain (2014). The author highlighted that students placed less importance on knowledge in all three sports assessed (in badminton, boxing, and volleyball). Similarly, Robitaille (2019), in a general analysis of students' knowledge acquisition in PE, showed that they did not acquire new knowledge after learning. In the same perspective, Avisse & Farger (2002) concluded that students come to PSE more to let off steam than to learn knowledge.

However, our results differ from those obtained by Samir *et al.* (2017) who noted that most students find interest in PE sessions. According to their opinions, PE allows them to acquire essential knowledge, skills and attitudes.

We can therefore wonder about the determinants of this differential. Two explanations are plausible. The first relates to the participants' perception of the learning object. We join the theoretical positions on motivation, highlighting the key role of the perceived usefulness of the activity or task (Barron & Hulleman, 2015; Gaspard *et al.*, 2018). According to this approach, when the presented task or activity is perceived as useful

for everyday life or for success in other subjects, the perceived value of that task or activity increases (Schunk & Usher, 2014). In a similar vein, Viau & Louis (1997) believes that when a student perceives no interest or utility in learning a task, he or she is demotivated, and unlikely to engage in it. Thus, our results suggest that the students in our study did not have a positive perception of the utility of learning the RTS/roll.

The second possible explanation is related to the particularity of the disciplinary field, notably its practical connotation and the teacher's action. In this vision, we believe that the teacher's action is essentially oriented towards the development of abilities and attitudes to the detriment of knowledge. In the same sense, Roche & Gal-Petitfaux (2014) showed that during teaching/learning, teachers' discourse is more oriented towards the explanation of instructions, regulations and the task to be performed.

Regarding the second hypothesis, namely "*the different skills developed would be related to the student's gender variable.*" This expectation was partially verified. Indeed, we noted from the students' answers to the questions that some skills are not influenced, at least directly, by gender. Our results indicate that, regardless of gender, the majority of participants do not have knowledge of the fundamentals of the RTS (segmental alignment). However, those related to the roll are more known by girls (Table No 4). In addition, the ability to perform the handstand and the roll are more significant for boys than for girls; boys are naturally stronger than girls. Finally, the proportion of affirmative responses concerning attitudes is higher for girls than for boys (Table No 5).

In this paragraph, we address the issue of gender differences in student performance. It is traditionally known that in PE, girls have more difficulty in appropriating the content of this school discipline and boys are often described as more skilful (David, 2000; & Pasquier, 2015). Indeed, the results presented show significant differences between boys and girls in terms of abilities; boys have better motor coordination than girls (Table No 5). These results corroborate those of Sevrain (2014.) when he concludes in his study that boys, compared to girls, have more motor skills.

This discrepancy can be attributed to several factors. In this study, we focus on the nature of the activity, involving gendered relationships to knowledge, and the emotional dimension associated with the practice of this activity.

First, we assume that the RTS is a difficult PSA that is more favorable to boys than to girls. This view is shared by Hariti (2013); & Kirk (2005) who believe that PE classes are primarily made up of those PSA that appeal to the power of the practitioners. These activities

are more suited to the tastes and interests of boys, with girls generally having a low skill level.

Second, the consideration of the notions of danger and safety in the explanation of the observed differences between girls and boys. In essence, gymnastics is a risky activity in that it systematically subverts the usual postural organization. It transforms locomotion from terrestrial to aerial, from pedestrian to manual, and from head down... This is not done without taking risks or without fear (Goirand: <http://www.epsetsociete.fr>) According to Carrasco (2005):

To do gymnastics is to act and evolve in an acrobatic way in a conventional environment with an unusual or even dangerous character (...). In his learning, the child is always confronted with a modulated fear that he will have to overcome, to tame, without being able to eliminate it entirely, and to compose with this unresolved remainder.

The causes of this fear concern several factors: the aerial aspect of the feats in aerobatics, the execution of precise gestures, sanctioned by a fall, in case of non-success; the uncertainty during the fall. From the above, we believe that the practice of handstand/rollover can be experienced more by the girls as dangerous and a threat to their physical integrity.

CONCLUSION

This empirical contribution focused on examining the skills developed by students in RTS/roll and to evaluate them according to the students' gender. To do so, a quantitative study is conducted with 161 students, based on a questionnaire. Three key points structure the present conclusion. These are: an assessment of the results obtained, the limitations of the study, and the prospects for the research.

Analyses of the data collected showed that students developed knowledge, skills and attitudes, but with different fortunes: skills and attitudes were more developed than knowledge. In addition, no relationship was observed between knowledge and the gender of the students. However, all other things being equal, a significant relationship was found in favor of boys regarding abilities, and in favor of girls regarding attitudes.

Nevertheless, the results highlighted here are interesting in that they shed light on certain mechanisms at work in learning. They also raise the question of the effects of the perception of RTS and of the students' perceptions of the teachers' practices. If so, why is it that such practices are perceived negatively by students? Further empirical research could further inform the debate on this issue.

In addition, this research, which is part of an innovative empirical approach in the Congolese context, has come up against certain limitations. For material and organizational reasons, the data on which our analyses are based were collected at a single school site. Due to the size of the sample, we will refrain from overgeneralizing. On the other hand, variables such as the perception of the difficulty of the task or the degree of anxiety in relation to the motor skill concerned are not included among our measures. These variables would enrich the content of our analyses.

Nevertheless, these results open up new research perspectives. We believe it is essential to supplement these quantitative analyses with a more qualitative approach that would allow us to question the learners on aspects that quantitative analysis does not allow us to approach. We can also, for comparative purposes, consider an analysis of the students' opinions concerning other PSA.

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