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Progress in motor learning through augmented feedback (video feedback from a model and video feedback from its own realization), the case of the long jump technics.

التقدم في التعلم الحركي من خلال زيادة التغذية الراجعة بمعاينة الفيديو (عرض نموذج) مع معاينة الفيديو (عرض أدائه الخاص) ، حالة تعلم تقنيات الوثب الطويل

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Abstract: The aim of this study is to test the effect of an augmented feedback device composed of video feedback associated with verbal feedback on an entire class, while learning a new task in physical education and sport (PSE). This device is put-in-place for six weeks during a long jump cycle with a class-of-second-year secondary. The experimental method was used to suit the nature of the research, where the sample included 26 students divided into two groups of equivalent level composed of thirteen (13 boys and girls) each. Group1 received verbal feedback and video feedback, (viewing their own performance).Group2 received verbal feedback and video feedback (viewing a model).

The results show on the one hand that video feedback facilitates and accelerates the improvement of motor progress among all the pupils of the two groups. Thus, it corroborated the various researches carried out to date on the usefulness of video feedback, and others share a more significant progression in learning in the group 1 VPR (viewing their own

performance), than in the group 2 VM (viewing a model).

Keywords: EPS, video feedback, motor learning, long jump.

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الملخص : الهدف من هذه الدراسة هو اختبار تأثير تركيبة للتغذية الراجعة المتكونة من مزيج للارشادات و التعليمات اللفضية مع معاينة الفيديو على الفصل بأكمله ، أثناء تعلممهارات حركية جديدة في التربية البدنية و الرياضية. يتم استخدام هذه التركيبة لمدة ستة أسابيع خلال دورة الوثب الطويل مع قسم السنة الثانية ثانوي. واستخدم المنهج التجريبي لملائمته وطبيعة البحث، واشتملت العينة على26 طالب مقسمين الى مجموعتين متكافئتين و متكونتين من 13 طفل و طفلة. المجموعة **1** تتلقى: الارشادات و التعليقات اللفظية مع معاينة للفيديو (عرض أدائهم الخاص) والمجموعة **2** تتلقي: الارشادات و التعليقات اللفظية مع معاينة للفيديو (عرض نموذج) . تظهر نتائجنا من جهة أن التغذية الراجعة بالفيديو تسهل وتسرع تحسين التعلم الحركي لدى طلاب المجموعتين ، وبالتالي تؤكد الأبحاث المختلفة التي تم إجراؤها حتى الآن على فائدة استعمال الفيديو في التغذية الراجعة، و من جهة اخرى تظهر تقدم أكثر أهمية في التعلم الحركي لدى المجموعة **1** VPR (عرض أدائهم الخاص) ، مقارنةً بالمجموعة **2** VM (عرض نموذج).

الكلمات الرئيسية : التربية البدنية و الرياضية, التغذية الراجعة بالفيديو ، التعلم الحركي ، الوثب الطويل.

I- Introduction and problematic of the study:

Since the early 1990s, work studies in the area of cognitive psychology have provided a new approach to the problems of motor learning and the differences between students. Strategies such as controlling relevant retroactive information, attention, memorization or even decision-making represent internal operations which are decisive for the performance of a motor activity. These relationships between the mind and the motor therefore add new learning perspectives. Our brain therefore needs to receive information before, during and after each movement of information in order to refine its PMG for the next similar movement to ensure learning of the task. This various information is called feedbacks. Indeed, without any knowledge of the outcome of the action or its progress, it is impossible to ensure its acquisition (Salmoni, Schmidt, & Walter, 1984; Schmidt, 1993, p.256).

Feedback (FB) "represents information about the difference between the state of a goal and performance" (Schmidt, 1993, p. 254). Feedback is inseparable from the teaching act (Bangert-Drowns, Kulic, Lin & Morgan, 1991) and its use in the school field has been the subject of numerous studies and categorizations (Georges & Pansu, 2011). In physical education, compared to other subjects, the originality of the feedback lies, among other things, in the induced effect on the effectiveness of motor skills.

There are two sources of feedback: intrinsic FB, coming from the subject's own perceptual channels (vestibular, proprioceptive, visual systems, etc.) and extrinsic or augmented FB, provided by an external source (trainer, teacher, chrono, etc.). (Schmidt, 1993). The function of extrinsic feedback would be to help the subject (with additional indications to his information) to progress, especially if he encounters difficulties in interpreting intrinsic information (Descatoire, 2009).

Extrinsic feedback can relate to knowledge of the outcome of the action (CR), defined as information on "the success of an action in relation to the environmental goal" (Schmidt, 1993, p.256) or on the progress of different parts of the movement performed (knowledge of performance: CP). This last type of information allows the learner to build a precise image of the movement carried out (Buekers, 1995) through information on the kinetics and kinematics of the action (Kernodle & Carlton, 1992; Schmidt, 1993) .

Numerous experiences in experimental psychology show that knowledge of the result (CR) or performance (CP) constitutes an element of progress in the acquisition of motor skills for a learner, and that CP would be the form of index the most effective for learning skills whose goal is the acquisition of a stereotypical movement (Descatoire, 2009). When it is not redundant, it would prove to be more relevant than CR in learning skills used in daily activities

(Schmidt & Lee, 2005), but also in the context of complex tasks because it would provide more information on inter-segmental coordination (Buekers, 1995; Young & Schmidt, 1992).

A lot of research has allowed us to test the effectiveness of video feedback in schools. The first research with Thierry Mérian (2007) has allowed us to test the effectiveness of video feedback in schools on two complex movements: front support tower at the helm and the fosbury jump. He showed that, for both movements, the learning speed with video is better than without this contribution. Rothstein and Arnold (1976) postulated that, faced with the large quantity of information provided by video, a novice cannot perceive the relevant elements to improve his performance and that, to be effective, video feedback must be associated with verbal feedback from the coach or teacher. Boutmans (1992) observed that subjects receiving video feedback improved the quality of their suspended basketball shooting; Michael Quartacci and Nicolas Strahm (2010) have also shown an improvement in learning using video feedback. Guadagnoli et al. (2002) also demonstrated, in golf swing learning, the greatest effectiveness of the combination of video feedback and verbal feedback over simple verbal feedback. From a general point of view, the results showed the need for feedback to improve performance and deterioration when performance is lacking.

Today, teaching and training strategies have evolved but have mostly been enriched with a maximum of teaching tools. The use of tablets, and in particular video feedback, has taken off, bringing about new teaching strategies for PSE teachers to engage students in learning. In physical education, compared to other subjects, the originality of the feedback lies, among other things, in the induced effect on the effectiveness of motor skills. Thus, the use of tablets and particularly video feedback, which consists of sending the learner his own image

in action, is becoming increasingly important in teaching strategies to develop self-evaluation (Mérian & Baumberger, 2007) and engage students in learning. The video provides elements of movement that can be observed and corrected based on visual information (Magill, 1993). It offers the possibility of watching its performance in a loop directly after the performance, of superimposing different performances or of passing them side by side (Liebermann et al. 2002),. It can be used as a means of regulation within the PSE lesson, especially at the start of learning, or it is generally necessary to provide the student with indications allowing him to become aware of his results, understand what that he does by helping him compare his current performance with that which is expected of him. This information expresses the execution error and implicitly suggests the correction that would be necessary to make it, because the learner cannot detect execution errors for himself through his own proprioceptive system (Merian and Baumberger, 2007).

All current theories on motor learning indeed assume a comparison mechanism which suggests that the learner can extract from the execution of each test the information allowing him to modify the following test. Learning and progress are therefore achieved on the basis of the evaluation of the deviation from the goal, and on the basis of taking errors into account. The teacher will, therefore, provide the student with instruments allowing him to capitalize on his experiences, by optimizing knowledge of the results of the action (demonstration, feedbacks, observation sheet, etc.). In addition, the only regulator of learning, the device (video feedback) in its mediatization function brings the student to a look and a judgment on what he produces.This constitutes a level of enrichment of the mediation contents which is developed during regulations (Haensler & Barthès, 2012). From there, we can legitimately think that the progression in the learning of a pupil no longer depends only on

his physical aptitudes, but also and specially on the returns feedback which are transmitted to him compared to the expected results. That is to say, it is the quality of intrinsic and / or extrinsic feedback.

Teaching means knowing and implementing the conditions (pedagogical and didactic) facilitating student learning. One of the most frequently used didactic means when guiding teachers before putting students into action is the video tool, which is currently on the rise and gives rise to real reflections such as: the use that can be made of video and profit from its advantages. The aim of our study is to verify the relevance of a teaching device based on increased feedback (video feedback), associated with verbal feedback (teacher), by experimenting with two methods of using video feedback in a context of practice and being able to compare them in order to answer the question of our research: **Which of the VPR video feedback (visualization of one's own realization) and VM video feedback (visualization of a model) is the most indicated in learning a new task in PES?**

I-2- Assumption:

We can certainly hypothesize that in a learning situation, the augmented feedback device, based on verbal feedback associated with video feedback has an impact on the significant improvement in motor progress in the student; and we believe that the augmented feedback device composed of verbal feedback associated with VPR video feedback (visualization of own performance) is the most indicated, allowing better motor progression in students when learning a new task in EPS that the augmented feedback device composed of a verbal feedback associated with a video feedback VM (visualization of a model).

I-2-Definition of concepts:

- **Feedback:** literally translated from English as "feedback", can be defined as feedback in a movement regulation loop in which the detection of the error and its correction would be essential for learning engines (Mulder & Hulstijn, 1985).

- **Intrinsic feedback:** The information comes from our sensory channels (Maslovat & Franks, in Hugues and Franks 2008), from the body of the performer. These perceptions can be visual, auditory, gustatory, tactile, olfactory).

- **Extrinsic feedback:** Sometimes called enhanced feedback or increased feedback comes from a source outside the body. It is generally verbal (Hebert & Landin, 1994; Salmonietal., 1984), of a coach giving corrections; but can also be presented in visual form such as: a stopwatch after a race, a note given by a diving judge or by viewing a video on a computer or a Smartphone (Schmidt, Lee, 2013, p. 258) .

II- PRACTICAL CHAPTER:

II-1- Objective:

-First of all, demonstrate the impact of the use of video feedback on improving motor progress in the students by comparing the pre-tests in the two groups where only verbal feedback was used (teacher's instructions) post test where verbal feedback combined with video feedback was used.

-In order to test The relevance of an augmented feedback device based on video feedback associated with the teacher's verbal feedback, which used in a learning situation, We suggested a comparison between two ways of using video feedback in which we have coupled in group1: verbal feedback from the teacher and visualization of their own performance images (VPR) and in group 2: verbal feedback from the teacher and visualization of a model (VM), and check which of the two term of use has the most impact on the significant improvement in

motor progress in the student, when learning a skill (long jump) commonly referred to in PSE.

II-2-Research Design and Methodology :

To achieve the objectives of the study, we used

II-2-1- The experimental method:

The methodology focuses primarily on experimentation with the use of video feedback; to determine its impact on learning by comparing the pre-test to the post-test of the two groups; then we move on to the comparison of the use of two video devices, group 1 (visualization of own performance), group 2 (visualization of a model) to determine which of the two devices has the most impact on the improvement significant motor progress in the student, by comparing the technical progress of the two groups when learning the technique from the chair to the long jump.

II-2-2- Experimental protocol:

The video will be used in all the sessions, in both groups separately. The process used is delayed viewing to allow rapid rotation of the students.

In order to make a comparison between two conditions of teaching, we decided to entrust the tablet to the teachers, by offering them the same protocol of use. Thus, in our preparation with each of them, we defined how their verbal observations (based on the criteria for performing the long jump technics) and we explained to everyone how to use the tablet by choosing the ideal angle and position to make a video record during their various passages, how to manage the order of passage and the sequence of groups of pupils as well as the time of visualization of the video feedback by the pupils.

The device presented here will therefore allow the student, without losing time to see each other almost immediately, in order to be able to redress themselves, this is an immediate regulation to act in the short-term memory of the students.

During each session, the teacher explains the performance criteria so that the students can understand in detail how these phases of the jump are performed. In both groups, the students do their exercises facing the camera (tablet) and go after each trial (passage) near the teacher in order to: For group 1 (VPR) view their services, while group 2 (VM), will watch the video of the model going in loop. In both cases associating the images with verbal regulations (criteria analysis). The teacher, as an expert, will guide the pupils of the two groups and encourage them to focus their attention-on the criterion of achievement determining to the success of such phase of the jump, such as the run (uniformly accelerated), the impulse (the call foot, the attack of the free knee, the arms), the suspension (the flight), the extension, the equilibration and bring it back from the arms, the position of the recrystallized body), reception (feet together, rolling forward. There is a double advantage here, first the use of feedback in learning and then the visualizations and regulations made in short-term memory This will allow each student to have immediate feedback and start the exercise over again, correcting their mistakes.

II-2-3- The statistical method:

Matched statistics concerning the motor variable is used to verify the significance of its evolution in the four phases of the long jump over a six-week cycle. For all the data (changes), the means and standard deviation were calculated. The Student test for paired groups is used to compare the values: first, between the diagnostic test and the end-of-cycle test for group 1 (VPR), secondly, between the pré-test and the post test for group 2 (VM) and thirdly compare the progression in learning between group 1 (VPR) and group 2 (VM).

II-4- The study population:

To carry out our research, we Conducted our research in high school (2nd year secondary class). The learning unit is made up of six sessions at the rate of one session per week lasting approximately one hour. The sessions take place in the long necklace (long jump). To make a comparison between the two teaching conditions, (Group 1 visualizing one's own performance and Group 2 visualizing a model). We used the same usage protocol when recording and viewing.

II-4-1- The Sample

The subjects of this research consisted of 2nd year pupils studying in high school. 26 pupils (11 girls and 15 boys) which presents an exemplary attendance index at PES sessions. Their ages vary between 16 and 18. After the diagnostic test we divided the students into two homogeneous groups of 13 students. According to the results (performance and technical performance of the long jump). Here is a summary table of the distribution of students in the groups.

Table n ° 1: the characteristics of the sample (Group 1 viewing the video of their own VPR achievements) and (Group 2 viewing the video of a VM model).

	N	Age (ans)	Poids (Kg)	Taille (m)
Groupe 1 (VPR)	13	17,23 ± 0,44	70,69 ± 8,05	1,74 ± 0,06
Groupe 2 (VM)	13	17,31 ± 0,48	70,69 ± 8,6	1,73 ± 0,06

II-5-Material / tools

In order to achieve the objective of our research we used a tablet to film the realization of the exercise on a long necklace and to watch it later. An observation sheet has been designed to assess each step of the long jump.

II-6-The choice of sports and physical activity:

We relied on national education programs to choose an APS (long jump), which encompasses and demands qualities such as speed, strength, coordination ... that

teachers generally used in their annual programming.

Long jump is an individual sport, it is motivating only if the student succeeds in correctly carrying out his different phases, of course in a climate of competition with his comrades in order to achieve the best jump.

Finally the choice was also made according to my pleasure to practice and teach this activity.

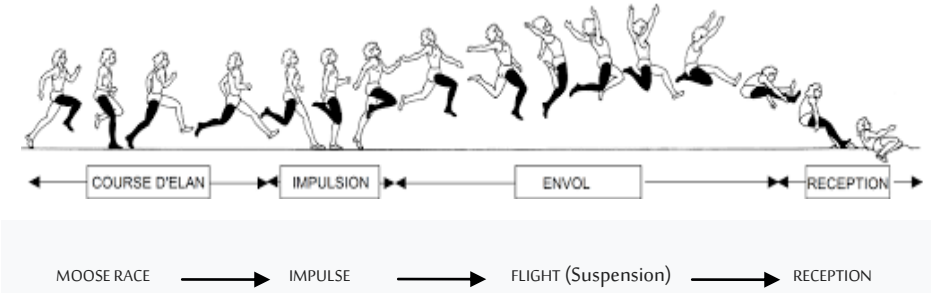

Figure 1: The different phases of the long jump technics

Table n ° 2: The performance criteria retained for the execution of the long jump technics.

Phases	Performance criteria
MOOSE RACE	-uniformly accelerated run, call. -Course-call link
IMPULSE	-Pulse call foot, free knee attack, arms. -Adjust the momentum stroke to achieve an effective momentum; -The duration of the pulse is minimized as well as the flexing of the pulse leg -Place the CG as high as possible during takeoff (the knee of the free leg is pushed up and forward); -The hip, knee, and ankle joints are fully extended -Use the free segments (arms, legs) to propel yourself;
FLIGHT (Suspension)	-Extension and Balancing (straight and vertical trunk); -Returned push leg and arms up and forward (the position of the body re-invented ((grouped).

RECEPTION	-Projection of the legs beyond the pelvis; -A late return of the lower limbs; - The arms go back; -Sitting in the mark left by the feet,

II-7- Measures:

Two measures are taken for each group during the experiment; pré- test at the start of the cycle and post test at the end of the cycle (long jump), based on observation. With observation sheets where the four phases of the jump are broken down into performance criteria, to which we had to give a score (successful = 1, unsuccessful = 0), then calculate the averages for each phase.

III- RESULTS:

The average results presented describe the evolution and advancement of learning in the four phases of the long jump for both groups, VPR and VM.

Table n ° 3: Comparison between pré-test and post test in the two groups

	Phases	Diagnostics test	End of cycle test	t	P-
VM	**Moose race**	1,15 ± 0,555	1,62 ± 0,768	-3,207	**0,008**
	Impulse	1,15 ± 0,376	1,69 ± 0,751	-2,941	**0,012**
	Flight	1,31 ± 0,63	1,62 ± 0,506	-1,76	0,104
	Reception	2,15 ± 0,801	1,08 ± 0,862	3,27	**0,007**
	Total	5,77 ± 1,166	6 ± 1,581	-0,714	0,489
VPR	**Moose race**	1,15 ± 0,689	2,46 ± 0,519	-6,278	**0.000**
	Impulse	1,31 ± 0,63	2,31 ± 0,48	-8,832	**0.000**
	Flight	1,31 ± 0,63	2,08 ± 0,76	-2,993	**0,011**
	Reception	1,23 ± 0,599	2,15 ± 0,801	-5,196	**0.000**
	Total	5 ± 1,155	9 ± 1,08	-14,422	0.000

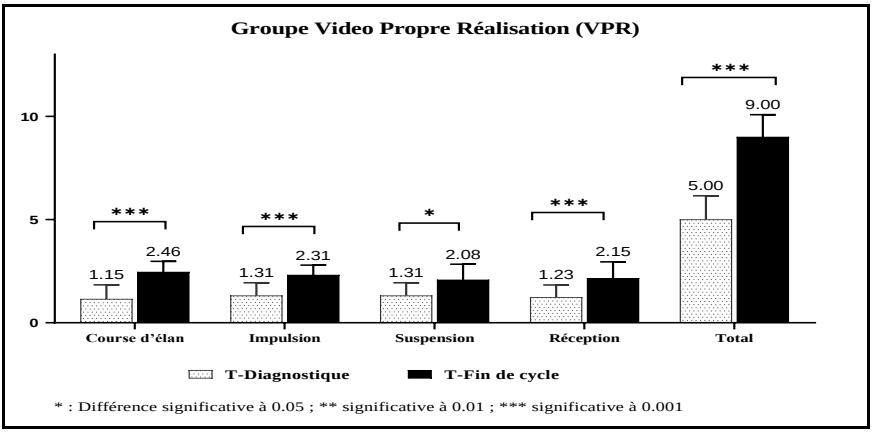

Figure n ° 2: Comparison between the means of achievement of the four phases of the long jump for group 1 (VPR) between the pré-test and the post test.

The general trend in this graph shows a greater progression in learning along the long jump cycle among the group viewing the video of their own achievement. The comparison between the pré- test and the post test revealed a significant difference at the threshold α<0.001. The comparison between the four phases of the jump revealed a statistically significant difference (P <0.001) for the run as well as for the impulse and the reception, in addition to a significant difference at P <0.05 for the suspension phase. This shows the importance and the impact of using video feedback and the impact of viewing your own performance on learning a new task in EPS.

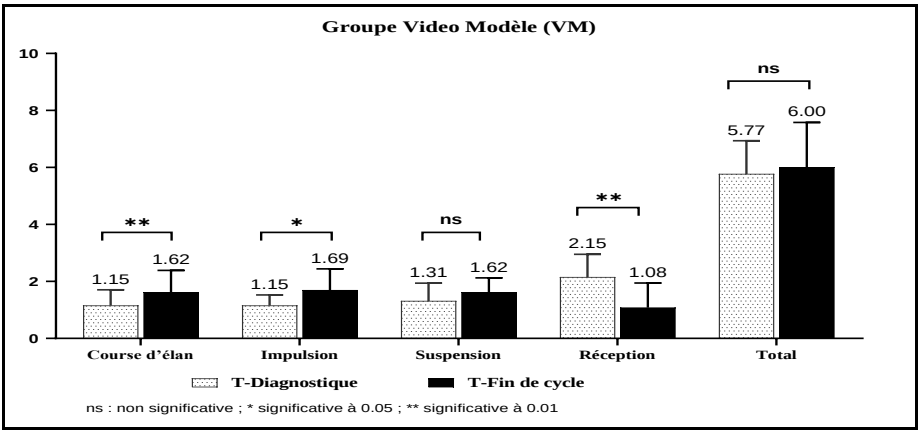

Figure n ° 3: Comparison between the means of achievement of the four phases of the long jump for group 2 (VM) between the pré- test and post test.

The general trend of the graph of the group visualizing a model shows that there is no significant difference between the pré- test and the post test in the long jump, however the comparison of the averages by phases of the jump from the start test (pré-test) and those of the end-of-cycle test (post test) revealed a statistically significant difference at P <0.01 for momentum as well as for reception, a significant difference at P <0.05 for impulse, and a difference significant at P <0.01 for reception, however there is an insignificant difference with regard to suspension.

The result of the various corrections made after each attempt, make the students progressively gain speed in the run and force during the impulse which cause them to jump further; however during the flight they can no longer manage their bodies in space; (bring the arms forward, the grouped body ...), which ultimately gives poor reception (example: tendency to fall behind or on the side after reception) and which explains the regression during the post test compared to the pré-test.

Table n ° 4: Comparison between the progression of group 1 and the progression of group 2.

Phases	VM	VPR	t (Student)	P-
Moose race	0,46 ± 0,519	1,31 ± 0,751	-3,342	**0,003**
Impulse	0,54 ± 0,66	1 ± 0,408	-2,144	**0,042**
Flight	0,31 ± 0,63	0,77 ± 0,927	-1,485	0,151
Reception	-1,08 ± 1,188	0,92 ± 0,641	-5,344	**0.000**
Total	0,23 ± 1,166	4 ± 1	-8,848	**0.000**

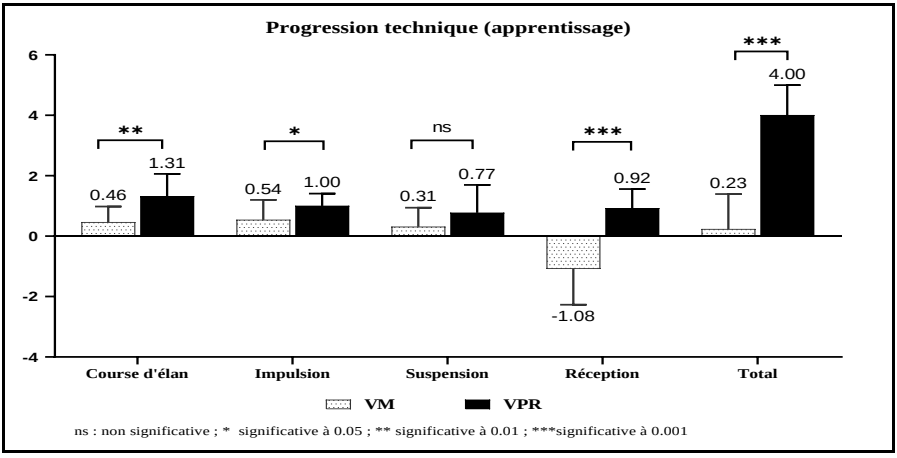

Figure n ° 4: Comparison between the means of progression in the four phases of the long jump between group 1 (VPR) and group 2 (VM).

By comparing the learning progressions of the two groups VM and VPR practicing the same activity (long jump). We observe in the graph above that, in general, the progression obtained along the long jump cycle is greater in the group viewing the video of their own performance (VPR) than in the group viewing a model (A statistically significant difference (P <0.001). This is visible in the four phases of the jump. A significant difference at the threshold $\alpha = 0.01$ for

the momentum, a significant difference (P <0.05) for the impulse, a non-significant difference for the suspension, and A very significant difference (P <0.001) For the reception.

IV- DISCUSSION:

The aim of our research is to test which of the video feedback visualizing one's own performance (VPR) or video feedback of a model (VM), both of them are associated with the teacher's verbal feedback, is best indicated in learning a new task in EPS. A comparison was made between these two groups over a long jump cycle; we have deduced that the video feedback of its own performance is more indicated than the video feedback of the model as regards the improvement of student learning. However, the absence of a control group and the size of the sample invite us to put into perspective the direct effect of the device on the learning measured.

Our results show that the study participants made significant motor progress in the long jump technique. Thus, there was an improvement in learning in the different phases (momentum, impulse, suspension) except reception at group 2 (viewing a model), while in group 1 (viewing one's own performance), notes an improvement in the four phases of the jump. In view of the elements of the literature review, it indeed appears that the use of video associated with verbal feedback can optimize motor learning. It should be specified that, during our experimentation, the feedback is provided "simultaneously" during the implementation of the action. This confirms the results of Swinnen, Lee, Verschueren, Serrien & Bogaerds (1997), who showed that simultaneous feedback promotes learning linked to segmental coordination, as in the case of the long jump.

The passage of the student at the end of each test to see the video feedback

would promote auto-detection of the error. It was found that the pupils discussed and interacted with each other very widely on the exercises to be carried out. Within each group, discussions increased. However, the motivational aspect and the interactions mentioned above are not actually the same among the students of the two groups. Note the motivation noted among the students in group 1 (VPR), where we noted a rise of competitive climate not only in the sense of the one who jumps the furthest, but also in the quality of the execution of the jump, this is in line with numerous studies ((Hodges and Franks, 2004) Allen & Howe, 1998; Amorose & Horn, 2000; Amorose & Weiss, 1998;) which have highlighted the important role of extrinsic feedback as sources of information for the 'self-assessment of one's own competence, and consequently on the increase in intrinsic motivation. Bilodeau and Bilodeau (1961, p. 250) assert that "there is no improvement without knowledge of the result".

The pupils of group 1 (VPR associated with the verbal feedback from the teacher), would be more motivated, therefore better able to understand the movement and in particular at the level of the sequence, of the different movements of the body segments; especially since the different phases of the jump are taught in order.

These results are consistent with the conclusions of numerous studies using video feedback (VFB) associated with verbal feedback for the rapid acquisition of complex skills (Boutmans, 1992; Boyce, Markos, Jenkins & Loftus, 1996; Erbaugh, 1985; Guadagnoli et al., 2002; Janelle et al., 1997; Mérian & Baumberger, 2007; Smith, 2006; O'Donoghue, 2006; Merian and Baumberger, 2007). However, the results appear to be inconsistent with those of Rothstein & Arnold (1976) and Salmoni et al. (1984) who evoke the need to have a certain level of practice to be able to optimize one's learning by the VFB, while the initial level of our sample; (diagnostic test) measured in the participants of this study

clearly shows that they did not have a high level of practice. In the end, we share the opinion of Delignières, Teulier, and Nourrit (2009, p. 332) who believe that "it can be assumed that certain essential information may be difficult to access naturally and that it may be useful to make it available for the learner ".

IV-1- Comparison between the results of the pré-test and the post test in the group using video feedback visualizing their own performance:

By achieving more success criteria during the balance test (82.05%), with an average of (9 ± 1.08) than during the start of cycle test (38.46%) with an average of (5.077 ± 1.115). Statistical analysis by comparing post test with the pré- test, demonstrated a statistically significant improvement ($P < 0.001$).

The comparison between the four phases of the jump from the pré- test and post test revealed an improvement in learning, and this by achieving more success criteria during the post test: (82.05%) for the momentum, (76.92%) for the impulse, (69.23%) for the suspension and (71.79%) for the reception; with a significant difference at the threshold $\alpha = 0.001$ for all phases of the jump, except the suspension phase where there is a significant difference at the threshold $\alpha = 0.05$.

The student will build a mental image of the movement in particular through the teacher's explanations and practice, then the video would allow him to view his movement directly after its completion, which brings him to a look and a judgment on what it produces, thus allowing it to be compared with its "mental representation" of movement (Schmidt, 1993).

According to Austermann Hula, Robin, Ballard, & Schmidt, 2008, giving feedback after a short delay (from a few seconds to 1 minute) should help the development of self-evaluation and self-detection of error in giving the learner enough time to relate intrinsic feedback to extrinsic feedback. The student will not simply modify his achievement following a correction, but he will first be

able to compare it. By seeing for themselves the adequacy between what the master tells him and his execution (Quigley et al, 1992), and to ensure the correct achievement of the skill required, the student must make the link between the criteria for achieving the skill (verbal feedback from the teacher) and his own achievements (viewed on the video), looking for where the error is and trying to correct it. Thus, in a mediation situation, the association of the supporting images with the elements of verbal mediation allows students to identify errors and successes, to identify the concepts at play, the indicators on which to develop the adapted action rules (Simonet, 1986). So we can say that: the observation of his own performance as well as the teacher's verbal guidance on these moving images, stimulating short-term memory, is certainly an effective means in acquisitions.

In addition, it seems logical that providing information about one's own performance through video generates motivation and positively influences emotional factors and thus contributes to improving the affective knowledge that the student has of the task. He thus finds sense in getting active. As pointed out (Weiss and Ferrer-Caja, 2002), intrinsically motivated individuals put in more effort and show more persistence. Add to this the observation of its novice peers which also contributes to improving the learning of beginners who watch them (Magill, 2011).

IV-2-Comparison between the results of the pré- test and the post test in the group using a model video feedback (VM):

Following the comparison of our results, and the statistical analysis, we remain surprised to find an insignificant difference between the pré- test and the post test in the group receiving video feedback (visualizing a model). to be due in the first place to the small size of our sample (13 pupils); and the fact that the pupils discover the activity for the first time (long jump), moreover, certain studies tend

to show that the VFB is only effective if the level of mastery is high; Rothstein &Arnold (1976) and Salmoni et al. (1984) discuss the need to have a certain level of practice in order to be able to optimize learning through video feedback. However, the statistical analysis of the comparison of the means by phase of the jump revealed an improvement in learning with significant differences in two out of four phases, a significant difference at the threshold $\alpha = 0.01$ for the run and significant difference at the threshold $\alpha = 0.05$ for the impulse, there is a non-significant difference in the suspension phase, while we can observe a regression in learning with a significant difference at the threshold $\alpha = 0.01$ in the reception phase, here again we question the seriousness and the investment in the task of certain pupils who participated in this study.

Blandin (2002) states that "Ŧlogically, observing the performance of the model during motor reproduction and receiving feedback on this production prompted subjects to make adjustments during execution." In addition, numerous studies show that the association of VFB and verbal feedback would optimize learning (Ross, Bird, Doody, and Zoeller, 1985; Darden, 1999; Kernodle & Carlton, 1992; Mérian & Baumberger, 2007) .However, certain limits have been witnessed concerning the use of this device, in particular for learning complex coordinations involving a large number of articulations in different planes of space (Rothstein & Arnold, 1976). This may explain the absence of a non-significant difference for the suspension phase, as well as the regression in the reception phase, it should be emphasized that the latter is very dependent on the previous phase (the suspension), Add to this , the way of interpreting the information gathered from the visualization of a model, and the ability to manage your body in space (impulse) to prepare for your fall (reception) in good conditions. In addition, we found that some students did not adhere to our

working method, and work much more on the show pole (of the model) than on observations and analyzes.

In theory, video feedback should allow the student to build a more precise mental representation of performance, which, in terms of learning, should ensure better regulation of his action.However, external visual control will not facilitate reproducing a model only when the learner has an adequate mental image of performance (Carroll and Bandura, 1987). This implies that the use of visual control will not necessarily be relevant in learning a completely new task (Carroll and Bandura, 1982). Without forgetting the short time of effective practice (four learning sessions) which does not completely stabilize these new skills. On another level, for FAMOSE (1990), " the concepts of learning and motivation maintain a reciprocity in PSE, motivation promoting learning and learning promoting motivation", which may explain the lack of interest observed in some students for this type of learning and the lack of investment in the requested task, as is the case of student # 10, add to this the frustration generated by the fact of comparing their benefits to that of the model which demotivates the student, and therefore negatively affect learning.

IV-3-Comparison of learning progress between the group using video feedback of their own performance and the group using model video feedback:

Statistical analysis by comparing the general average of group 1 progression (VPR) which is (4 ± 1) to the general average of group 2 (VM) which is (0.23 ± 1.166), showed that there is a significant difference at the threshold $\alpha = 0.001$. When comparing the different means of the four phases of the jump between group 1 (VPR) and group 2 (VM), the statistical analysis revealed a significant difference at the threshold $\alpha = 0.01$ for the run, a significant difference at the threshold $\alpha = 0.05$ for the pulse, a non-significant difference for the suspension,

and a very significant difference at the threshold $\alpha = 0.001$ for the reception in favor of video feedback (VPR) which means the usefulness and the advantage of using video feedback of the own realization over the use of video feedback of a model; and which confirms our hypothesis which states that feedback is much more effective when it takes the example of the person concerned instead of taking an external example (model).

By referring to our observations in the field, we can affirm that the pupils are different vis-à-vis the use of video feedback and more precisely video feedback (visualization of a model) during PSE. This difference can be seen in the efficient use of video and the interpretation of the information it provides on the progress of the gesture. Indeed, the motivational aspect generated by the video is not necessarily the same for all the students (the two groups), we have noticed that the students in the group (VM) seem less motivated than those in the group (VPR), often, they try to carry out the various phases of the jump without carrying out return allowing them to check the good realization of this one, by comparing their criteria of realization to those of the model. On the other hand, in the group (VPR) we can notice that, the pupils are motivated by the fact of seeing their own performances after each test and their progress after each correction. It should also be noted that not all students are equal in the use of new technologies, and that some students have a lack of interest in this type of learning and lack of investment in the task requested.

CONCLUSION:

The objective of the research is an experiment concerning two ways of using video in PSE learning. After having followed a class of students along a six-week long jump learning unit, we will remember that the analysis of the data allowed us to observe motor progress of the students and that the video feedback reinforces the student acquisitions. By comparing the two learning devices based

on video feedback associated with verbal feedback (group 1 (VPR) receiving verbal feedback and video feedback (viewing their own productions), and group 2 receiving verbal feedback and video feedback of a model); the results showed that the students in group 1 (VPR) had better motor progression than group 2 (VM).

Based on our results, we can say that:

-Feedback, whatever its nature, is decisive for the learning of our students.

-Video feedback from the kearner's your achievement has a greater impact than video feedback from a model on learning.

-The teacher's verbal feedback is essential for video feedback to have an impact on student motivation and therefore, as a corollary, on learning.

-The effectiveness of video feedback seems to depend in particular on the level of familiarization of students with the method of using video in the PSE session, their motivation and their ability to interpret information.

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