

Full Length Research Paper

The importance of video-feedback and instruction

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In a study that involves the apprenticeship of a sport technical skill – fosbury flop – in Physical Education lessons, where 8th year pupils (164) of a primary school, divided into two groups of 82 participated, it is concluded that the results achieved by the two groups differed. The group with the better result is the one which used video, as a transmitter of feedback. Before the beginning of the teaching unit some pre-tests on motive performance and cognitive knowledge of the fosbury flop were done. During the process, teaching/learning of all the capacities relating to auto- perception, feedback perception and information perception transmitted by the teacher was evaluated. At the end, some post-tests on motive performance and cognitive knowledge were done and some elements concerning the pupils' satisfaction in relation with the lessons set taught. It was verified that the video-feedback influences largely the pupils' learning (cognitive and motive) and amplifies their capacity of auto-perception. That influence decreases when the video is only used to transmit instruction. Moreover, relevant differences between the two groups concerning the perception capacity of the feedback, information and satisfaction with the lessons were not verified.

Key words: Video, feedback, instruction.

INTRODUCTION

Beyond the appreciation of the cognitive activities of the pupils, it should be pondered what they think about the pedagogic auxiliaries such as exercise books, books, slides or videos and relating them with the amount of knowledge obtained in Physical Education to know how much these elements help in obtaining success (Lee and Solmon, 1992).

This investigation was done to verify if video changes the motivation for learning and if it influences its apprenticeship. The conclusion is: does the presence of the video always discriminate the type of images between video instruction and video feedback?

In order to verify if there are differences between the utilization of video as an instruction transmitter or as a way of transmitting feedback, a sample of 164 pupils (n = 164) was studied during the teaching/learning of the high jump using fosbury technique. The sample was divided

into two groups of 82 pupils: group 1 and group 2. Group 1 observed their own motive performances through video recorded images – video-feedback; meanwhile group 2 observed a motive model performance only – video-instruction.

The participants were subjected to a pre and post-tests, at the beginning and end of the teaching unit, in order to evaluate their motive capacity as well their cognitive knowledge in relation to high jump.

During the teaching-learning process, their auto-understanding capacity was evaluated through some inquiries; and their capacity of understanding instruction as well as perception of the feedback was evaluated through interview (Hazen et al., 1990; Morrison and Reeve, 1988).

Often feedback is verbally done which limits its action. This is because its disposability and the alternatives to present it are inherent to the person who gives it, and restricted to the conditions of time and space, where it is occurs (Boutmans, 1992). Video can also be an efficient and rich means for presenting a feedback (Meeus, 2010).

However, video does not serve only for transmitting

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feedback. It is equally important in transmission of learning, as it permits that the pupils have more understanding of the correct movement to execute or imitate (Morrison and Reeve, 1988).

Based on some studies which have been developed and starting from the analysis of the influence of the video utilisation in the apprenticeship of physical activities, it was possible to collect a set of advantages which this strategy can supply (Hastie, 1990; Hall et al., 1990).

For this study, participants were divided into two groups, where group 1 was made to watch their motive performances through video recorded images, in two swimming techniques – crawl and breaststroke; and group 2 received video-feedback, equally in swimming techniques- backstroke and breaststroke. The authors verified that the groups showed significant differences in the post-test results that entail crawl and backstroke, but there was no significant difference in breaststroke technique. So it is possible to conclude that the pupils get better performing levels and consequently more elevated percentages of evolution in the techniques where they received feedback through video. The authors also verified, through inquiries at the end of the study, that the pupils stayed more satisfied with the lessons when they watched themselves on the video since the technique permitted them to see what they did not know and made learning easier to them.

Investigations on the use of video for teaching permitted the enumeration of large reasons which make video an efficient pedagogic auxiliary means for physical activities teaching (Boyer, 2009):

- It makes teaching easy, aiding the teacher in the transmission of ideas and images;
- It permits better understanding of the lessons subject by the pupils;
- It leads to higher learning percentages gain than the traditional teaching;
- It improves pupils' attention;
- It makes the pupil an active agent of work and makes apprenticeship easier;
- The same image can be watched (analysed) by several pupils;
- The same image can be transmitted over and over;
- The same image can be transmitted at normal speed or in slow motion which makes watching and analysis easier;
- The teacher can have more time for each pupil;
- The teacher can watch and analyse the performance of each pupil providing specific and different information to all the class;
- It aids the reflection of the watched images permitting the athletes to be conscience of the positive and negative aspects in theme;
- It allows the correction of mistakes and it suggests their possible and more correct solutions;

- It permits the transmission of new knowledge;
- It permits the reproduction of images of the performed movement at once;
- It permits the reproduction of these images as many times as necessary until all mistakes, committed during the performance of the movement, are seen;
- It permits the reproduction of images of a model performance as many times as necessary until the correct movement is obtained;
- It makes it easy for teachers to transmit instruction as well as feedback;
- It makes it easy for pupils to understand the subject and makes the teaching and correction of the subject clearer to the teacher;
- It makes it easy for pupils to see the mistakes which they did not know they committed and makes them to do the correction by themselves;
- It quickens the learning process, makes it easier, leading to success of the pupils;
- It contributes to the satisfaction the pupils have during the learning.

The video use during the training sessions permits the interruption of the activity in order for the athletes to see, immediately, images from the training, which leads to a motive gain increase taking advantage of short memory. Based upon the consulted reference, it is possible to bring out some more advantages of the video utilisation, such as:

- It permits the pupils to compare the concept that they have of the correct movement and their own performance;
- It permits the pupils to compare their own performance (extrinsic feedback) with their own auto- perception (intrinsic feedback);
- It permits the pupils to compare the corrections pointed by the teacher with their own execution simultaneously;
- It permits the teacher to show a model performance, which is always the same, without any imperfection or mistake caused by fatigue, that usually occurs when the modeller is the teacher;
- It permits the teachers to transmit a feedback that corresponds to one hundred per cent of what the pupil performed (descriptive feedback). In this, the teacher tries not to imitate the bad pupils' performances (descriptive feedback) or tries to demonstrate correct performances (prescriptive feedback) mainly when he does not perform very well the movement he wants to teach.

With the objective of knowing the difference between the use of video as an instruction transmitter (video instruction) or as a feedback transmitter (video feedback), a study was done with 164 pupils, from 6 classes of nearly 28, during a teaching unit. The unit had as objective the teaching-learning of the high jump using the

fosbury technique. The teacher was the same in all classes. The average age of the pupils was fourteen varying between thirteen and sixteen.

MATERIALS AND METHODS

Before the experiment, the pupils were subjected to a pré-test of evaluating their capacity in the high jump using the fosbury technique as well their cognitive knowledge about this jump.

The participants consent to all the experimental procedures, according to Helsinki Declaration, defined in United Nations Declaration, as the model for the conduct of research in which humans are participants. The data analyses accomplished appropriate participants' permissions.

The pré-test relative to motive performance was video recorded. Later the performances of the pupils were evaluated through the observation of the recorded images and the results written down on a criterion slip created for that purpose. Based on those notes the pupils were classified on a nominal hierarchic scale.

The initial sample was then divided into two homogeneous groups concerning the performing capacity of the jump ($F = 0.0533$ – ns for one p -value > 0.05). Each randomised group had 82 pupils. During the process of the teaching-learning that comprises 6 lessons- 3 for an hour and 3 for three hours, there was an evaluation of the capacity of auto perception through some inquiries elaborated based on the effect as well the capacity of instruction perception. The feedback perception was evaluated through interviews. All those moments were video recorded.

At the beginning of each lesson the pupils were divided in accordance with the group where they belonged.

The pupils of group 1 observed the images that were video recorded, which referred to their own motive performances (executed jump and video recorded at the end of the previous lesson). That observation period was supervised by the teacher who commented on the images given; thus, the pupils have a complete feedback of their performances. That period of observation had duration of nearly 3 min.

The pupils of group 2 observed a performance model of the high jump executed by an Olympic athlete. Those images ran in slow motion from several angles and magnified in certain movements. The teacher commented on the images and used them for transmitting the instruction of the lesson, putting evidence of the movements he wanted to teach during that lesson. The observation time of those images was nearly 3 min.

After that period, the analysis of the video images recorded (group 1 video-feedback and group 2 video-instruction) and the lesson began, with the teacher doing verbal instruction followed by one short warm up.

The lesson comprised a set of activities which had the purpose of preparing the pupils for the performance of the jump. The lesson ended with the global performance of the jump which was video recorded. That video record was analysed by the pupils of group 1 at the beginning of the lesson the day after.

The process was, as much as possible, equal for the 8 classes in order to warrant the fidelity of the results.

During the last lesson, pós-tests were made similar to the pré-tests, following the same method adopted at the beginning with the purpose of evaluating the evolution achieved by the pupils.

At last the pupils were asked about their satisfaction with the lessons set and asked for their reasons.

With the purpose of analysing the results of the two groups to see if there were or no differences between the video-feedback and video instruction utilisations, variance analysis was used to compare the two groups, based on their motive and cognitive learning; as well as their auto -perception and perception capacities, using both instruction and feedback for each group.

For analysing the video action in any of the used methods, in the satisfaction with the lessons, Chi-square test was applied to both groups.

First of all, the results concerning cognitive and motive learning were analysed. Second, the results of auto perception, feedback perception and instruction capacities were discussed. The groups are not significantly different at the pré-test (p -value = 0.54) but they show significant differences at the pós-test and evolution (p -value < 0.05).

RESULTS

It is possible to verify that group 1 shows an evolution higher than group 2 in the cognitive parameter. At the beginning of the study, the groups showed values very close; those of group 1 were lower, but at the end of the study there was a reverse situation- there was significant difference.

Through the statistic results based on the variance analyse of the values of the pre and pós-tests of each group, and cognitive learning (group 1 – $F = 300.19$ *** - p -value > 0.001 and group 2 – $F = 204.59$ *** - p -value > 0.001), it is possible to verify that group 1 has an evolution higher than group 2.

The pré-test shows a lot of mistakes done by both groups as a reflex of a deficient motive performance. The pós-test shows that the number of the mistakes decreases in both groups but group 1 shows a decrease that is most prominent. Analysing the standard deviation of the mistakes done by both groups, it can be seen that while group 2 does not present significant alterations between the pre and pós-tests, group 1 presents a substantial reduction.

Studying the results given by the variance analysis of the values of the pre and the pós-tests of each group concerning motive learning (group 1 – $F = 419.51$ *** - p -value < 0.001 and group 2 – $F = 20.26$ *** - p -value < 0.001), it can be verified that t group 1 had an evolution more prominent, as it presents F values superior to group 2.

The difference between the two groups is highly significant (p -value < 0.001), showing that group 1 has higher values in auto- perception capacity.

The groups are not different (p -value = 0.506). The perception they both have of the transmitted information is equal to the group who has seen the motive performance through the video recorded images (group 1) compared to the group who only saw a model performance (group 2). The truth is that the percentages achieved by each group are very similar.

In the feedback perception capacity, the groups are not different (p -values = 0.787) having both obtained similar values.

The two groups are not significantly different in satisfaction, as it can be proved by the result of the Chi-square Test (χ). It can be verified that both groups have majority of the pupils in the "satisfied" or "very satisfied" parameters. Although group 1 has more pupils who are

very satisfied than in group 2 (50% against 42.7%), where the majority are satisfied (51.2%), in totality the parameter was having more pupils who are satisfied (which is 50%). Group 1, on the other hand, has only one pupil who was unsatisfied (1.2%) against 5 (6.1%) of group 2 that has one who was completely unsatisfied.

Through the analysed elements it has been verified that the groups do not present significant differences in the following variables: satisfaction with the classes; perception capacity of the information; and perception capacity of the feedback.

In this context it is possible to say that the satisfaction of the pupils is not altered by the kind of images seen on the video. Thus, almost all the pupils stayed satisfied with the lessons; those who received feedback through the video (video-feedback) (98.8%) as well those who watched a model performance (video-instruction) (93.9%).

The transmitted images do not exert any influence on the pupils' perception of the feedback or of the teacher's information.

It was verified that the groups presented significant differences in the other three variables:

- Auto perception capacity;
- Cognitive learning;
- Motive learning.

During the study of the correlations described it has been verified that the pupils, who received feedback through video, were able to evaluate their motive performances (auto perception) with accuracy and that strategy (video-feedback) had more positive effects on the cognitive and motive learning of the pupils than the video instruction.

The fact that all behaviours with significant differences in standard deviation of group 1 have decreased while that of group 2 increased in the values showed by pre and pós-tests means that group 1 showed a tendency to become more homogeneous, while group 2 became more dispersed in relation with the performance of its elements.

Through the statistic results referred to in the variance analyse between the pre and pós-tests values of each group, in each learning, it was possible to verify that group 1 made a progress in a more effective way as it showed F values higher than those of group 2 in both.

Conclusion

It was concluded that group 1, in spite of its present percentages with satisfaction levels in the lessons lightly higher than group 2 does not differ very much in relation with this variable. In relation with information and feedback perception capacities both groups are not different in showing similar results.

In the auto perception capacity, it was concluded that the group who has seen the video-feedback achieved better results than the other group who has seen video-instruction. So, group 1 pupils were able to identify their own mistakes more accurately than the pupils of group 2.

It was in group 1 that one achieved superior levels of performance in the cognitive learning as well in the motive, showing evolution values significantly higher than that of group 2. So, the conclusions are:

- 1) The video-feedback exerts a higher influence than the video-instruction on the learning of the pupils. As it can be seen group 1 – video-feedback – had an evolution higher than group 2 – video-instruction in the motive learning (74.3% against 49.9%);
- 2) It amplifies, with better results than the video-instruction, auto perception capacity. As it can be seen group 1 achieved understanding of 71% of the mistakes whereas group 2 only understood 48.3%;
- 3) It exerts identity as that verified in the video instruction strategy in information perception capacity (group 1 – 54.1%; group 2 – 56.6%) as well as in relation to feedback perception capacity (group 1 – 78.9%; group 2- 78.2%);
- 4) It has no higher influence on lessons satisfaction than the video instruction (98.8%) of the pupils of group 1 and 93.9 of group 2 stayed satisfied with the lessons.
- 5) The general opinion of the pupils is that video has a positive influence on learning as a transmitter of feedback and instruction and that it should be used in all Physical Education lessons for the following reasons:

- i) It facilitates learning;
- ii) It makes lessons more comprehensive – the subject is better understood as well as the teachers' explanations;
- iii) It makes one to see mistakes, identify and correct them – referred by a pupil from group 1 only;
- iv) It allows for observation of evolution – referred by group 1 pupils only;
- v) It increases motivation for learning;
- vi) It keeps the pupils more interested in the learning tasks.

Thus, it can be affirmed that video use, as a pedagogic means helps Physical Education, video-feedback and instruction. However, its utilisation for transmitting feedback to the pupils leads to better results than when it is used for transmitting instruction only.

Considering that at the school almost all of the pupils are beginners in the subjects or inexperienced, video use must be done carefully. It must be used in accordance with the following suggestions:

- For transmitting information to the pupils a model performance which can be performed by an athlete with experience or by a pupil, in spite of being corrected, will give them the sensation to easily imitate.

- For transmitting feedback to the pupils the teacher is obliged to:

- i) Put a fixed camera for preserving the recorded image quality and, simultaneously assuring the pupils of the record quality;
- ii) Obtain at least a recorded performance of each pupil;
- iii) As much as possible to integrate global performance into the learning which is to be recorded;
- iv) Put in good order pupils and performance, fluidity without any loss of time.

In any of the situations, transmitting instruction or feedback, the images must be commented by the teacher who, by purpose, must:

- Know very well the modeller which he intends to present;
- Study first the images that he intends to reproduce, from the modeller or from the pupils;
- Heighten the critical compounds of the performance which he intends to teach, during the lesson, leading the pupils' attention into the direction of three essential aspects (instruction);
- Record, at least, three moments of the pupils during the lesson, at the beginning, at the middle and at the end (if the time as well the lessons organisation permit it would be good to record all the lessons or at least one yes and another no);
- Arrange the work for the images to be seen before starting the lesson since it is used only by the short memory of the pupils.

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