

STRATEGIES FOR LEARNING GYMNASTIC SKILLS THROUGH TECHNOLOGIES IN INITIAL TEACHER TRAINING

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Abstract

The objective of this research was to present the study carried out for groups of first year students of the degree of Physical Activity and Sport Sciences of the University of Alicante (Spain). The purpose of the project was to determine the usefulness of self-assessment and the peer evaluation in teaching and learning of gymnastic skills. The methodology used was quantitative and qualitative. Analysis of Qualitative Data (AQUAD 6) software was employed to analyse the qualitative data and the office software Microsoft Excel for MAC (© 2015 Microsoft, Version 15.32) was used to the quantitative data. Observation as a strategy of information collection and the subsequent analysis of what is observed is an essential element in the process. Similarly, the use of technological instruments such as video camera and smart phone, the latter within the reach of the majority of students, were a facilitating element of the activity. On the other hand, students made a critical reflection on the method used by teachers, indicating under their perspective the strengths and weaknesses of the whole process. Audio-visual strategies and media have been such a positive issue in this study as well as self-assessment and peer evaluation, as they are adequate strategies to contribute to a proficient learning and management of the information.

Keywords: *Coevaluation, self-assessment, technological instruments, artistic gymnastics, regulation of learning.*

INTRODUCTION

Today, educational models, under the Bologna Process guidelines, emphasize competence-based learning. This process is characterized by developing, among other aspects, a more autonomous work of students, as well as an increase in the use of information and communication technologies. Due to this reason, university teachers seek more collaborative and participatory teaching-learning systems,

where the student has a leading role. In this sense, students must make decisions in the teaching-learning process about what, how, how much, and when to learn; that is, themselves should regulate their motivations towards this process.

Currently, various types of technological tools are used to complement and improve the contents of physical education classes in initial teacher training

such as blogs, web pages, etc. Some other authors have done the same by using teaching resources resembling those used in everyday life (videos, chats...) (Bergmann & Sams, 2014; Moffett & Mill, 2014).

In the field of Physical Activity and Sports, as in other subjects, many authors defend theories where high school and university students develop more autonomous behaviours and communication skills through collaborative strategies (Fernández-Río, 2006; Grineski, 1996; Hargreaves, 2005; Slavin, 1990; Vernetta, Gutiérrez, López, & Ariza, 2013). In the context of gymnastic skills, collaborative strategies and the use of learning registration tools (observation sheets, self-assessment and peer evaluation sheets, etc.) can help students to learn more meaningfully and with greater responsibility as has already been demonstrated in a number of studies (Dyson, Griffin, & Hastie, 2004; Vernetta, López, & Delgado, 2009; Vernetta, López, & Robles, 2009). Additionally, the recording instruments (video cameras, smart phones...) used by the student as tools for the observation and evaluation of their own learning can favour self-regulating behaviours in their training (Azevedo, Guthrie, & Seibert, 2004; Wilson, 1997). According to Prat, Camerino and Coiduras (2013), the advantages of flexibility, immediacy, adaptability, interactivity and others that contribute to the use of technological tools to the teacher, mean an improvement in the different aspects of the teaching-learning process. Likewise, Marinsek and Slana (2014) and Krizaj and Čuk (2015) claim that smart phones and videos are valid and reliable devices to improve the capacity of visual evaluation and the processing of all technical phases of the gymnastic movements. Information communication technologies (ICT), when used as constructivist tools, create a different experience in the learning process among students, relate to the way in which they learn best, and function as important elements for building their own knowledge (Hernández, 2008).

The evaluation is also an aspect of the teaching-learning process that worries teachers and it has been a matter of research by numerous authors in the field of Physical Education (Hernández, Velázquez, Alonso, & Castejón 2004; López, et al., 2007; Mosston & Ashworth, 1993). In agreement with the participatory strategies, we consider that the evaluation process should also be focused towards more formative and collaborative evaluation systems that contribute to the achievement of a more autonomous learning of the university student. Self-assessment and peer evaluation are presented in various studies as means that encourage the student to participate directly in the perception of their educational evolution and as systems that contribute to greater social development, autonomy and responsibility (Fraile, 2006; López et al., 2007; Slavin, 1990; Vernetta, Gutiérrez, López, & Ariza, 2013). The absence of autonomy in the learning of our university students, reflected and not obtained with the use of situations of conventional learning, leads us to reflect and introduce in our teaching more participatory and cooperative teaching methods, relying on technological instruments that could reinforce the learning of these competences. In this sense, observation as a strategy of information collection and subsequent analysis of what has been observed is presented as an essential element in the process. Likewise, the use of technological instruments such as video camera and smart phones, the latter within the reach of the majority of students, can be a facilitating element of the activity.

Therefore, this work aims to present an investigation carried out with groups of first year students of the degree in Science of Physical Activity and Sport of the University of Alicante. The aim of the project was, on the one hand, to design templates for observing the techniques of execution of different gymnastic skills and, on the other hand, to determine the usefulness of self-assessment and peer evaluation using templates designed together with the use of information

technologies and of communication, in the teaching-learning of such skills.

METHODS

This study is a quantitative and qualitative research and presents a quasi-experimental design. The selected sample is not accidental due to convenience and availability and is composed of 104 registered students: 80 men and 24 women (age average: 22,2 years old) in the subject *Artistic and Gymnastic Skills* of first of the Grade in Science of Physical Activity and Sport of the University of Alicante (Spain), in the academic course 2015-2016. The students were informed about the purpose of the study and that it was carried out according to the Helsinki declaration.

The instruments designed and used for this work were:

- Observation template of the gymnastic skills.
- Video camera and smart phone.
- Closed questionnaire with five questions about the student's perception of the usefulness of different evaluation tools for their teaching and learning process: effectiveness of the recorded initial self-assessment, error detection through recording, utility for the correction of own errors and other's errors through the recording, utility for personal progress using recording, adequacy of self-assessment and peer evaluation strategies.
- Open question: What would you highlight from the use of self-assessment and peer evaluation strategies through recordings and which difficulties have you encountered in the process?

The research is divided into two main phases: the first part corresponds to the design of the observation templates for self-assessment and the peer evaluation of four gymnastic techniques. The second phase has consisted of using and evaluating the template of observation of gymnastic abilities by the group of students enrolled in the subject of *Artistic and Gymnastic Skills*.

The practice group performs an initial self-assessment of the technical execution of four gymnastic skills: forward roll, backward roll, cartwheel and handstands. The gymnastics skill was recorded with the camera of the students' smart phones and then self-assessed by the students. It is then recorded in an observation template (offered by the university teacher), to verify if the different technical phases of these skills are met. Subsequently, in groups of four students, they carried out a peer evaluation.

After completing this initial process, the contents of the subject are implemented for two and a half months. The group can use the recordings and the observation sheets as teaching tools to know, at all times, the evolution of their teaching and learning. After the training period, the students perform a self-assessment and final evaluation of the skills learned, using the same registration form and recording as tools to analyse their learning progress. Finally, they were given the questionnaire about their perception of the usefulness of technological tools in their self-assessments and peer evaluations and how it impacted on the learning process of the proposed skills. On the other hand, the students made a critical reflection on the method used, indicating under their perspective the strengths and weaknesses of the whole process.

For the analysis of the data of the questionnaire a contingency table was used through the office software Microsoft Excel for MAC (© 2015 Microsoft, Version 15.32) and the data collected from the open question was analysed by three teachers of the *Area of Body Expression*, compiling the most relevant narratives of the participants. The Analysis of Qualitative Data (AQUAD 6), computer software developed by Huber (2004), was used to process the information. This computer programme has allowed us to organise and categorize the data in codes so that we could finally determine the point of view of participants.

RESULTS

The results are then grouped into three main blocks. The first findings show the design of the observation templates where the different technical phases of each of the developed acrobatics are broken down. Secondly, the results of the questionnaire are presented and finally the students' perceptions and reflections of the process carried out are reflected.

1. Result of design observation template

The template designed in order to evaluate the four gymnastic abilities based in Vernetta, López and Panadero (2000), Estapé (2002) and Karácsony and Čuk (2005) are divided in three technical phases (initial phase, main phase and final phase):

Forward roll

Evaluation criteria

Initial position

Stand outstretched arms

Main phase

Center of gravity moves forward

Hands on the floor at shoulder width

Flexion of the head and cervical-dorsal support

Back curved, legs grouped

Final phase

Buttocks heels

Finish standing without hand support

Backward roll

Evaluation criteria

Initial phase

Standing back to the mat

Main phase

Squatting, arms to the front

Center of gravity back, sitting action

Turn completely with curved back

Support of hands next to the ear

Final phase

The feet look for the ground, not receptive with the knees

Cartwheel

Evaluation criteria

Initial phase

Stand outstretched arms

Main phase

Broad forward step

Elevation of the back leg

Alternative hand support

Legs open and straight upright

Final phase

Alternative foot supports

Finish standing up and arms up

Handstand

Evaluation criteria

Initial phase

Stand outstretched arms

Main phase

Support of hands far from the front foot

Hands resting on shoulder width

Angle arms-trunk-open

Line arms-trunk-legs straight

Keep the vertical 2" without aid

Final phase

Reception of alternative legs

2. Questionnaire result about the use of the observation templates

97 students (93.3%) state that they have been able to detect their technical failures and 7 students (6.7%) say that they have not been effective at it. 81 students (77.9%) affirm that, the strategies of the self-assessment and the peer evaluation along with the recordings and the use of the registration and observation templates are of great use for the individual improvement of the acrobatics. On the contrary, 23 students (22.1%) have a less satisfactory view.

To conclude, 94 students (90.4%) perceived that, the evaluation strategies used are adequate as learning tools for the gymnastic skills developed in the subject of *Artistic and Gymnastic Skills*, while 10 students (9.6%) have a contrary view. The results can be seen in Table 1.

Table 1.

Perception of the student of the usefulness of the evaluation tools for their learning.

Questions	Men		Women		TOTAL	
	YES N (%)	NO N (%)	YES N (%)	NO N (%)	YES N (%)	NO N (%)
Self-assessment and peer evaluation to identify mistakes.	74(92.5%)	6(7.5%)	23(95.8%)	1(4.2%)	97(93.3%)	7(6.7%)
Self-assessment and peer evaluation for the individual improvement.	58(72.5%)	22(27.5%)	23(95.8%)	1(4.2%)	81(77.9%)	23(22.1%)
Self-assessment and peer evaluation adequate as learning strategies.	70(87.5%)	10(12.5%)	24(100%)	0(0%)	94(90.4%)	10(9.6%)

3. Results of open question

Concerning the analysis of the open question on what would you highlight about the use of self-assessment strategies and peer evaluation through recordings and which difficulties have you encountered in the process? The following observations are reflected:

The initial self-assessment carried out through their own recordings gave them a perception of difficulty towards the subject:

After the initial self-assessment, I thought that it would be impossible to achieve all the gymnastic elements (Student03).

The information given by the teacher, together with the observation templates and the recordings for the analysis of their learning, allowed them to progress successfully and to identify the main errors in technical performances:

Little by little with class practices, the use of smart phone to see the mistakes made and the contributions of classmates in analysing our executions have helped us to move forward. In addition, I think I have made progress in this matter with the invested effort (Student15).

I felt admiration for my personal progress while watching the videos (Student02).

The peer evaluation strategy has developed aspects related to group cohesion,

fellowship and trust in others in these students:

The reward has been greater sight through the eyes of my companions. I have seen the progress in the others thanks to my indications and my evolution, and thanks to the corrections that my companions made to me (Student21).

We worked in class and also in our free time with our classmates to evaluate and correct our mistakes. I think that thanks to this I have succeeded in advancing at this subject (Student35).

As for the difficulties encountered in the process by the students, in their reflections there were no problems to highlight, but there are some allusions made to the difficulty in reserving sport- spaces outside the class schedule in order to reinforce and practice stunts:

We had a lot of problems when it came to using the tatami, it was always full and we had to stay all day at the university (Student11).

DISCUSSION AND CONCLUSIONS

This study, which was put into practice in the second semester of the academic year 2015-2016 and which was used in the subject *Artistic and Gymnastic Skills*, has aimed to determine the effectiveness of self-assessment and peer evaluation, in teaching-

learning gymnastic skills. The findings of the students' perception of whether the self-assessment and the peer evaluation with digital support are effective and facilitate the correction of errors in the technical execution of the four proposed acrobatics indicate that all students have a positive vision regarding this. On the other hand, the presented results, which refer to whether, the strategies used to learn the gymnastic skills, have allowed identifying their own mistakes thanks to the recordings and their subsequent analysis. Likewise, the students' critical reflections on the different assessment strategies and tools used during their formative process have also been reflected. Considering that the evaluation offers relevant information on the different aspects of the educational process (Blanco, Sánchez, Rodríguez, & López-Guzmán, 2006; Gessa, 2011) this should be carried out in a continuous and permanent way to make possible modifications or necessary changes in student learning.

As Zubiaur (1998) states, learners should know the execution techniques as well as its results (evaluation), in the motor learning. In this sense and as the author defends, there are few researches which refer themselves to the knowledge of the execution process of motor-gesture-learning (feedback), despite this is a more relevant aspect than the knowledge on the final results of the action.

The strategies of self-assessment and peer evaluation involve the students in their formation, turning them into protagonists of this and generators of their own feedback, aspects that allow them to assimilate and understand knowledge (Vernetta, López, & Delgado, 2009). Our results reinforce these claims, since almost all the participants have considered that the self-assessment and the peer evaluation, through the recordings, have helped them to detect and correct their errors in the learning of gymnastic skills. As for the perception of personal progress, the students mostly concluded that this type of tools facilitated the improvement and evolution in the technique of execution. Bandura (1986) pointed out self-

observation, self-assessment and self-reactions as a key for the learning process. In our research the process we have carried out respects the observing, evaluating and reacting phases, facing the learning of a work involving the student in an active way from the cognitive and motivational aspect (Zimmerman, 2013) and therefore it has been successful inside the process which has been carried out. In this sense, the multitude of technological applications that smart phones offer today, so within the reach of our students, could favour a greater assimilation of knowledge and learning (Azevedo, Guthrie, & Seibert, 2004). Likewise, the participants report improvements in aspects related to their training in values such as overcoming, self-esteem and effort, as well as other studies (Cuesta & Zamora, 2016; Vernetta, López, & Robles, 2009).

To sum up, this research is designed to verify if observation, audio-visual media, self-assessment and peer evaluation are adequate strategies to contribute to a more effective, more conscious and more self-regulated learning and control of information to work. This work has been beneficial in the process carried out. The thoughts and experiences of the students can bring us closer to improving our methodological approaches in the teaching of gymnastic contents.

To conclude:

The students' perception of the self-evaluation and the peer evaluation with digital support is effective, as well as shown in some other studies as it facilitates the correction of errors of the gymnastic abilities.

Our future intention is to implement self-assessment and peer evaluation of all students in other subjects with the aim of forming more autonomous and responsible students for their own learning.

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