

# TECHNOLOGIES AND SELF-ASSESSMENT AS STRATEGIES FOR COLLABORATIVE GYMNASTIC LEARNING

María Alejandra Ávalos<sup>1</sup>, Ainoa Garde<sup>2</sup> and Lilyan Vega<sup>1</sup>

<sup>1</sup> General Didactics and Specific Didactics, University of Alicante, Spain

<sup>2</sup> Alicante, Spain

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## **Abstract**

*The acrosport is an ideal content to work in physical education classes due to its cooperative and integrating characteristics and the multiple benefits it can bring to the students. The aim of this research is to analyze the perception of 81 students of High School after carrying out an acrosport unit using the technologies and involving the students in the evaluation process. For this, a qualitative methodology with descriptive character was used. The instrument for the collection data was the semi-structured interview where questions were addressed about the benefits and difficulties encountered in the development of the unit, as well as about the usefulness perceived by adolescents of the use of video during the development of the unit and self-evaluation. The qualitative data were coded according to the narrative content of the students and analysed with the AQUAD 7 programme. The results show that the students perceive benefits in terms of enjoyment and companionship in this practice. Regarding the difficulties encountered, the lack of time and the specific requirements for the development of this modality are the most outstanding aspects. Furthermore, the student's value positively the use of video in the acrosport classes and the self-evaluation supported by rubrics. In this way, the practice of acrosport contributes numerous affective-social benefits, concluding in addition, that the use of the video and the inclusion of the students in the evaluation allow them to be participants of their teaching-learning process, being able to contribute to the formation of more critical and autonomous people.*

**Keywords:** *acrobatic gymnastics, rubric, video recording, learning management, High School.*

## **INTRODUCTION**

Acrosport is a discipline with innumerable educational and socializing possibilities, because it is a physical activity carried out in a group and, therefore, it can favour the cooperation of students, where creative, artistic and acrobatic factors are in force (Barba, 2010; Cabo, 2011). Likewise, it is a physical activity that due to its cooperative and integrating characteristics allows its use within physical education

classes, thus offering numerous possibilities of motor exploration, stimulating space-time notions, developing physical and creative capacities, enjoyment, autonomy and confidence in oneself and in others (Cabo, 2011; Dowdell, 2013). This gymnastic modality, already in the Primary Education stage, is considered an excellent cooperative and integrating proposal for motor and attitude development (Barba,

2010; López Pintor, 2010). In addition, the physical education teachers in the High School stage identify the Acrosport as the most appropriate modality to develop personal and social values in the students and that can favour their teaching-learning process due to its high collaborative component, minimizing the personal differences between classmates (Ávalos, Martínez, & Merma, 2015a). In addition, Reguera and Gutiérrez (2015) argue that the Acrosport improves self-concept levels in those subjects with physical and/or emotional problems, since the students, feeling they participate in the activity they are carrying out and cooperating with their classmates, feel enriched corporally and emotionally.

In spite of all these benefits that this sporting activity could bring within the scope of physical education (PE), there is still a resistance on the part of the teacher to include some gymnastic modalities in his or her programmes, since an erroneous conception of them predominates, an insufficient gymnastic knowledge in the initial training of the teacher and the application of inadequate teaching-learning methodologies (Ávalos, Martínez, & Merma, 2015a). In addition, referring to the problems related to students, we highlight the negative dispositions towards gymnastic practice, mainly focused on fear, insecurities, rejection (Duarte, Carbinatto, & Nunomura, 2015), and negative experiences in PE classes (Ávalos, Martínez, & Merma, 2015b). Along these lines, Stylianou, Kulinna, Cothran and Kwon (2013) focus on strengthening the pedagogical content in the initial training of PE teachers. In relation to the student body, teaching methodologies must be considered, in accordance with their characteristics and thus favouring the most collaborative and social models. Therefore, considering factors linked to personality and interests, differences in motor development and the maturity of students would allow for more effective learning (Nunomura, Okade, & Carrara, 2012).

***Acrosport evaluation in Physical Education.*** Evaluation in PE, as well as educational evaluation in general, should be understood as the ability to identify difficulties, errors, actions that are performed well, in order to analyse them, make judgments and make decisions (Sanmartí, 2010). For this reason, evaluation should be a process of dialogue between all those involved and not be limited to the simple application of examinations, tests or quizzes. When assigning responsibilities to students in this evaluation process, it is very important that the evaluation strategy chosen (such as the rubrics, or checklists) take into account the definition of success criteria and indicate different levels of achievement of objectives (López Pastor et al., 2007). The students are the protagonists of their own learning and the teacher facilitates the success of this process, fostering the critical spirit (Figueiredo, Lago, & Fernández, 2008). The contribution of the students in the evaluation processes in PE passes through the active participation of the students in their own learning through evaluation processes that they themselves carry out on that same learning. There is also peer evaluation, where a student evaluates a colleague and, in turn, is evaluated by the latter (López Pastor et al., 2007). The evaluation has to be shared by all the agents that intervene directly or indirectly in the teaching-learning process, especially between the teacher and the student. The participation of students in assessment processes is not only possible and viable, but also contributes to greater social development, strengthening their autonomy and responsibility and their critical sense (Dorado, 2011; López Pastor et al., 2007). Likewise, in order to carry out the different types of evaluations, there are instruments for making an evaluation in which the students participate in a more oriented, precise and objective way (Sanmartí, 2010).

For this reason, the rubrics are being developed as an interesting resource for an

integral and formative evaluation (Gallego & Raposo, 2014; Wolf & Stevens, 2007). Generally, they are designed in such a way that the students can be evaluated objectively and consciously, allowing the teacher to clearly specify what he expects from the student and which are the criteria with which a previously established objective will be qualified (Reddy & Andrade, 2010). Additionally, the internal perception we have of our own actions often does not correspond to the external perception of others (Palao, Hernández, Guerrero, & Ortega, 2011). Thus, the video is for the student an audio-visual medium to show his performance, reinforced by verbal information from the teacher (Ávalos & Vega, 2018) and supported by a rubric. These tools can contribute to the training of people who are more autonomous, critical and capable of making their own decisions. In this sense, Del Pozo (2012) aims to provide new tools to facilitate the evaluation within the subject of PE, more specifically to evaluate the technique in body expression. For this reason, it proposes the rubric as a novel instrument. It points out the importance of being able to show students what is expected of them, as well as knowing the levels of achievement they can reach. In addition, it allows students to carry out a self-assessment, feedback their learning, as well as encourage peer evaluation. The rubric, in the field of gymnastic skills, is already an effective tool in their evaluation (Gutiérrez & Vernetta, 2007). In addition, the use of video allows students to see their own action, providing a greater number of feedbacks and a better learning of the contents, increasing their involvement and motivation for the practice (Potdevin, Bernaert, Huchez, & Vors, 2013). It is an extrinsic channel that can give information both for the knowledge of the execution and for the knowledge of the results, taking more and more importance in the strategies of the teacher to develop the self-assessment of the students (Palao et al., 2011).

In order to contribute to the improvement of the educational process of Acrosport, the purpose of this study was, on the one hand, to analyze the benefits, difficulties and proposals for improvement in the development of Acrosport. And on the other hand, to evaluate the usefulness of the video and self-evaluation through the rubric as strategies for the teaching-learning process of Acrosport, all under the perception of secondary education students.

## METHODS

This qualitative research with a descriptive approach is framed in the educational field. In this sense, it is essential to analyse the contributions and perceptions that the participants express in order to go deeper into a specific situation and in a specific context such as, in this case, the educational one (Enright, Coll, Ní Chróinín, & Fitzpatrick, 2017; Pereira, 2011).

This study has been carried out based on available sampling and for convenience. The initial sample was made up of 90 secondary education students from a public educational centre in the province of Alicante (Spain), who were studying the subject of PE. Finally, a total of 81 students (55.55% female; 44.44% male) between the ages of 12 and 13 participated. All the subjects who formed part of the final sample of the study agreed to participate voluntarily under the prior consent of their parents and the management of the educational centre. In addition, the students were informed about the purpose of the study and that it was carried out according to the Helsinki declaration.

The instrument designed and used for data collection was a semi-structured interview composed of five open-ended questions, as shown below:

- What positive or beneficial aspects of the Acrosport stand out?
- What difficulties have you had throughout the Acrosport sessions?

- Did you find it useful to carry out a self-assessment of your work through the rubric and recordings of the group work?

- Has the use of technologies during the development of the Acrosport teaching unit helped you in your teaching-learning process?

- What aspect would you improve in the development of the Acrosport sessions?

Another necessary tool to be able to carry out the Acrosport sessions was the provision of a Smartphone by the students, an issue that was not a problem as it is now a very accessible tool for teenagers.

At first, nine Acrosport sessions were held in February and March 2019. The first two sessions were dedicated to familiarization games, learning gymnastic elements and pyramids in which the complexity increases little by little. They also work on basic issues such as help and safety in practice. The following five sessions were carried out in mixed groups of 4-6 students, formed by the teacher herself to be balanced according to abilities, forming a total of 16 groups. These five sessions were used to elaborate and prepare the final practical exam, with each student and group being able to use the mobile phone and the technological possibilities it offers to record or register their learning when the student considers and thus be able to observe their faults and the improvements achieved in their creation process. The final exam consisted of designing a group composition of Acrosport prepared by themselves, under guidelines set by the PE teacher. In the eighth session the final composition was made, the delivery of the edited recording of the final composition of Acrosport by the students and the recording of the same by the teachers in the execution of the test. The last class was used so that students could evaluate themselves in working groups, using rubric and recording as instruments to analyse and assess their final composition and learning. In addition, parallel to this self-evaluation, the teacher also evaluated the different groups in the same way as the

students. The use of the rubric was the same for both the pupils and the PE teacher; they only differ in the data they collect (the group on their own self-evaluation and the teacher on the group). And finally, they were given the semi-structured interview, which they answered individually, in writing and in the gym. The written and anonymous interviews lasted an average of 20 minutes.

The following hypotheses were considered for the qualitative analysis of the information:

- Acrosport can be a motivating content that encourages the development of social and personal skills.

- The use of technology can help the teaching-learning process of the contents of gymnastics.

- The rubric as a self-evaluation tool can involve students in their teaching-learning process by promoting decision making and responsibility.

First, all the information provided and extracted from the interviews was read and analysed in detail, in order to find the first relationships between the students' answers and the hypotheses raised. Subsequently, a coding process was carried out with the frequencies of the students' answers. The definitive code map was obtained, after the triangulation of the codes with two teachers specialized in gymnastic modalities and a PE teacher. We used the *AQUAD 7* software (Huber & Gürtler, 2015) to count the frequencies. The most relevant information was collected in two main themes:

- Theme I: Student perception of the Acrosport implementation.

- Theme II: Student perception of the use of video and self-assessment in the Acrosport learning process.

## RESULTS

The findings found are presented under the two main themes of the study. The results are presented in the form of codes together with their absolute frequencies (AF) and the corresponding percentage

thereof (%AF), where AF corresponds to the total number of appearance of the concept, found in each of the questions, and the %FA is related to the total of the absolute frequency. These data are also collected in tables and supplemented with some fragments written by the students.

**Theme I: Students' perception of the Acrosport implementation.** This theme collects the benefits, the difficulties and the proposals for improvement that the students bring in relation to the practice of Acrosport.

The findings referring to the benefits that the Acrosport provides (Table 1) showed that the aspect most frequently valued by students is teamwork (26.43%)

pointing out the importance of cooperation, companionship and trust placed in their peers. Additionally, they indicated positively the affinity; enjoyment and amusement (23.56%) perceived in the sessions, followed by the freedom and creativity (18.39%) that awakens in the students the Acrosport. With less presence, are identified as satisfactory aspects gymnastic learning (17.24%) such as tumbling or extended hand support, as well as the innovative character (12.64%) of the discipline. Finally, in a minority of cases, manifestations emerged that claimed not to find any type of benefit or positive aspect in the practice of Acrosport (1.72%).

Table 1

*Benefits of Acrosport work in physical education sessions, by students.*

Codes	AF	AF%
Team work	46	26.43%
Affinity and enjoyment	41	23.56%
Freedom and creativity	32	18.39%
Gymnastic apprenticeships	30	17.24%
Innovation	22	12.64%
None	3	1.72%
<b>TOTAL</b>	<b>174</b>	

Note: AF- absolute frequency; AF%-absolute frequency percentage.

Table 2

*Difficulties encountered in the Acrosport practice, according by students.*

Codes	AF	AF%
Lack of time	49	32.02%
Specific requirements	38	24.83%
Lack of material resources	29	18.95%
Colleagues with few workers	25	16.33%
Fear and physical contact	7	4.57%
None	5	3.26%
<b>TOTAL</b>	<b>153</b>	

Note: AF- absolute frequency; AF%-absolute frequency percentage.

**Table 3**  
*Student's improvement proposals.*

Codes	AF	AF%
Longer practice time	31	30.69%
Auto group choice	26	25.74%
Increase in resources	18	17.82%
Small groups	11	10.89%
Fewer choreographic components	6	5.94%
Variety of exercises	5	4.95%
No proposal	4	3.96%
<b>TOTAL</b>	<b>101</b>	

Note: AF- absolute frequency; AF%-absolute frequency percentage.

**Table 4**  
*Use of video recording in Acrosport sessions, according to students.*

	Codes	AF	AF%
Yes	Error identification	44	34.64%
	Correction of errors	32	25.19%
	Innovative learning	21	16.53%
	Facilitating progression and comprehension of learning	16	12.59%
	Personal memory	9	7.08%
None		5	3.93%
<b>TOTAL</b>		<b>127</b>	<b>100%</b>

Note: AF- absolute frequency; AF%-absolute frequency percentage.

**Table 5**  
*Use the rubric for the self-assessment, according to students.*

		AF	AF%
For...	Take into account your criteria	51	52.04%
	To be the protagonists of their own evaluation	20	20.40%
	Facilitate learning progression	16	16.32%
	Greater responsibility	11	11.22%
<b>TOTAL</b>		<b>98</b>	<b>100%</b>

Note: AF- absolute frequency; AF%-absolute frequency percentage.

Below are some of the students' stories about the positive aspects they found in this practice:

*I liked teamwork, spending time with my classmates and gaining confidence with myself and my classmates (student\_04).*

*It's something different, fun and very creative (student\_16).*

*I have enjoyed working with music, it is different from other sports that we do in school and in high school and I have learned to do the pine without help (student\_22).*

*We had a lot of freedom and autonomy in the classes, to choose the music, the costume, the dance and some figures (student\_31).*

*I have learned to do the back flip and the pine without help (student\_57).*

In contrast, in the difficulties linked to the practice of Acrosport (Table 2), problems arise that are associated with the lack of time: short duration of classes (30.02%), specific requirements: gymnastic difficulty (24.83%), and also the lack of material resources: mattresses and loudspeakers (18.95%). Less frequently, other negative factors such as lack of work by peers (16.33%), along with fear and physical contact (4.57%) are found. Finally, a minimal part of the students did not find any problems in the practice of Acrosport (3.29%).

Students highlighted these difficulties in the following paragraphs drawn from their interviews:

*We have almost no material, few mattresses and loudspeakers and then we find that there are fellow workers more than others (student\_7).*

*It has been very difficult for us to memorize the figures, order them and invent somersaults, turns and dance steps (student\_12).*

*Some figures are difficult to make, and we can fall, creating insecurity (student\_29).*

*There is a lot of physical contact and I find this uncomfortable. Also, in my group my classmates have been very lazy and not very hardworking (student\_40).*

*Little time to rehearse and my classmates couldn't stay at recess or at home to practice, classes should last longer (student\_65).*

Additionally, the students expressed proposals for improvement of the Acrosport (Table 3). Among them, it was important to have more practice time (30.69%), to be able to choose the work group (25.74%), to increase material resources (17.82%) and to create smaller groups of students (10.89%). With a lesser presence, the decrease in

choreographic components (5.64%) and the increase in the variety of exercises (4.95%) were identified. A smaller percentage did not propose any improvement (3.96%). Students pointed out some of these suggestions in the following sentences:

*To have longer classes to be able to practice or more time at recess would be very good (student\_03).*

*To be able to choose the group ourselves or to be able to change groups (student\_33).*

*To be able to choose groups those are smaller (student\_72).*

*More variety in games and buy more mats and speakers (student\_37).*

*Let the final work have less choreography and more figures (student\_56).*

**Theme II: Student perception of the use of video and self-assessment in the Acrosport learning process.** As for the

importance and use of video recordings (Table 4) with their Smartphones, the majority of students state that they found the use of this tool useful during the teaching unit and as a complement to the rubric (96.03%). The reasons they gave were that video recordings have allowed them to identify errors (34.64%), correct them (25.19%), provide new learning (16.53%), facilitate the progression and understanding of learning (12.59%) and, finally, serve as a personal reminder (7.08%). The students highlighted these aspects in the following sentences:

*The video has helped me to see my bugs and correct them (estudiante\_12).*

*With the video we realized that there were things that did not fit as well as we thought, especially the positions and supports (student\_26).*

*The recordings have seemed to me a different way of learning. It's fun and motivating (student\_39).*

*The video and the recordings during the classes have helped me to see the mistakes, learn from them and have the*

*video of remembrance of the final work (student\_44).*

*Thanks to the recordings I have been able to observe the improvement from one class to another (student\_65).*

In addition, there were minimal manifestations in which the students had not found any usefulness to the use of the recording (3.93%).

In relation to the assessment of the use of self-assessment as a learning strategy (Table 5), all students stated that it is important for the development of Acrosport carried out. The reasons given for this were that self-assessment had allowed them to express their personal perception within the evaluation process (52.04%), to be protagonists of their own evaluation (20.40%), to progress in their learning (16.32%), and finally, to have greater responsibility (11.22%). The students highlighted these aspects in the following sentences:

*Being able to evaluate myself with the rubric and seeing myself in the video has helped me to know how to do it well next time (student\_5).*

*I liked that we are considered in the evaluation (estudiante\_21).*

*Thanks to the self-assessment I can give my opinion and put a note (student\_36).*

*It is not only the teacher's note that counts (student\_51).*

*We take the evaluation seriously because we have a responsibility and it motivates us (student\_76).*

## DISCUSSION

The aim of this study has been to know the perception of the implementation of Acrosport using video and self-assessment through the rubric as strategies for the teaching-learning process of gymnastic content, all from the point of view of high school students.

The results obtained confirm that the development of the Acrosport content in PE classes' favours teamwork, generates

freedom in decision-making and improves the creative abilities of the students, while at the same time working on the activity in a playful environment. Along these lines, Cabo (2011) and Dowdell (2013), among others (Reguera & Gutiérrez, 2015; Vernetta, López, & Gutiérrez, 2008), highlight in the practice of this sport the cooperation between peers, autonomy and enjoyment, developing physical and creative skills. Likewise, Ávalos, Martínez and Merma (2015a), support these benefits by stating that PE teachers perceive the development of gymnastic skills as a content that could guarantee the integral development of students, favouring the acquisition of attitudes such as responsibility, effort, confidence and self-esteem.

However, difficulties arise for students in the practice of this discipline. The most notable is the lack of free time that young people have outside school hours to practice. Although the practice of extracurricular activities (reinforcement, languages, physical activity) could improve academic performance, when they are practiced in excess, they occupy too many hours a day, often leaving little free time to today's youth and adolescents (Rosa & Maria, 2016).

In relation to the specific requirements, linked to the difficulty when performing the somersaults and/or the extended support of hands, among others, Fernández and Méndez (2013) point out that these difficulties could be counteracted using more collaborative methodologies, teaching gymnastic skills in a way appropriate to the development of students and not through very directive and rigid teaching methods. Another way to compensate for these difficulties would be to include and develop the gymnastic skills correctly from the early stages of training so that in later stages learning is not so complicated (Culjak, Miletic, Kalinski, Kezic, & Zuvela, 2014). Within this same section, they also point out the lack of resources. The main problem of the scarcity of material resources is given in

the majority of occasions by the cut in economic aids to the different educational centres, which causes a limited provision of specific equipment in the PE classes, reaching to foment in many PE teachers the use of self-built materials as solution to this problematic (Méndez, Fernández, & Méndez, 2012).

Because they consider the lack of practice time and materials to be a problem, the students point out these aspects in the proposals made to improve the development of the Acrosport. At the same time, they emphasize being able to choose themselves the working group in the sessions. When the teacher does not intervene, the students end up grouping by friendship, affinity or sex, and may create situations of discrimination or unequal groups (Ramos & Hernández, 2014). For this reason, on many occasions, the creation of small mixed groups is recommended, taking advantage of the diversity of the existing students in the classroom and promoting inclusion (Velázquez, Fraile, & López, 2014).

With regard to the results of the use of video and recording via Smartphone in PE classes, the majority of students answer that they found useful, highlighting their use in identifying and self-correcting errors for later learning and facilitating the progression and understanding of the same in a different and novel way. Palao et al. (2011) state that better learning results are produced when verbal information is combined with a video system, since the use of video allows students to see their own action, increasing their involvement and motivation through practice, bringing students closer to a more objective assessment of its execution.

Similar studies exist (Aiken, Fairbrother, & Post, 2012; O'Loughlin, Chróinin, & O'Grady, 2013; Potdevin et al., 2013; Trujillo, 2008) where they also use video as an auxiliary instrument in PE classes for self-correcting performance and as a self-assessment system reinforcing motor learning and the achievement of

specific skills, in this case gymnastics (Ávalos & Vega, 2018). With respect to the self-assessment of Acrosport's work through the rubric, high school students value this participation as satisfactory since it has allowed them to manifest their criteria, feel protagonists in the evaluation of their work, perceive an improvement in their learning and develop greater responsibility. In this line, Del Pozo (2009) and Gallego and Raposo (2014), see in the rubric an interesting resource for a formative and integral evaluation, considering its motivating and participative use, making possible the autonomy and personal initiative of the students. Additionally, Trujillo (2008) uses the self-assessment cards together with the filming of the assemblies elaborated by the students as an instrument of analysis, in order to enrich the teaching-learning process. Furthermore, Ávalos and Vega (2018) use observation forms together with audio-visual media and conclude that the use of both instruments has made possible a better knowledge and assimilation of diverse gymnastic skills by university students. Involvement in the student assessment process constitutes greater social development, strengthening their autonomy and responsibility, and they are the protagonists of their teaching-learning process (Figueiredo et al., 2008; López Pastor et al., 2007). Haerens et al. (2018) and Ryan and Deci (2019) identify these aspects as basic needs in students whose attention is a priority for teachers.

## CONCLUSIONS

Taking into account the results obtained, we can conclude that raising the content of Acrosport using technologies within the teaching-learning process as well as involving students in their assessment in an educational context of High School as applied in this study, can positively favour the teaching-learning process of the students involved, facilitating rewarding experiences and providing numerous

benefits in terms of teamwork, creative capacity and the acquisition of attitudes such as responsibility, autonomy and trust, among others. Hence, the importance of students' voices, these must be taken into account to improve and progress in teaching practice and thus optimize student learning.

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### Corresponding author:

María Alejandra Ávalos  
Area of Physical Activity and Sport Science, University of Alicante  
Carretera de San Vicente del Raspeig, s/n, 03690 Alicante, Spain.  
Phone number: 965903400-2099;  
Email: [sandra.avalos@ua.es](mailto:sandra.avalos@ua.es)

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