

The effect of a “PBL” physical activity program based methodology on the development of values in Spanish Primary Education

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ABSTRACT

The purpose of this research is to assess a Project-Based Learning (PBL) intervention program within the context of Physical Education. Research approaches PBL methodology in order to evaluate its importance regarding students' ability to develop certain personal values and attitudes. The sample involved 38 girls and 37 boys among sixth year students in Spanish Primary Education (11-12 year olds) and the intervention program was carried and developed throughout the academic year in 2014/15 This study approaches an Action Research methodology assessing key items such as teachers' journals, students' questionnaires and also an interview reflecting the different opinions of the students. This research validates the suitability of the intervention program as results show increased students' awareness respecting critical values and attitudes such as responsibility and respect. **Key words:** PROJECT-BASED LEARNING, VALUES, ATTITUDES, PHYSICAL EDUCATION, PRIMARY EDUCATION.

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INTRODUCTION

The continuous renewal of the different methodology approached in the teaching-learning processes of current educational programs shows its marked evolution and development, leading to an increased interest for comprehensive research and discussion in this area of knowledge (Martín & Muñoz, 2010; Pericacho, 2012; Torres & Fernández, 2015) due to the shortcomings of our current education system.

Since schools nowadays provide other benefits than just academic and conceptual skills, we can find new ways to meet different goals through a variety of methodologies assessing contents from a multidisciplinary perspective. This is a key point in 21st century Education (Torres & Fernández, 2015). Some of these multidisciplinary dimensions include ICTs, pro-environmental education and the main research subject of this study, personal values. All of the above are significant skills that should be taught along with the respective knowledge associated with the different subjects and courses. Education regarding these skills should also be engaged following a non-traditional methodology to overcome the lack of resources of traditional approaches in order for teachers to meet their required goals.

In terms of the intervention program discussed in this research, it is worth noting the values and attitudes assessed and their relevance. The concept of “*value*” from an objective moral standpoint refers to what is entitled to be objectively appreciated such as desired behaviors and lifestyles. On the other hand, from a psychological standpoint, values are considered preferential frameworks which help us through the development of specific attitudes and behaviors to integrate into our society. In this sense, general attitudes can be considered as tendencies acquired during the learning process leading to specific responses to different objects and situations (Bolívar, 1998; Larios, 2017).

In this regard, Physical Education teachers have the most suitable tools in order to work on these values and attitudes at a personal, individual level within the school ambit. Physical Education and sporting activities have long been considered as appropriate means to achieve and acquire broad personal development values through education in sports involving a significant commitment of all involved social players and actors, especially the teachers. (Aguado, Garzarán, & Fernández, 2015; Cepero, Marín & Torres, 2010; Martínez et al., 2014; Ruíz & Cabrera, 2004).

Values such as accountability and responsibility, self-development, enforcing rules, persistence, teamwork, finding the boundaries, self-discipline, cooperation, honesty and loyalty are qualities widely desired and also obtainable through sporting activities and the help of a leading family, teachers and trainers as well as a significant support of the respective actors involved that will help these values to properly develop and linger within individuals. In addition, these skills greatly influence a healthy physical, intellectual and social development which are fit for individuals to be better regarded in our current society.

Hernández (2000) posits that new and updated Project-based Learning (PBL) methodologies like the one approached in the intervention program analyzed in this research enable “*a new approach for a multidisciplinary curriculum strategy and the basis for a more complex thought process as opposed to the simplification of current teaching strategies*”. This author also reported the significant advantages of PBL methodologies regarding certain attributes and characteristics of the students, e.g. building one’s identity, enforcing creativeness, developing critical thinking, decision-making and problem solving among others. Project-based Learning can be considered as new environment for students and teachers to work together while enjoying the learning process. This is, students feel rewarded as they grow more involved with the

projects and “*teachers appreciate the perceived flow of the different projects within the students, in spite of the considerable effort in designing and managing the development of a particular project*” (Trujillo, 2016).

However, the nature of PBL is essentially disruptive for a traditional teacher or a traditional educational center. PBL requires the coherence of teachers’ professional development outside conventions and prejudices. Teachers are basically pondering the risks involved when applying these new methodologies, questioning themselves about engaging challenging projects which will expose their true capabilities regarding knowledge and competences for the learning process.

This research concurs with Maldonado (2008) that PBL brings students to significant, complex learning project which will keep fundamentally developing their skills, abilities, attitudes and values while teachers should play the role of both planners and leaders who encourage students to learn, discover and feel rewarded for the acquired knowledge.

The intervention program approached in this study is based on three different work projects (one for every academic quarter) which will tackle contents of the Physical Education course from a global perspective largely moderated by the development of different key competences. In this sense, this research addresses two subject matters: a) knowing the effectiveness of the PBL intervention program regarding the acquisition of personal, social skills and attitudes (accountability, effort, self-worth, self-efficacy and healthy lifestyle habits) and, b) assessing the influence of the intervention program on social and civic competences among 6th year students in Spanish primary education.

SCHOOL MATERIALS, SUPPLIES AND METHODOLOGY

This research adheres to the social critical paradigm theory through an action-research approach to qualitative and quantitative techniques focussing on the teaching process. This research can be considered a longitudinal, interpretative-descriptive analysis which is repeatedly assessed over the course of the academic year.

Participants

After examining the framework of prior research in extant literature (Sabino, 2014), the sample used in this research is comprised of 75 students in their 6th year in Spanish primary education at Vicente Aleixandre state school in Marbella. The sample is divided into three groups within the same academic course, 6°A (12 female and 13 male students), 6°B (13 female and 13 male students) and 6°C (13 female and 11 male students) about 11.44 years on average.

Participants are enrolled in an intervention program fundamentally based on the PBL methodology in order to improve students’ personal values and attitudes.

Data collection and analysis tools

Different tools were approached to collect relevant data for our study, two employed in the qualitative analysis of the research (teacher’s journal and semi-structured interviews) and one for the respective quantitative assessment; a questionnaire for “*basic competences and individual and group values assessment*”, designed and validated by García-Pérez (2011) following the layout proposed by Collado (2005). The purpose was to combine this framework through a data triangulation capable of validating collected data as modeled by Denzin & Lincoln (2000).

In this sense, it is worth noting that the “*questionnaire for basic competences and individual and group values assessment*”, as validated by García-Pérez (2011), collects information on students’ beliefs, ideas and motivations towards physical activities. Respondents filled the questionnaire twice: in October after the first few weeks of the academic year and right before the summer break in June to verify the impact and outcome of the intervention program respecting the acquisition of different, key civic and social competences.

The *teacher’s journal* was the other tool approached in order to collect information regarding the effects of the intervention program. The journal describes the different experiences in the Physical Education course and, in addition, it includes records of our shared reflections on this matter especially in terms of decisions and actions which serve as a working knowledge towards future applications of different intervention programs.

Each and every one of the most significant factors influencing and determining our teaching approach during the intervention program had been reflected on the journal, providing a continuous stream of information relative to the barriers and needs found after implementing the program. In this sense, teachers’ proper insight and guidance helped to achieve the goals (Collado, 2005 & García-Pérez, 2011).

The third tool employed in this research was an analysis of the answers provided during the *semi-structured interview* detailed on the digital blog (see Figure 1) and relying on previous research where this instrument was approached as a learning tool (Hidalgo, Tenorio & Ramírez, 2016; García-Pérez, 2011). The main purpose was to get students to openly express themselves as they were increasing their perceived trust regarding this tool and finally contributing their different points of view on their work or any other factor which could be used to confirm or reject subsequent considerations derived from the journal and the questionnaire.

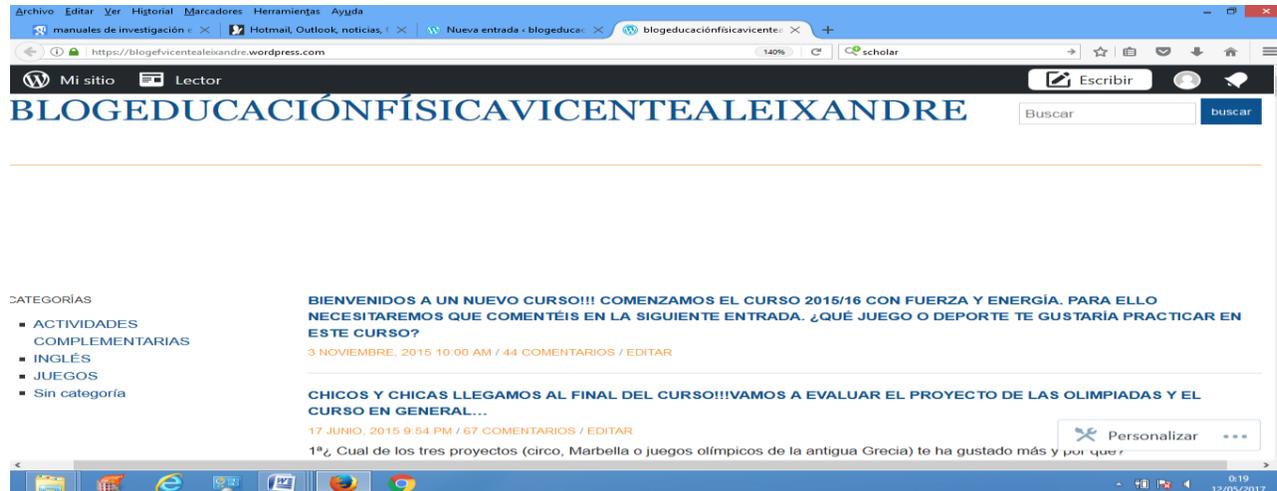


Figure 1. Physical Education class’ digital blog website.

The software suite SPSS 22.0 and the Nudist 8.0 application were approached for data analysis, management and encoding.

Procedure

The intervention program discussed in this study was applied during the 2014-2015 academic year. The program was divided into three different projects that were developed over the course of the academic year, each project was applied every quarter of the year. Non-motor activities were fairly similar across the three different projects whereas the contents of the Physical Education course were closely connected with the particular subject of each of the projects. Students' decided on the contents and thus the baselines of this teaching/learning process were drawn. The projects revolved around a multidisciplinary work with an increased focus on the shared feedback provided by multiple different teachers involved in the different projects.

Respecting the evolution of this research over time, our qualitative tools collected data at different points in time, the teacher's journal was employed to assess every dimension involved in our study in the different areas which we previously divided into several categories and subcategories to ensure a comprehensive classification. Subcategories were employed to contribute feedback such as general comments and positive, negative or neutral ideas regarding the subject matter examined while reading through the teacher's journal. All comments included the date they were added to the journal. Also, we engaged in discussion of the different contributions from other studies on our subject matter which could improve our research proposals.

Regarding the semi-structured interview and the responses on the digital blog, our research approached three specific dates in the academic year, students' feedback and responses were collected on the blog after each quarter. The temporal dimension of the data was the basis for the formal structure employed to examine students' responses on the digital blog over the course of the academic year. After this initial analysis, students' opinions on each project (established as Dimensions/Fields) were also sorted into different categories and subcategories to ensure a comprehensive classification. Once again, following our established procedure, subcategories were employed to contribute feedback such as general comments and positive, negative or neutral ideas regarding the subject matter examined while reading through the teacher's journal. All comments included the date they were added to the journal. Also, we engaged in discussion of the different contributions from other studies on our subject matter which could improve our research proposals. In this sense, the different questions were approached separately.

In a summarized form below, the different contents assessed and developed over the course of the academic year:

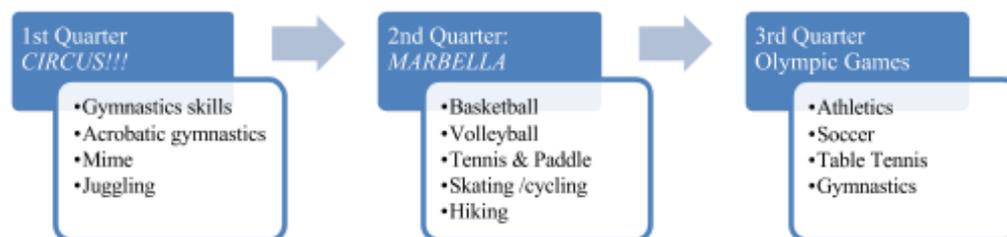


Figure 2. General contents approached during the intervention program.

These factors and dimensions impacting the teaching process as they moderated the effect of the intervention program to a certain extent were determined by the common characteristics of the PBL methodology and, in addition, by the teachers' differing attitude intended to achieve a pioneering, flexible, open, cooperative, thought-provoking and especially cognitive methodology. In this regard, the most significant factors of each project are displayed in table 1:

Table 1. Methodological patterns common to the three projects of the intervention program.

| | | |
|---|--|---|
| Different dimensions of developed methodology | Productive teaching styles. Suitable grouping. Cooperative learning. Different feedback sources. Teacher leading the Teaching-Learning process. | Approach to complementary activities. Students' decision on contents to be developed. Predefined workgroups. |
| Interdisciplinary activities | Outside school time work on the blog. Working on the website of the learning center, specifically on the Physical Education course with the different contents of the project. Coordinating contents to be developed with other teachers of the Physical Education area. | Conversation assistants helping with general bilingual work and also with specific vocabulary related to each sporting activity, they cooperate in complementary activities. |
| Evaluación | Self-evaluation of hygiene through a monitoring tool placed at the gym, where students show their commitment to bring their own toiletries and use them after the class. Notebook of suggestions and reflective activities: a work group effort where students responded different questions usually placed at the beginning of each class. | Hetero-evaluation of the work of each of the members of the work group while producing the final work product. Students evaluated and rated the work of their peers within the work group, this assessment influenced the final grade assigned by the teacher. Rating was secret with only the teacher knowing results of the evaluation and then acting accordingly. |
| Other activities related to PBL | The three classrooms worked in a cooperative way divided into groups of 4 or 5 students. Groups were changed for each project and assigned randomly. A weekly journal was maintained along with a calendar of activities published every fortnight. | Micro-teaching: each work group designed a session of sports or a sporting activity and had to manage it under the guidance and supervision of the teacher. Activities would be original or recycled from past sessions. The whole process was evaluated, especially the originality and the role assigned to each student. |

RESULTS

Results are presented following the concept of data triangulation suggested by Denzin & Lincoln (2000) involving the collection of a large quantity of data and assessment techniques from different points of views and perspectives respecting the subject matter approached. This type of analysis enabled this research to obtain the most possible comprehensive results (García-Llamas, 2003). Assessing the questionnaire handed to the students was the first step taken in the data triangulation analysis followed by the evaluation of the feedback on the teacher's journal and, lastly, the assessment of students' contributions on the digital blog respecting the semi-structured interview.

Results are evaluated according to the most significant personal values and attitudes regarded by teachers and students following guidelines by Beregui & Garcés de los Fayos (2007) and Calle & Martínez (2015). These values and attitudes were developed through a cross-disciplinary effort in the three different projects examined in our study. In this sense, the personal values are described in the following three sections.

Responsibility

Among the different items in the questionnaire addressing different patterns of students' responsibility we found item #1 to be the most significant: *I assist in keeping school supplies tidy*. As for the rest of items, item #2: *I usually do the classwork I've been assigned*, item #3: *I meet the deadlines when delivering homework and other assignments*, item #4: *I am focussed on the activities we engage in the classroom*, item #5: *I developed a habit to finish my homework and other assignments*, and item #6: *When the teacher tells me I am doing something wrong, I promptly correct it*.

Regarding item #1 (*I assist in keeping school supplies tidy*), results obtained in June (see Table 2) show a relevant increase in the “I agree quite a lot” and “I fully agree” responses, especially concerning the “I agree quite a lot” response, up to 50% in June from 20% in October. This substantial improvement was corroborated with results from the Chi-square analysis showing values of $p = 0.000$ respecting the assessment of the different responses over time. Thus, we can confirm that the differences are significant between the first and second time the students answered the questionnaire.

Table 2. Descriptive analysis of item #1 (*I assist in keeping school supplies tidy*).

| | OCTOBER | | | | JUNE | | | | TOTALS | | | |
|---------------------|-----------|-------------|-----------|-------------|-----------|-------------|-----------|-------------|-----------|--------------|-----------|--------------|
| | MALES | | FEMALES | | MALES | | FEMALES | | FEMALES | | MALES | |
| | Frec | % | Frec | % |
| Completely disagree | 1 | 1.3 | 2 | 2.7 | 0 | 0 | 0 | 0 | 3 | 4.0 | 0 | 0 |
| Mostly disagree | 7 | 9.3 | 8 | 10.7 | 1 | 1.3 | 1 | 1.3 | 15 | 20.0 | 2 | 2.7 |
| Tend to disagree | 8 | 10.7 | 8 | 10.7 | 2 | 2.7 | 1 | 1.3 | 16 | 21.3 | 3 | 4.0 |
| Tend to agree | 11 | 14.7 | 10 | 13.3 | 6 | 8.0 | 11 | 14.7 | 21 | 28.0 | 17 | 22.7 |
| Mostly agree | 7 | 9.3 | 8 | 10.7 | 18 | 24.0 | 20 | 26.7 | 15 | 20.0 | 38 | 50.6 |
| Fully agree | 3 | 4.0 | 2 | 2.7 | 10 | 13.3 | 5 | 6.7 | 5 | 6.7 | 15 | 20.0 |
| Totals | 37 | 49.3 | 38 | 50.7 | 37 | 49.3 | 38 | 50.7 | 75 | 100.0 | 75 | 100.0 |

As for item #3 (*I meet the deadlines when delivering homework and other assignments*), descriptive data (see Table 3) shows an important increase in the “I fully agree” response up to 44% in June from 24% in October.

Table 3. Descriptive analysis of item #3 (*I meet the deadlines when delivering homework and other assignments*).

| | OCTOBER | | | | JUNE | | | | TOTALS | | | |
|---------------------|-----------|-------------|-----------|-------------|-----------|-------------|-----------|-------------|-----------|--------------|-----------|--------------|
| | MALES | | FEMALES | | MALES | | FEMALES | | OCTOBER | | JUNE | |
| | Frec. | % | Frec. | % |
| Completely disagree | 9 | 12.0 | 13 | 17.3 | 1 | 1.3 | 0 | .0 | 22 | 29.3 | 1 | 1.3 |
| Mostly disagree | 2 | 2.7 | 0 | .0 | 1 | 1.3 | 0 | .0 | 2 | 2.7 | 1 | 1.3 |
| Tend to disagree | 5 | 6.7 | 2 | 2.7 | 5 | 6.7 | 0 | .0 | 7 | 9.3 | 5 | 6.7 |
| Tend to agree | 8 | 10.7 | 6 | 8.0 | 4 | 5.3 | 4 | 5.3 | 14 | 18.7 | 8 | 10.7 |
| Mostly agree | 6 | 8.0 | 6 | 8.0 | 17 | 22.7 | 10 | 13.3 | 12 | 16.0 | 27 | 36.0 |
| Fully agree | 7 | 9.3 | 11 | 14.7 | 9 | 12.0 | 24 | 32.0 | 18 | 24.0 | 33 | 44.0 |
| Totals | 37 | 49.3 | 38 | 50.7 | 37 | 49.3 | 38 | 50.7 | 75 | 100.0 | 75 | 100.0 |

In addition, this study found significant differences ($p=0.008$) when examining dates and genders as reported by the Chi-square analysis performed in June (see Table 4). There was a distinct positive evolution regarding the development of responsibility among students during the period of time that the intervention program was active. Also, female students achieved higher responsibility levels compared with their male peers.

Table 4. Chi-square test of the global analysis on gender regarding item #3.

| Time and gender analyses | | Value | gl | Asymptotic significance (bilateral) |
|--------------------------|---------------------------|-----------|----|-------------------------------------|
| October | Pearson Chi-square | 5.175(a) | 5 | .395 |
| | Credibility rating | 6.002 | 5 | .306 |
| | Linear linear association | .040 | 1 | .842 |
| | N of valid cases | 75 | | |
| Junio | Pearson Chi-square | 15.622(b) | 5 | .008 |
| | Credibility rating | 18.601 | 5 | .002 |
| | linear linear association | 11.789 | 1 | .001 |
| | N of valid cases | 75 | | |

Lastly, we address results obtained for item #6 (*When the teacher tells me I am doing something wrong, I promptly correct it*) as we found relevant differences in the Chi-square analysis ($p=0.025$). The global analysis assessing the impact of the program over time (see Table 5) shows that there was an improvement in this personal attitude in June after contrasting results obtained back in October; there was a marked reinforcement in the development of this attitude.

Table 5. Chi-square test over time regarding item #6.
(*When the teacher tells me, I am doing something wrong, I promptly correct it*)

| Global analysis over time | Value | gl | Asymptotic significance (bilateral) |
|---------------------------|-----------|----|-------------------------------------|
| Pearson Chi-square | 12.825(a) | 5 | .025 |
| Credibility rating | 16.320 | 5 | .006 |
| N of valid cases | 150 | | |

In this regard, when examining students' digital blog, we find answers along the lines of the results we obtained from the questionnaire. Students respond in the following manner when requested to put in practice some personal values such as responsibility:

*I couldn't agree more, in addition of the enhanced learning we are experiencing values such as responsibility and fellowship (and their positive and negative implications).
TN. G 6ªA, March, 26, 2015. 7:39 PM P-1 (607-609) CAVA*

*Definitely, we have to respect our classmates and be responsible with our assignments and homework.
ZNC 6ªB, March, 1, 2015. 11:07 PM P-1 (675-676) C CAVF*

On the other hand, teachers reflect the improvements regarding this value during the intervention program on the journal. It was addressed multiple times:

*The working environment has definitely improved and disruptions in class have decreased considerably, this could be explained by the contents we are teaching at the moment which provide students with sufficient leeway for feeling free and responsible, at least for most of them.
11/10/2014 P-1 (088-090) GCR*

*On the whole, the responsibility level has been exceptionally good regarding the third project, with just a negligible minority of students not complying with their assignments.
06/12/2015 P-3 (4087-4089) PDCI*

With regard of the last comment, at the end of the academic year this study confirmed previous data from the questionnaire suggesting a significant improvement in the general implication of every group towards classwork and assignment.

Effort

While addressing effort and persistence, we found some related items in the questionnaire with results significantly shifting over time from October to June. In this sense, *item #12: "I put special effort into the Physical Education course"* and *item #19: "I persevere in participating in the activities of the Physical Education course even if they are not to my liking"* show a marked difference in results between the two times the questionnaire was approached. The Pearson Chi-square test provided a value of $p=0.011$ (see Table 6) in a global analysis focussed on participants' gender (item #12), confirming a higher level of effort among female students compared to that of their male peers.

Table 6. Chi-square test of global analysis on gender regarding item #12.
(*I put special effort into the Physical Education course*)

| Global analysis on gender | Value | gl | Asymptotic significance (bilateral) |
|---------------------------|-----------|----|-------------------------------------|
| Pearson Chi-square | 12.968(a) | 4 | .011 |
| Credibility rating | 14.022 | 4 | .007 |
| N of valid cases | .011 | 1 | .918 |

In addition, this research found other significant differences in the Chi-square test ($p=0.010$) regarding *item #19 (I persevere in participating in the activities of the Physical Education course even if they are not to my liking)* when comparing results obtained in October to those presented in June (see Table 7).

Table 7. Chi-square analysis over time regarding item #9.

| Global analysis over time | Value | gl | Asymptotic significance (bilateral) |
|---------------------------|-----------|----|-------------------------------------|
| Chi-cuadrado de Pearson | 15,014(a) | 5 | .010 |
| Credibility rating | 16.563 | 5 | .005 |
| N of valid cases | 150 | | |

Students' responses to the semi-structured interview included multiple references stating the importance of values such as effort and persistence, regarded as benchmarks and models for our teamwork strategies and also, in individual attitudes which aim to meet a collective goal. Below, we are showing some of the opinions concerning the contents of the projects and the students' preferences:

Juggling and gymnastic skills circuits. They are really fun and we are learning something new. When everyone is focussed on these activities we can achieve them while doing something else than soccer, they feel like new opportunities.

TMG 6°C, March, 6, 2015, 5:26 PM P-1 (236-240) CARF

Truth is, this year we have really persevered in the Olympics in Ancient Greece project.

FPC 6°C, June 22, 2015, 8:42 AM (1433-1434) JOL

The ancient Greece, our class has really put a great effort into the Ancient Greece project.

IRB 6°B, June, 22, 2015, 11:14 AM P-3 (1499-1501) JOL

References to effort and persistence as means to properly approach work while meeting the different goals can be found over the course of the academic year. The “hidden”, underlying role of the teacher during the intervention program was to address several values, especially responsibility and effort. In this sense, the teacher’s journal reflect feedback in line with those comments placing work as a central dimension closely linked to effort in order to meet the goals. Below, examples of the aforementioned feedback:

As days go by and students become aware of the final stretch of the quarter, they are encouraged to complete their tasks. A project has been already finished with high marks, some of the students have even approached the QR codes. However, it is being really difficult to properly manage our work across all the students, an issue arising in every subject we teach at the school center.

9-3/10/2015 P-2 (3754-3758) CUCP

The three groups are highly motivated when approaching the task at hand and we are asking parents to help students complete their work at home since the school day is simply not enough for the complexity and volume of tasks.

09-08-15-6/16/2015 P-3 (342-344) EFA

Self-worth and personal autonomy

Self-worth, personal autonomy and self-reliance were other values we addressed and developed during the intervention program. Since these values entail similar characteristics we are grouping and analyzing them together. We found several items in the questionnaire related to these values and we placed special attention on those linked to self-worth as in the case of *item #20: “I am trying to become less shy”*, *item #26: “I accept myself as I am”* and *item #37: “I am the best in my class in sporting activities”*. All of these items did indeed show improvements when comparing results obtained in October with those obtained in June. In this regard, *item #20* saw a 12 point improvement in the range of responses “I fully agree”. Respecting the other two items, #26 and #37, they show significant differences in the Pearson Chi-square test when assessing the analysis on the whole over time. Results confirm that male students see themselves as the best fit for sporting activities, especially the first time the questionnaire was employed in October $p=0.020$ (see Table 8).

Table 8. Chi-square test on global analysis on gender regarding item #37.

(I am the best in my class in sporting activities)

| Time and gender analyses | | Value | gl | Asymptotic significance (bilateral) |
|--------------------------|---------------------------|-----------|----|-------------------------------------|
| October | Pearson Chi-square | 13.343(a) | 5 | .020 |
| | Credibility rating | 15.631 | 5 | .008 |
| | Linear linear association | 12.418 | 1 | .000 |
| | N of valid cases | 75 | | |
| Junio | Pearson Chi-square | 10.200(b) | 5 | .070 |
| | Credibility rating | 12.966 | 5 | .024 |
| | linear linear association | 6.924 | 1 | .009 |
| | N of valid cases | 75 | | |

Respecting *item #27: “I dress according to my own tastes”* and *item #28: “When the Physical Education teacher gives pertinent information, I usually contribute with my feedback on the subject matter”*, they show

significant differences in the Chi-square test when globally assessing the evolution of items over time (see Table 9). This means that the value personal autonomy was successfully developed during the intervention program, even if some of the differences can be explained by students' natural maturing over the academic year. Usually, personal autonomy can be considered an additional, positive dimension when developing, attaching and retaining other personal values.

Table 9. Chi-square test regarding dates in item #27.

| Global analysis over time | Value | gl | asymptotic significance (bilateral) |
|---------------------------|-----------|----|-------------------------------------|
| Pearson Chi-square | 12.917(a) | 5 | .024 |
| Credibility rating | 13.900 | 5 | .016 |
| Valid cases | 150 | | |

These items confirm the validity of the methodology approached to assess the development of values. In this sense, students' responses to the semi-structured interview also show signs of continuous, positive development over the academic year.

*Juggling. I thought it was the hardest activity but I made it through.
JM.GG 6°B, March, 9, 2015, 4:24 PM P-1 (245) CARF*

*Indeed, even if we all have different motor skills I think everyone can take part in these activities.
TN.G 6°A, March, 26, 2015, 7:39 PM P-1 (410-411) CAFA*

*Sports teach me how to trust myself and also how to stay calm and avoid confrontation.
JL.GO 6°A, June, 22, 2015, 11:37 AM (2099-2100) MVCA*

*Sports makes me confident about myself so I can go about my daily life.
AHC 6°A, June, 22, 2015, 11:38 AM (2112-2113) MVCA*

In this line, activities that students' tackle individually within the work groups are fondly regarded, as it was the case when procuring materials for the Olympics in ancient Greece project.

*I especially enjoyed the Ancient Greece project, I had a lot of fun making my own costume.
FHP 6°A, June, 22, 2015, 9:32 AM P-3 (1446) JOAC*

*The costume for the Ancient Greece project was really fun to make.
VGG 6B, June, 22, 2015, 9:50 AM P-3 (1460) JOAC*

*I really enjoyed working on Word without external help.
IRB 6°B 22 junio, 2015 a las 11:14 AM (1901) ACCA*

*Now I know how to do things on my own, especially after working on the blog.
EN.CC 6°C 23 junio, 2015 a las 11:38 AM (2149) ACCA*

The teacher’s journal usually reflects the development, management and assessment of individual, personal values:

Students have an overall poor self-worth, this value should be worked on.
14/10-15/10 P-1 (4117-4118)

I think students have issues with their self-worth, definitely need further observation before tackling this issue.
27/10/2014 P-1 (4120-4121)

Oddly enough, I tried to reinforce the self-worth of these particular students. During the sessions where we enjoyed great attention and positive working dynamics the leaders of the class had been clearly defined beforehand.
16-17-23-03/24/2015 P-2 (4045-4050) VSL

This is the first time I appeal to their responsibility and personal autonomy when students were asked to develop their own work practice and the result was that most did hide within the work group in order to avoid working on their own as intended, they got approached and reminded of the goals of the projects and consequences of not completing the tasks they are assigned.
11/03/2014 P-1 (061-064) VIA

DISCUSSION AND CONCLUSIONS

Responsibility

Results of item #1 respecting this personal value reinforce other conclusions from previous research on the same field of knowledge with similar goals and the same average age of participants. In this sense, research by García-Pérez (2011) focussing on this item found that 40.6% of male students and 46.7% of female students responded, “I fully agree” regarding the need of tidying up the classroom and school supplies after the Physical Education class. Along these lines, Collado (2005), when assessing 12-13-year-old students, reported an increased bias towards positive responses in this regard both in male and female students over the course of the academic year.

In light of these findings, we agree with Prada (2003) reporting the need of “teaching the ethics of responsibility and its central role in human freedom, we are the only beings capable of taking ownership and responsibility for our actions”. We consider then our accountability both for the things we do and those we do not, as Díaz & Alfaro (2014) posit “teachers must lead by example students, so they are held accountable and take ownership for the different activities they engage”.

Respecting genders, results show that female students turned in assignments and homework better than their male peers. This corroborates research by García-Pérez (2011), who concluded “female students are more responsible when turning their assignments and homework on time”, even if in this research by García-Pérez the obtained results did not show significant differences regarding the Chi-square test, the analysis focussing on gender or the evaluations of responses to the questionnaire over time (October and June). In this line, we concur with results from Aldea-López (2004), finding that “a responsible person tends to stay motivated when tackling an assigned task as well as loyal to the proposed goals”, responsibility is thus regarded as a moderating factor.

In this sense, we also agree with Proyecto Cártama (2014) and their focus on approaching PBL to “form competent and self-sufficient persons accepting their responsibilities and acting independently while respecting others”. Education institutions should engage in projects with equity and keep high expectations regarding their students, focussing on developing their full potential through, human values and personal competences through a reflective, critical, involved and supportive teaching experience in the face of social injustices.

When assessing the responsibility of teachers and their central role in the guidance of students through the teaching-learning process, it is worth noting some conclusions from Proyecto Cártama (2014) in this regard: “in a learning environment, teachers should be held accountable for their personal development and continuous learning”. Thus, teachers engaged in self-development with the intention to apply the teaching methodologies already proven successful in the scientific literature should get involved in the Project.

In addition, regarding the PBL methodology approached in our research during the intervention program, we would like to highlight conclusions from González, Madoz & Gorga (2008): “*Teachers are no longer regarded as benchmarks of knowledge and wisdom when the PBL methodology is implemented, they are considered as moderators of the learning process instead*”. On the other hand, students are more active and willing to engage in responsible, cooperative tasks affecting their learning experience.

Lastly, Díaz & Alfaro (2014) posit a significant conclusion: “when teachers lead by example, students are held accountable for their responsibility regarding the activities they engage in”. Therefore, the PBL methodology involves a high level of responsibility; a value which is intrinsic to the teacher but should be developed among students, this is the main purpose of the Project.

At the end of the academic year, we confirmed all data collected from the questionnaire with a satisfactory level of involvement in every work group regarding work and assignments. In this sense, one of the main personal values initially signalled as especially relevant saw a significant development at the end of the academic year, as already reported in previous research by Öngün & Demirağ (2015) and Sáenz & Ruiz (2012).

Effort

This personal value was also assessed given its increased importance in the current state of our current education system over other values. Results show differences in gender and time, with male students exhibiting a higher level of effort compared to their female peers, corroborating findings from Cepero, García & López (2013); García-Pérez (2011) & Martínez et al., (2014) especially in the development of this value over the academic year. In this regard, the level of effort is in fact lower over time in the case of female students whereas male students manage to keep their effort high. Also, Posadas (2009) analyzed the importance of effort in the Physical Education course by examining the personal values that students wanted to acquire through the practice of sporting activities, with results showing that, among the six initial values assessed, effort and persistence towards assigned tasks were in second place in order of relevance. Similar results were drawn by Figueras (2008) when approaching these personal values in a sample comprised of students coursing 5th and 6th year in Spanish Primary Education in the region of Granada (Spain). In this case, effort was found to be the third best regarded personal value in order of importance.

One of the characteristics of the current education system model is students' increased willingness to put personal effort into Physical Education and sports, enabling the development of a different methodology for both activities supported by multiple factors related to a certain dimension and evolving following a common

pattern (Cantó, García, López y Miñarro, 2016; Cepero, García & López, 2013; Cuberos, Giráldez, Zagalaz, Sánchez, y García, 2016; Folgar, Boubeta y Cristóbal, 2014). In the School ambit, we can only find a sporting activity that cannot be considered co-educational and is justified by male traits such as strength, power, resistance... as opposed to traditional female traits such as rhythm, coordination, balance and others better suited for different sporting activities: rhythmic gymnastics and sports gymnastics, dance and corporal expression among others. We found that some of these observations have changed in recent times, however they are still fundamentally in line with research by Figueras (2008) & Posadas (2009).

Cecchini et al. (2008) revealed through a multiple regression analysis that approach goals regarding students' assignments affected their persistence and effort towards Physical Education. These findings are in line with those reported within an academic context by Elliot & McGregor (2001) and, in the ambit of Physical Education, by Guan, Xiang, McBride & Bruene (2006). In our research, avoidance goals also contributed to explain persistence/efforts levels, once more falling in line with reports from Guan et al. (2006).

In light of all of the above, we believe that our results confirm that focussing on work and repeating the importance of the day's message did indeed draw students' attention on the relevance of effort and its consistency in order to achieve positive results in any task engaged. Regarding the increased importance of effort compared to the rest of personal values in our current education system, research by Martín et al. (2006) is worth mentioning as it reported that 58% of students blamed lenient teachers for their own lack of effort. On the other hand, 28% of students suggested that their lack of effort derived from a poor understanding of the contents as they were barely useful compared to the knowledge already acquired.

Finally, we highlight the following words from a teacher participating in research by Soto (2011, page 333) reflecting on his students:

“I try to pass them the message that effort is needed to achieve any objective, not only in the ambit of School or other education centers, but also in every aspect of life. You will not make it far without effort”.

Self-worth and self-efficacy

Data collected in June show that the intervention program was critical for the positive development of self-worth and self-efficacy among students, these results are in line with research by Castellano & Pantoja (2017); Cuesta (2013) and Domínguez & Castillo, (2017).

Similarly, we also agree with the findings from Marín-Regalado (2007) researching students from Granada (Southern Spain) in their 5th and 6th year in Spanish primary education. This researcher developed a program to improve self-concept and self-worth and found that students should have a clear knowledge of their qualities and faults and those of their peers in order to positively build self-worth within the classroom.

Both the methodology and contents approached during the intervention program were central to the co-educational dimension involved in the learning process. Thus, gender stereotypes associated with certain sporting activities were eliminated, as already proposed in recent intervention programs developed by Hernández-Mendo, Blanco-Villaseñor, Pastarna, Morales-Sánchez & Ramos-Pérez (2016). In this sense, Baena & Ruiz (2009) posit that “regarding the practice of physical activities, traditional gender-based prejudice conveying any kind of weakness in women should be eliminated. The contents of the course should be taught equally for male and female students”.

Results from our research also show that, in October, male students considered themselves as a better fit for sporting activities. However, results in June show that they regard their female peers equally thanks to the values developed through the intervention program. Esnaola (2005) & Navarro-Patón, Barreal-López & Basanta-Camiño (2016) reported in this sense significant, statistical differences respecting gender when assessing physical aptitudes, in this case males show an increased physical fitness.

Lastly, Fraser-Thomas & Beaudoin (2004), de Robles-Rodríguez, Abad-Robles & Fuentes-Guerra and Benito-Peinado (2017) also researched personal values associated to self-worth reporting that an approach to new sporting activities as opposed to traditional sports secured equal opportunities for all students independently from their gender with an increased participation of females in these activities. These studies paved the way for certain physical activities where gender-based prejudices are still in place.

The overall conclusions we can draw from our research are the following: a) implementing an intervention program based on the PBL methodology in the Physical Education course had a positive impact on the development of personal values among all students involved, b) responsibility and effort were the most appreciated values by students and teachers, with a higher level of responsibility in the case of female students reflected on items #1 and #3 in the questionnaire. However, male students displayed a higher level of effort into activities related to the Physical Education course. Results on gender-based differences obtained at the end of the academic year show that equity was achieved in students' competences in sporting activities. This positive outcome was explained by the development of students' self worth by approaching other personal values such as persistence and effort.

Lastly, the PBL methodology incited a pro-environmental behavior and an increased respect for school materials, supplies and facilities. More importantly, the PBL experience sparked enthusiasm and motivation among all students towards the contents they worked on. Success was within everyone's reach encouraging the positive effects of physical activity on their personal sense of self-worth.

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