

LEARNING BY BODY: THE EXPERIENCE OF A GROUP OF COLOMBIAN TEACHERS WITH FUNCTIONAL ADVANCED DIDACTICS

APPRENDERE CON IL CORPO: L'ESPERIENZA DI UN GRUPPO DI INSEGNANTI COLOMBIANI CON LA DIDATTICA AVANZATA FUNZIONALE



Clinical Exercise and Rehabilitation Research Centre, University of Derby, United Kingdom
f.ferraro@derby.ac.uk

Santolo Ciccarelli

Università degli studi di Napoli Parthenope
santolo.ciccarelli001@studenti.uniparthenope.it



Francesco Paolo Salemmme

Università degli studi di Macerata
f.salemmme@unimc.it



Francesco V Ferraro



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ABSTRACT

The present paper proposes a study carried out in Colombia on six non-experienced teachers of physical education, who took part in an embodied based training course aimed at teaching a method of Functional Advanced Didactics (FAD). Teachers have acquired practical skills. The results showed the satisfaction of the participants for the course. In addition, three teachers applied FAD to their students, reporting improvements in several areas.

Il presente lavoro propone uno studio effettuato in Colombia su sei insegnanti non esperti di educazione fisica, i quali hanno preso parte ad un corso di formazione embodied based finalizzato all'insegnamento di un metodo della Functional Advanced Didactics (FAD). Gli insegnanti hanno acquisito competenze pratiche. I risultati hanno mostrato la soddisfazione dei partecipanti per il corso. Inoltre, tre insegnanti hanno applicato la FAD ai propri studenti, riportando miglioramenti in diverse aree.

KEYWORDS

Pedagogy; Embodied theories; Gamified learning; Teacher training; Social science

Pedagogia; Teorie incarnate; Apprendimento gamificato; Formazione degli insegnanti; Scienze sociali

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Introduction

The Latin American educational system, despite increased investment and higher graduation rates, which increased by 3.5 per cent between 2010 and 2016 (Froemel et al., 2022), continues to face numerous challenges that hinder equitable access and the improvement of the quality of teaching (Bertoni et al. 2018; Rodríguez, 2019). In some countries such as Colombia, in addition to the historic problems due to political struggles that have limited the quality of their education (Ortega Mejía et al., 2020), we have to face the challenge of economic and socio-educational inequalities (Morales Díaz et al. 2022), which affect the growth of a country that is rich in raw materials and low-cost labor. (Eneis et al., 2022;Pal, 2023). The adoption of a teaching system based on the principles of embodied cognition theory, according to which knowledge is shaped by physical experiences and sensory involvement rather than by abstract symbols or exclusively mental representations (Farina, 2021; Tanton, 2023; Smith, 2024), turns out to be an effective alternative to conventional teaching methods (Feng, 2023) because in addition to helping students to understand and reduce socio-economic disparities, it emphasizes the impact of social factors such as empathy, communication and collaboration. (Irby-Shasanmi et al., 2012; Suitner et al., 2015; Francesconi et al., 2019). Furthermore, the use of the gamification methodology, which integrates typical game design techniques within structured contexts, such as school environments (Dehghanzadeh et al., 2024), has proved effective in improving students' involvement, motivation and results. (Rodriguez & Cusme, 2023). However, "Using an embodied centred teaching approach supported by gamification implies that teachers have a good knowledge of these methodologies (Bremmer, 2021; Miglani, 2022). An educational path based on experiential learning can effectively transmit such knowledge, promoting a higher level of awareness than a purely theoretical approach (Arcodia et al., 2022).Therefore, teaching proposals that take advantage of the movement and envisage taking over various tasks have proved effective in improving both skills and learning experiences (Adinda et al., 2022), as well as the self-esteem, autonomy and communication skills of the students involved (Díaz Ojeda et al. 2023); even if the difficult goal of educating the movement is pursued (Custodio & Pintor, 2021). In this regard, the research team intends to present an experiment that envisaged the administration of an embodied training course based and set on the methodology of gamification, addressed to six teachers not experienced in physical education, employed in the Mercedes Ábrego primary school (Cartagena de Indias, Colombia).

The aim of the research was to verify whether it was possible to teach Functional Advanced Didactics (FAD), an experimental teaching method that combines exercise with conventional teaching disciplines.

The experimental hypothesis presupposes that thanks to the use of an immersive-type teaching protocol that can predict body use in relation to a gamified context, it is possible to train any primary school teacher to administer the FAD method.

1. Methods

A highly interactive teaching approach was used, which envisaged the creation of an engaging learning environment, valorizing active and playful methodologies, enhanced by the support of technological tools." (Florez M, 2022). Through an educational approach based on learning focused on practical experience (Pérez-Rivas et al., 2023), the participants were found to perform various tasks, covering both the role of teacher, with the task of teaching FAD (table 1) to the rest of the group, and the role as a learner with the job of completing the motor teaching paths.

The training course envisaged the simulation of practical activities identical to those that the participants themselves proposed, once the course was completed, to their students.

"The sessions included video recording of activities, performed via a smartphone attached to a gimbal (a robotic tripod capable of stabilizing images); The videos were then used as digital educational subsidies accessible at any time." of the same videos, with the objective of providing pedagogical aids accessible and consultable in case of need, even after the course is completed.

The intervention lasted two hours per session, with a period of two weeks and took place over a month.

Table 1. The structure of the Functional Advanced Didactics

Knowledge phase	Nuclear Phase	Retroactive phase
This phase of the FAD method involves the implementation of specially designed motor patterns to improve the laterality and attention of students. The aim is to facilitate the acquisition of motor and cognitive skills that can be useful in various scenarios of everyday life. During this phase, the educator uses verbal signals to guide students through three distinct levels of execution speed: “Green” (maximum speed), “Yellow” (moderate speed) and “Red” (arresto). These speed variations are intended to stimulate the students' concentration, helping them to perform precise motor sequences. In addition, the use of different execution speeds allows students to develop greater body awareness and better motor synchronization. While improving their ability to adjust the	During this phase a teaching session is undertaken which refers to curricular activities, which could be, for example, a geometry lesson; in this case one of the game tasks involves dividing the participants into two opposing groups. At the beginning of the challenge, each team will complete a motor track consisting of an identical circuit and parallel to that of the other team, designed to avoid possible injuries. Once the final point is reached, you will be able to access a station where containers containing auctions will be present. The objective of the activity is to overcome obstacles and collect objects (staves) to configure a geometric shape within an area delimited with adhesive tape. The instructor will specify the particular shape to build at the beginning of the game. The activity is carried out in sequence, with the participation of one player at a time. Instead, when it comes to teaching English, a useful technique is to create a play area consisting of concentric circles created	After the nuclear phase, the next phase takes place, known as the retroactive phase; in which a comparison process is initiated between the students aimed at alleviating any tension that may arise during the competitions. The main objective in this phase is to work on awareness of emotions, as well as facilitating recovery through physical and mental relaxation techniques. Once the discharge phase is completed, students are asked to position themselves on the ground and form a circle. After the establishment of a minute of silence, a ball is inserted inside the circle and the participants are given the opportunity to pass it to another student of their choice. This gives the opportunity to interact with the classmate

rhythm and adapt to different environmental circumstances. Overall, this first phase represents an educational opportunity for students, enabling them to improve their motor and cognitive skills in a systematic and targeted manner.	through cards attached to the floor. The cards that form the area serve as teaching tools depicting animals, objects, colors, crafts and food. Within the area are placed numerous small plastic cones. At the beginning of the exercise, students, in turn, will enter the central point of the area and listen carefully to the instructions of the teacher. Their goal is to place a cone on the image corresponding to the verbal input. The game continues until a student makes a mistake. The student who gets the highest score is declared a winner.	with whom conflicts arose during the lesson or for whom a particular feeling of friendship is felt. After passing the sphere, the instructors urge the students involved to start a comparison activity assisted by the entire class group.
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The table summarizes the characteristics of the three stages provided by the Functional Advanced Didactics method.

Study to pursue the goal of improving the motor, cognitive and emotional abilities of the students.

1.1 Participants

Participants in the experiment (Figure 1) had to meet inclusion criteria, according to which they had to be native Spanish speakers, be primary teachers not experienced in physical education, and have the physical requirements to practice typical FAD activities. Six teachers participated in the study, all employed within the Mercedes Ábrego state school, located (Cartagena de Indias, Colombia).

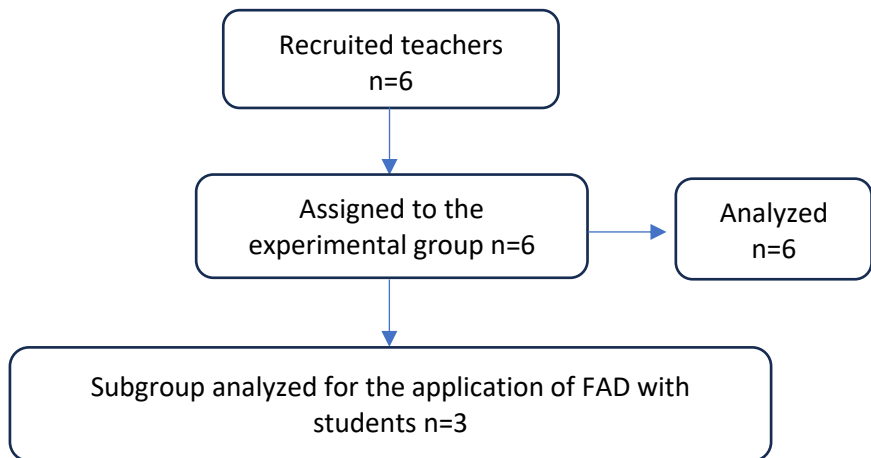


Figure 1. Participant selection process

1.2 Measurements

At the end of the training course, each of the participants was given structured interviews with the aim of investigating their degree of satisfaction with regard to the FAD experience, the knowledge acquired, the methodology used and the duration of the course. The results were measured on a Likert scale from one to five, where the number one indicated that they were not satisfied at all and the number five that they had been completely satisfied. Subsequently, three of the six teachers attending the course were selected, who were employed for three months in administering the FAD method to their students. At the end of the study, new questionnaires were given with structured interviews to the three teachers involved, designed to measure their perceptions regarding the cognitive abilities, behavior, readiness to learn, the acquisition of new skills and the socio-emotional sphere of their students. The results were measured on a Likert scale from one to five, where the number one indicated that there was no improvement and the number five that there were significant improvements.

2. Results

Table 2 contains data on the average of responses on the degree of satisfaction, the knowledge acquired, the methodology used and the duration of the FAD training course.

Table 2. Average responses of participants to the training course Functional Advanced Didactics

#	Results of the interview administered to teachers at the end of the FAD course	Average of responses
1	FAD Experience (n= 6)	
	Very satisfied	n= 3(50%)
	Totally satisfied	n= 3 (50%)
2	Acquired knowledge (n= 6)	
	Very satisfied	n= 4(67%)
	Totally satisfied	n= 2 (33%)
3	Methodology used (n= 6)	
	Very satisfied	n= 3(50%)
	Totally satisfied	n= 3 (50%)
4	Time Course development (n= 6)	
	Very satisfied	n= 4(67%)
	Totally satisfied	n= 1 (17%)
	Neutral	n= 1 (17%)
5	Ability to master the teaching method (n= 6)	
	Very satisfied	n= 1(17%)
	Totally satisfied	n= 5(83%)

Results of the interview given to teachers at the end of the course on Functional Advanced Didactics. The table shows the average response of teachers (n=6) on various aspects of the FAD course, with the level of satisfaction divided into "Very satisfied" and "Totally satisfied".

Table 3 shows the average of the responses concerning the perception that the three teachers involved in the administration of the FAD had in relation to their students.

Table 3. Average responses from teachers who participated in the Functional Advanced Didactics experiment

#	Results of the interviews administered to teachers at the end of the experiment in which they administered the FAD to their pupils	Average of responses
1	About the cognitive area of their pupils (n= 3)	
	Improvement	n= 3(100%)
2	About the discipline of their pupils	
	Improvement	n= 1(33%)

Significative improvement	n= 1(33%)
Neutral	n= 1(33%)
3 About the readiness to learn of their pupils	
Improvement	n= 1(33%)
Significative improvement	n= 2(67%)
4 About the new skills of their pupils	
Improvement	n= 1(67%)
Significative improvement	n= 2(33%)
5 About the social-emotional area of their pupils	
Improvement	n= 1(67%)
Significative improvement	n= 2(33%)

Table 3. Results of interviews given to teachers at the end of the period in which they applied the Functional Advanced Didactics method to their students. The table shows the average response of teachers (n=3) regarding the improvements observed in the different areas of student development after using the above method.

From the survey, in which 6 female teachers aged between 38 and 69 years participated, it appears that at the end of the FAD course, the teachers engaged in the training said they were very satisfied or extremely satisfied with the experience (50%; 50%), very satisfactory or fully satisfied about the knowledge acquired (67%; 33%), very satisfying or totally satisfied of the methodology used (50%, 50%), highly satisfied, completely satisfied and neutral with regard to the duration of the course (67%, 17%, 17%), while in terms of the ability to master FAD method, they said they are absolutely satisfied (83%; 17%).

Subsequently, the three teachers (between the ages of 38 and 50) who experimented with the application of the FAD method with their pupils improvements in their cognitive area (100%), improvements, significant improvements or said they were neutral in their discipline (33%; 33%, 33%). Additionally, significant improvements and improvements were in terms of readiness to learn (33%; 67%), significant improvement and improvement in the acquisition of new skills (67%; 33%), and significant improved and improved in the socio-emotional sphere (67%, 33%).

The results suggest that the FAD experience was highly appreciated by teachers and that the application of the method has produced positive effects on the students.

3. Discussion

The objective of the study was to verify whether the teaching of a teaching method based on the principles of embodied cognition theory (Kiefer et al., 2023) and referring to the methodology of gamification (Cabello et al, 2021); can be adopted also by teachers who are not experienced in physical education teachers in a developing context such as that of Colombia (Viasus Pérez, 2022).

The adoption of this kind of teaching methodologies, in which the body interaction acts as a mediator between the cognitive processes and the surrounding space, represents a valid pedagogical tool (Howell, 2022). Because an educational proposal of this kind allows you to benefit from a large number of stimuli that can arise only from the interaction between the body and the environment (Macedonia, 2019; Khatin-Zadeh et al., 2021). In addition, the above-mentioned training methods have proved effective in facilitating active engagement during the learning process (Almarcha et al., 2023; Weiss, 2022; Rotter et al., 2021).

In a one-year study conducted in Poland by Wawrzyniak (2022) the effectiveness of a teaching approach involving the use of the body in teaching was examined. The study involved 70 primary school students, divided into four groups: a control group and three experimental groups led respectively by a physical education teacher, a non-experienced physical education tutor and a mixed team of both. The study focused on the use of eduballs, educational balls decorated with letters and numbers, which were used by the three experimental groups, while the control group carried out normal physical education activities.

The results indicate significant improvements in cognitive skills (calculation, reading and writing) and basic motor skills (locomotion and object control) in all three experimental groups that used eduballs, while the control group did not observe significant improvement. This suggests that embodied pedagogies can be effective in improving both cognitive and motor skills of elementary school students, regardless of the type of teacher conducting the activities. (Almarcha et al., 2023; Damsgaard et al., 2023).

Therefore, teaching teachers who are not experienced in physical education to use a teaching method that includes the use of the body is important for several reasons. First, such an approach can positively influence the development of computational thinking, a fundamental skill in today's digital world, by promoting interaction with technological environments and the procurement of digital content by students. (Zang et al., 2021).

Furthermore, empirical studies have shown that teaching based on the use of the body can promote the learning of the various school disciplines, highlighting their

versatility and effectiveness (Tanton, 2023). Going in sharp contrast with traditional behaviorism, suggesting that cognition is not simply a system of symbolic processing, but is deeply influenced by sensory-motor experiences. (Srinivasa et al., 2022; Burns, 2020).

Finally, the transition from a disincarnated cognitive paradigm to an incarnate paradigm within school environments, can limit the problems inherent in the quality of education, thanks to the increased capacity for interaction that this kind of protocols can return. (Zaki Zadeh et al., 2022; Fang, 2021).

Therefore, it is believed that it is important to further investigate the teaching method adopted in Colombia, so that we can promote the spread and implementation of a method of teaching such as FAD in schools.

Conclusion

The results highlighted the satisfaction of the teachers with regard to the knowledge acquired, the methodology used and the duration of the training course they underwent.

In addition, the three teachers involved in the administration of the FAD showed satisfaction with regard to the perception that they had with respect to their students, following the management of the aforementioned teaching method.

These results are believed to be important because in addition to promoting the spread and acceptance of FAD, it makes it possible to involve teachers who are not experienced in physical education in teaching practices that prefer motor play activities.

Therefore, the research team intends to further investigate the effectiveness of the proposed training course, undertaking a new experiment that may allow access to a greater number of teachers not specialized in physical education, as well as the participation of a control group.

Limitations

The main limitations of the study relate to the number of samples, the duration of the experiment, the lack of a control group and the failure to provide questionnaires addressed to pupils who have practiced FAD.

CRediT

- Conceptualization: Santolo Ciccarelli
- Data care: Santolo Ciccarelli
- Formal analysis: Francesco Paolo Salemmme
- Survey: Santolo Ciccarelli
- Methodology Development or design: Santolo Ciccarelli; Francesco V Ferraro
- Project administration: Francesco V Ferraro
- Resources provision of study materials: Francesco Paolo Salemmme
- Supervision: Francesco V Ferraro
- Validation and verification: Francesco V Ferraro
- Writing: Santolo Ciccarelli (Methods, results and discussion) ; Francesco V Ferraro (Methods, conclusion and limitation); Francesco Paolo Salemmme (Introduction and results)

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