

INNOVATIVE TEACHING UNITS APPLIED TO PHYSICAL EDUCATION – CHANGING THE CURRICULUM MANAGEMENT FOR AUTHENTIC OUTCOMES

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Abstract:

The aim of this article is to reflect on the original attributes that define planning in order to reformulate the concept of teaching units in Physical Education (PE), providing teachers with new structures of planning that allow them to achieve authentic outcomes. Some issues related to students' learning are raised as regards the duration of a traditional teaching unit, as well as the total time amount and allocation dedicated to students' learning. Based on previous psychological and learning theories, as well as on in-service teachers' experience, four proposals of innovative teaching units are provided. Providing opportunities for significant and meaningful learning level in PE is not an easy task for teachers. The main objective of the proposals is to provide students with substantial learning experiences and to accomplish authentic outcomes by planning PE classes. Intermittent, alternated, irregular, and reinforced teaching units are analysed. The proposals focus on new approaches to time allocation in PE, and on a renovated concept of unit planning and curriculum design. Several applications for each type of teaching unit are shown in order to highlight PE teachers' opportunities to innovate their planning. The proposals of intermittent, alternated, irregular, and reinforced teaching units could guide teachers through planning of PE based on related learning and may provide an effective tool for PE planning to overcome learning deficiencies attributed to traditional teaching units.

Key words: learning process, physical education teachers, traditional teaching unit, curriculum organization, length of a teaching unit

Introduction

The evolution of planning in education was initially marked by the United Nations Educational, Scientific, and Cultural Organization (UNESCO, 1962) recommendations, whereby planning was associated with the evolution of society (attending to pupils' future needs more than the present requirements), thus giving rise to short- and long-term planning concepts applied to educational stages: Recommendation number 18 referred to "institutional planning should be directed to ensuring maximum efficiency and flexibility in use" (UNESCO, 1974: 8). As a result of this recommendation, planning in education has been theoretically associated with the characteristics of flexibility, efficiency, and based on objectives (Viciano, 2002). All nations, depending on their own educational policy, socio-cultural and socio-economic characteristics, political and ideological factors, as well as external influences, have developed their standard guidelines or educational aims from which districts (communities/neighbourhoods) and school centres programme their educational goals (with

regard to the general profile of their students, and their community characteristics). Following these educational goals planned by the centres, teachers programme Physical Education (PE) adapting their teaching to the students (Kelly & Melograno, 2004; Viciano, 2002).

A teaching unit in Physical Education

In contrast to the original planning characteristics of flexibility, efficiency and being objective-based (Siedentop, 1998; Viciano, 2002), one of the most used planning structures in the subject of PE has been developed around the concept of a teaching unit (TU) or unit of instruction (Kelly & Melograno, 2004; Piéron, 1992). Teaching unit is understood as a closed and traditional concept associated with several problems. First, TU has been defined as a part of the annual plan made by physical educators (Pesquie, 1988; Piéron, 1992), a period of time that teachers only fill with several subject matters. The concept of "covering the curriculum" (Siedentop & Tanehill, 2000), where teachers feel the necessity of treating a wide range of contents

during a year, has caused ineffective short TUs (Himberg, Hutchinson, & Roussell, 2003; Robles, Giménez, & Abad, 2010). In this line, for example, pre-service and novice PE teachers usually design very short TUs (two or four weeks, twice a week) with the main objective to make students develop their physical fitness (Pérez-Pastur, 2010).

Nevertheless, recent studies express concern that the length of TU is crucial in learning (Araújo, Mesquita, & Hastie, 2014). Secondly, TU has been conceived as a particular number of classes consecutively conducted in the school centre to attain the set objective (or a group of them), and in the best case scenario, teachers consider the necessary learning-time (based on their own experience or taking the reference of previous studies) to achieve it/them (Viciano, Salinas, & Cocca, 2008). Despite, although many studies have been effective in increasing the levels of students' learning in PE settings (i.e. fitness, motor skills, tactical understanding in games) (Arday, et al., 2010; Westendorp, et al., 2014; Gray & Sproule, 2011), none of them mentioned for how long the achieved learning level was sustained afterwards. However, recent research has started to analyse this issue (Mesquita, Farias, & Hastie, 2012; Pereira, et al., 2015). Lastly, the traditional concept of TU raises the third issue. Traditional TUs have usually been based on the achievement of isolated objectives and isolated contents acquisition (Kelly & Melograno, 2004; Piéron, 1992; Siedentop & Tanehill, 2000) failing to establish the relationships between those objectives and the rest of the subject, or the situational perspective of the learning (Smith, 2011).

From the traditional point of view, the most important aspect of TU in PE has been its duration that is represented by the number of classes (minutes) needed to achieve the objective/es (Delau-nay & Pineau, 1989; Viciano, 2002). This duration includes the overall learning time spent and the time students needed to learn something as a part of it (Van der Mars, 2006). Based on the Carroll's model of school learning (1963), saying that the degree of learning could be represented by a function, many authors modified the model in order to complete the variables that ensured an effective teaching process (Cruickshank, 1985; Huitt, 2006; Van der Mars, 2006). In the numerator of the model's function was the "time spent learning" (that will be the academic learning time in the future: it is composed of the allocated time or opportunity to learn, and of the time students spent in tasks learning or in perseverance). The denominator was "time needed to learn" (composed of students' aptitude for learning the contents, their ability to understand the instruction, and the quality of that instruction). This model, modified by successive authors, has contributed step-by-step to the total comprehension of a good framework for students' motor learning in PE (mainly in behavioural skills), and also added

new variables for including students' social skills in the model of the teaching/learning process (McIl-rath & Huitt, 1995).

However, based on the original UNESCO's conception of planning (i.e. recognising the attributes of flexibility and efficiency and based on educational objectives), and on an innovative TU concept (beyond the traditional point of view), a new variable could be taken into account for improving those models and students' learning: this is the *innovative distribution of TU time* throughout an annual plan in PE. This new element could be included in the numerator of the formula of the school model for learning (and the subsequent modified models) in order to improve three important elements regarding learning (but maintaining the time spent in learning and the time needed to learn constant): (a) provide situational learning in PE; (b) improve the relational cognitive-behavioural learning between PE contents; and (c) develop and maintain the cognitive and behavioural learning level already achieved. This new perspective of the time-learning distribution along the academic year could facilitate teachers to attain authentic outcomes, based on meaningful learning, instead of being contented with easily forgettable simple goals (Mayorga-Vega, Merino-Marban, Vera-Estrada, & Viciano, 2014).

Consequently, the purpose of this article is to highlight the importance of innovative forms in the distribution of time planning in PE along the annual plan, and to provide new planning possibilities (foreseeing particular divisions and distributions of time for learning) for teachers in order to solve some planning-related learning issues in PE.

Planning-related learning issues in Physical Education

With regard to curriculum and planning errors, Siedentop and Tanehill (2000) commented that one major culprit was the continued widespread use of the short-unit multi-activity curriculum model that many referred to as the "smorgasbord" curriculum. Because PE has many contents and goals, some teachers plan the curriculum as a series of short activity units, with a few classes of isolated basic skills practice. This approach could lead to continued students' efforts to learn in those short periods of teaching, since students are continuously in a discovery phase, and are not able to achieve the learning with so limited opportunities for successful practice (Viciano, 2002). Consequently, boredom emerges in students and the failure of learning is certain. Although simple objectives could be achieved after a short TU, depending on the nature of learning pursued, authentic outcomes commonly fail. Moreover, learning is usually isolated, with no relationship to the whole subject matter (Zhang, et al., 2014). Recent studies regarding other curricular models such as the sport education model

(usually centered in social interactions) addressed these issues, showing importance and complexity of the factors related to learning (Araújo, et al., 2014).

Regarding the time of learning opportunities, Van der Mars (2006) represented a multi-level scheme of the influences that determine the student's time/opportunity to learn in PE. This scheme includes: (a) a national and state level legislation that regulates the recommended minutes of PE per week; (b) a district level legislation that sets the length/calendar of the lesson; (c) school level regulations that decide on the length of TU and preferred activities; and (d) program/class level regulations that define the time of lesson, allocated time, engagement time, moderate-to-vigorous physical activity time, and academic learning time in PE.

For instance, in Spain the Ministry of Education has established two one-hour lessons per week ($\cong 65$ -68 hours/lessons per year) for PE in the curriculum of elementary and high school, which, in reality, are reduced to 45-50 min each due to the transition and displacement between classrooms (Ministry of Education, 2006). This aspect of the current Spanish educational law is widely criticised by PE teachers (Viciano, 2002). This similarly limited time assigned to PE is shared by numerous European countries, where the average time allocation ranges from 53-81 hours/year (European Commission/EACEA/Eurydice, 2013) and, consequently, all of them share this learning-regarded problem and its consequences. It supposes 65 hours per year approximately (varying among the countries, i.e. in primary education the minimum recommendation ranges from 37 hours in Ireland to 108 hours in France; European Commission/EACEA/Eurydice, 2013) with a great number of contents to deliver and objectives to achieve. Despite several studies demonstrating that PE teachers could increase, for instance, students' physical fitness within the traditional design and time allocation (Mayorga-Vega, Viciano, Cocca, & Rueda, 2012; Viciano, et al., 2008), many PE teachers still consider that it is impossible with only two lessons a week (Salinas, 2011; Corbin, et al., 2014).

Most authors reveal their concern about the time they need to achieve an objective in PE. Some authors have observed that it is necessary to deliver a great number of lessons, because a reduced number tends to situate students at a discovery level, with not enough time to produce sustained effects on learning (Seners, 2001; Siedentop & Tanehill, 2000). Hébrard (1986) specified that 10 lessons were insufficient for reaching the stage of learning in PE and that students would probably forget the learning gained. Himberg et al. (2003) suggested that the first change for increasing the effectiveness of the curriculum would be to lengthen teaching units from two or three weeks to four to eight weeks. All studies regarding time/opportunity and learning in the PE research line support the link between

time and learning, considering that proper instructions are provided during that time (such as feedback, presentation of the task or motor problem to be solved by students, or the style of teaching) (Van der Mars, 2006; Viciano, Lozano, Cocca, & Mayorga-Vega, 2012). None of them has treated innovative distribution of TU time that could facilitate comprehensive learning in PE, instead of considering the TU as an accumulative number of lessons consecutively delivered, and usually conceived as a short-term planning.

The proposals of innovative TUs below address those issues, mainly concentrated in those countries (and some states of the USA) where the PE schedule is composed of two (or three) lessons a week, showing different opportunities to organise learning/teaching periods planned by PE teachers in the annual curriculum. However, some limitations such as local regulations, school contexts, or students' characteristics could affect the application of the proposals presented in this article.

New structures for planning teaching units in Physical Education

The educational objective is the key element of the curriculum that guides the teaching-learning process and planning (Kelly & Melograno, 2004). It is defined as a statement of instructional intent that specifies what knowledge, attitudes, and behaviours are meant to be learned (in fitness, motor, cognitive, or social domains) (Siedentop & Tanehill, 2000). An outcome is a description of what a student will know and be able to do as the result of participating in the activities of the programme. Outcomes could be conceived as "ends", and curriculum objectives as "means" (Lambert, 1996). However, the adjective of *authentic* comes from the "authentic pedagogy theory" of Newmann, Marks, and Gamoran (1995) that has been assigned to outcomes in order to specify the contextual performance where skill, knowledge, or social strategy will be used by the students. The characteristics of meaningful learning (connections with previous knowledge), students' engagement and analysis (psychological involvement of students in their learning), and connection to the world (application of the information and performance to other real sport and physical activity contexts in the students' life) are related to this authentic pedagogy theory, and they constitute the theoretical basis of the following units of planning proposals. Newmann (1992) defined student engagement in an educational setting as the student's psychological investment in an effort focused on situated learning. Situated learning, in contrast with many classroom activities that are out of context, refers to the deliberate situated performances for learning, developed in authentic contexts (with social interactions, collaboration and performed in situations that would normally involve that knowledge).

Proposal I: Intermittent teaching unit

First proposal of innovative TU is called the “intermittent teaching unit”. This proposal is based on the frequency of practices distributed during a year or a particular period of time, thus changing the concept of a conventional TU and connecting students’ learning with other knowledge of the subject of PE.

In Figure 1 the traditional TU is shown in comparison with the intermittent TU (shaded areas). The intermittent TU is composed of many lessons’ pieces of time (from 5 to 15 min) that allow PE teachers to develop a particular content matched to the rest of the physical activity developed during the lessons that compose this intermittent TU. This conception of TU allows teachers to carry out applied lessons instead of artificial lessons based on isolated and decontextualized contents. The intermittent TU could be applied around ten minutes in the introductory or in the cool down phase (first or final parts of lessons). Several studies with variable durations, ranging between nine weeks to one academic year, have carried out different examples of this situational perspective of the development of flexibility in elementary and secondary school settings (Constantino, Aires, & Ramos, 2012; Sánchez Rivas, Mayorga-Vega, Fernández Rodríguez, & Merino-Marban, 2014).

The application of the intermittent TU is centred on some learning and contents that PE teach-

ers usually develop day by day (i.e. the warm-up, methods of training in flexibility, muscular relaxation methods, prevention of injuries, etc.). It seems that these subject matters should not be developed during a traditional TU, because if they are concentrated in several consecutive PE sessions, it could be boring and ineffective for students’ learning, and the performance would be decontextualized. Moreover, the application of this learning to several physical activities is unusually linked to other subject matters, but isolated.

It could seem that the total amount of time allocated to this intermittent TU would be less than the time of a traditional TU, because only very short periods of time of each lesson are allocated. However, when all these short periods are summed, then it gives the same or more learning opportunities for students than a traditional TU. Instead of traditional lessons, this innovative TU organises the phases dedicated to learning’s advance in groups of a particular number of lessons (i.e. 10 minutes during several periods of 5-10 lessons). In each phase of lessons, the content is organised progressively in order to facilitate the students’ understanding and participation (see examples in Figure 2).

The number and duration of the phases that compose the total process is adaptable, depending on the objectives programmed by PE teachers. In Figure 2, there are three different examples of objectives centred on students’ autonomy in

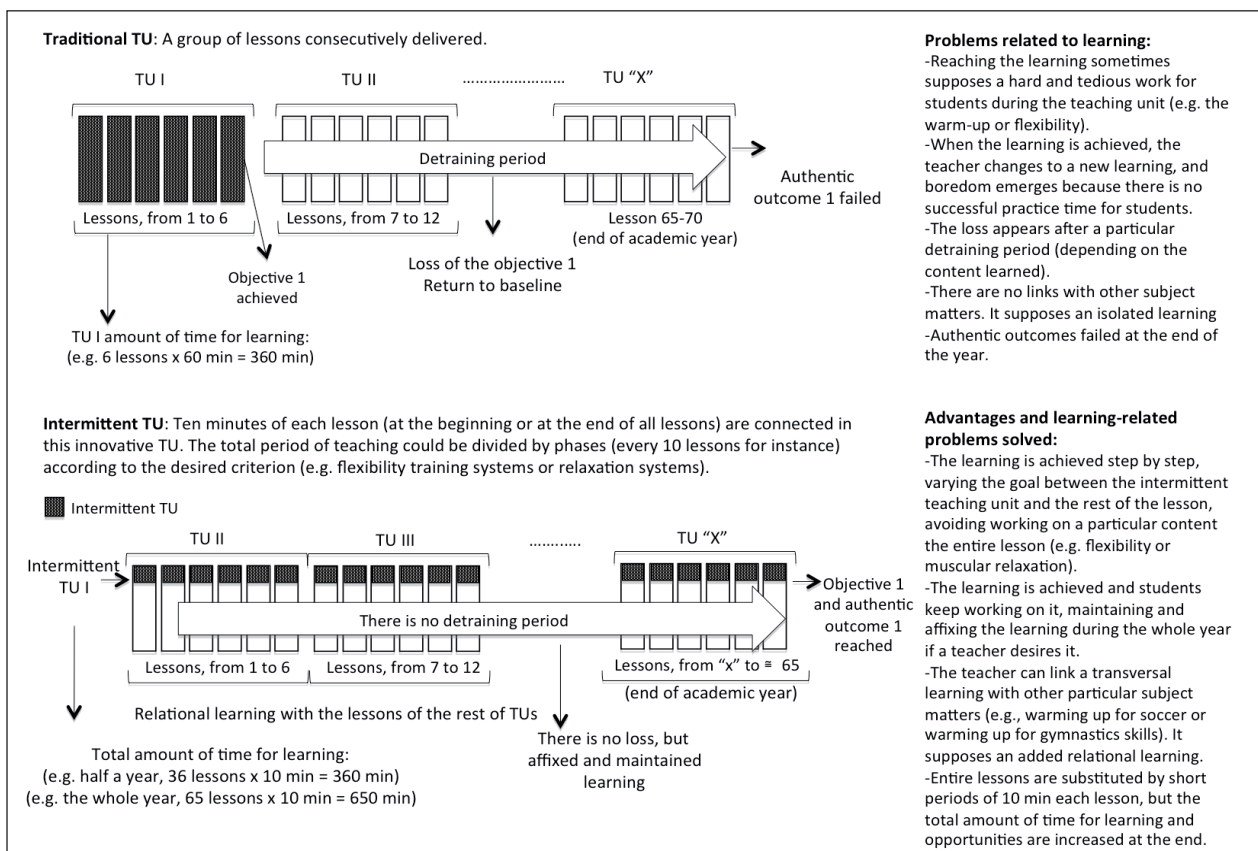


Figure 1. Comparison of intermittent and traditional teaching units.

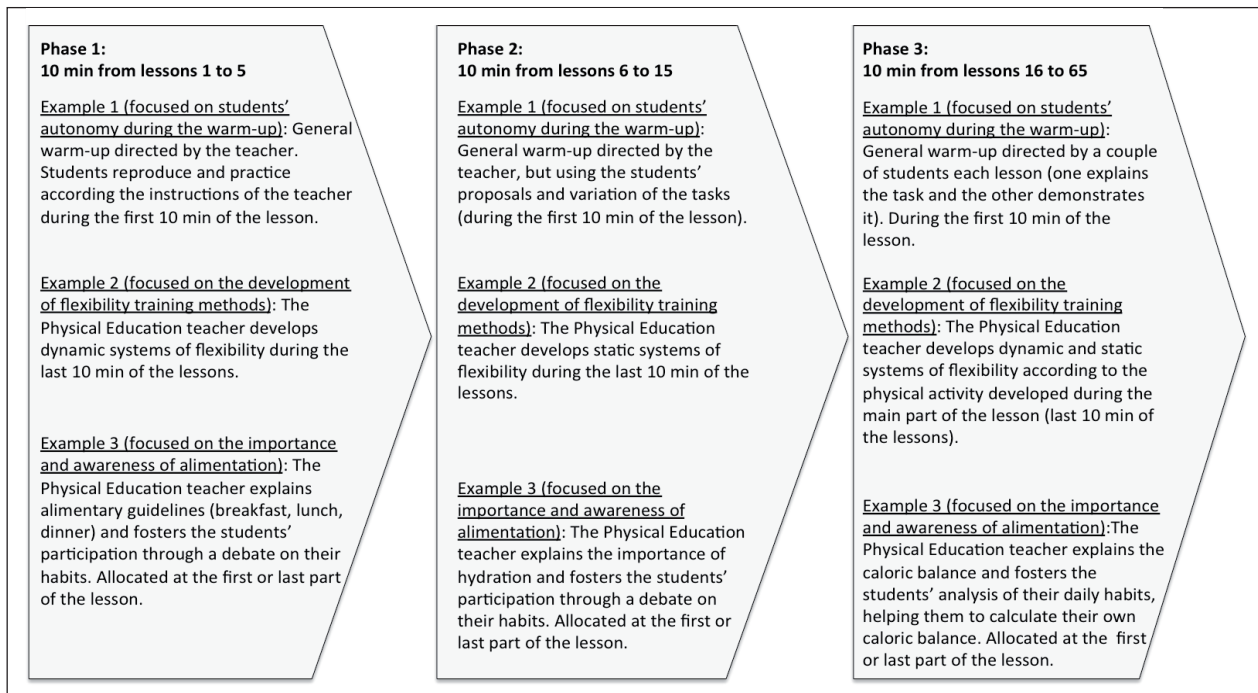


Figure 2. Examples of intermittent teaching units progression.

warming-up, on the development of several kinds of flexibility training methods and their application to specific physical activities, and on the attitudinal and cognitive learning related to alimentation and caloric balance.

Proposal II: Alternated teaching units

Alternated TUs allow students to link the learning developed by both TUs (the objectives of the two TUs alternated), thus allowing students to understand the fundamentals that connect them (Figure 3).

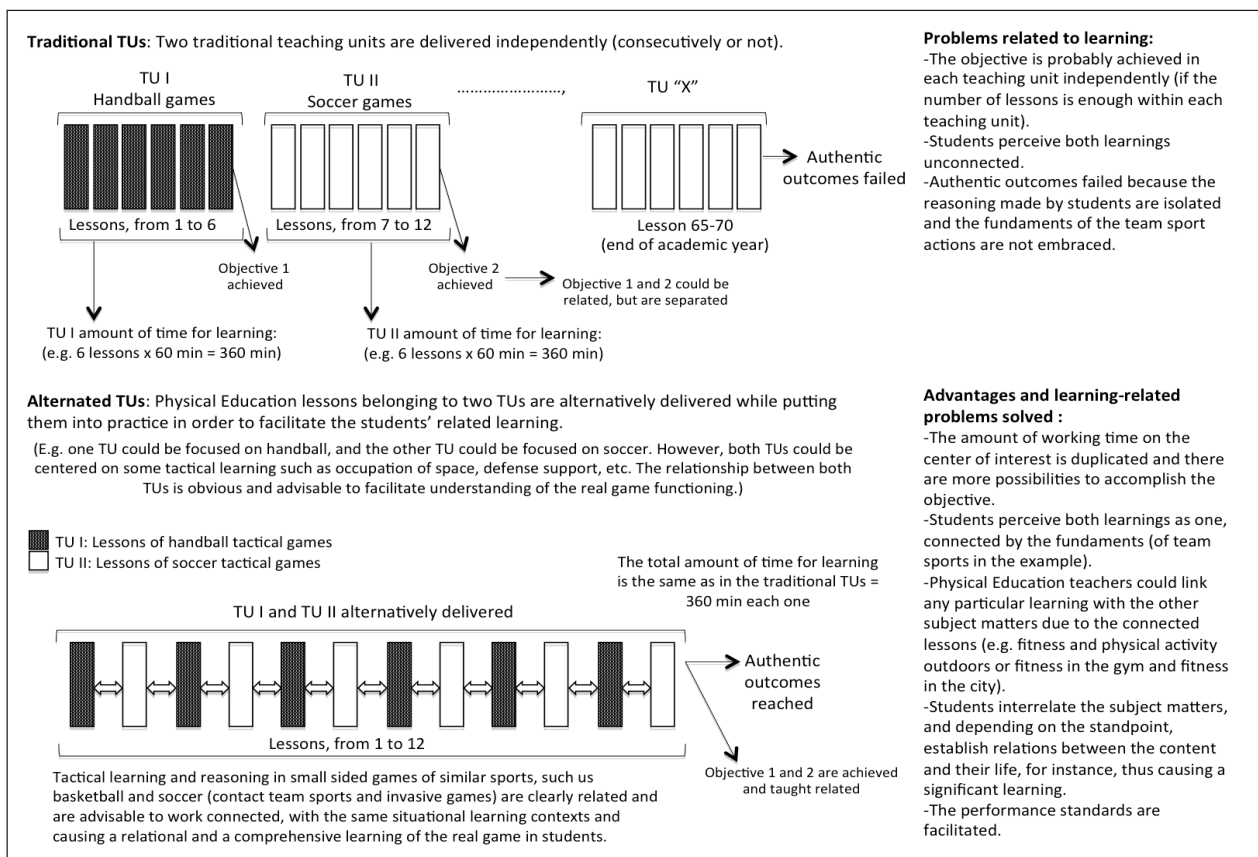


Figure 3. Comparison of alternated and traditional teaching units.

The example of Figure 3 is based on the teaching games for understanding developed by Bunker and Thorpe (1982), although many other applications could be incorporated into these alternated TUs (Figure 4). The main applications of the alternated TUs to PE are: (a) to relate concepts and behavioural skills belonging to the PE syllabus; and (b) to connect the learning developed in classroom to the students' life. The transfer between concepts and learning has been previously verified in secondary school, in motor skills as well as in team sports (Román, Miranda, Martínez, Martínez, & Viciano, 2007; Yáñez & Castejón, 2011).

Although the transfer and relational learning can be applied between two or more tasks in the same PE lesson, often the learning that PE teachers are interested in is developed within different contexts (e.g. indoor-outdoor), or each one needs different materials and organisations that make it difficult to put into practice both types of tasks in the same lesson (e.g. skating-skiing). In these cases, the alternated TUs are a good solution for promoting significant learning in PE. Moreover, some school centres also have a shared schedule by two PE teachers in the same hour of the same day of the week that produce the problem of sharing the gym. Using alternated TUs teachers could solve this problem: one day an indoor content is taught and the other day of the week an outdoor content, thus facilitating the sharing of the available gym between PE teachers. Nevertheless, some limitations such as adverse weather conditions could affect the feasibility of this proposal.

Teaching alternated lessons, as in the examples of Figure 4, allows teachers to relate the learning, make them aware of these relationships between contents and methods in PE, and help them in reaching authentic and meaningful outcomes.

Proposal III: Irregular teaching unit

From the characteristics of flexible and dynamic planning at its maximum level, having the main propose of a TU in mind: to reach the objective and authentic outcomes, arises the irregular TU that provides a wide range of possibilities in PE. The irregular TU means to distribute the lessons that compose it over the whole academic year with regard to the main centre of interest pursued by the PE teacher. Thus, many possibilities emerge from this perspective applied to several curriculum models (see example within sport education model in Figure 5).

The amount or time related to learning opportunities is variable and depends on the number of lessons used and the optional use of the extracurricular time (depending on the maturity and autonomy of the students). In Figure 5 the irregular TU uses recess time in order to develop the competition phase, "the season", in a sport education model. Moreover, the use of extra-curricular time for learning in an irregular TU allows PE teachers to collaborate with students' families in achieving authentic outcomes and performances applied to life (e.g. irregular TU centred on the daily calculation of caloric balance needs collaboration with the fami-

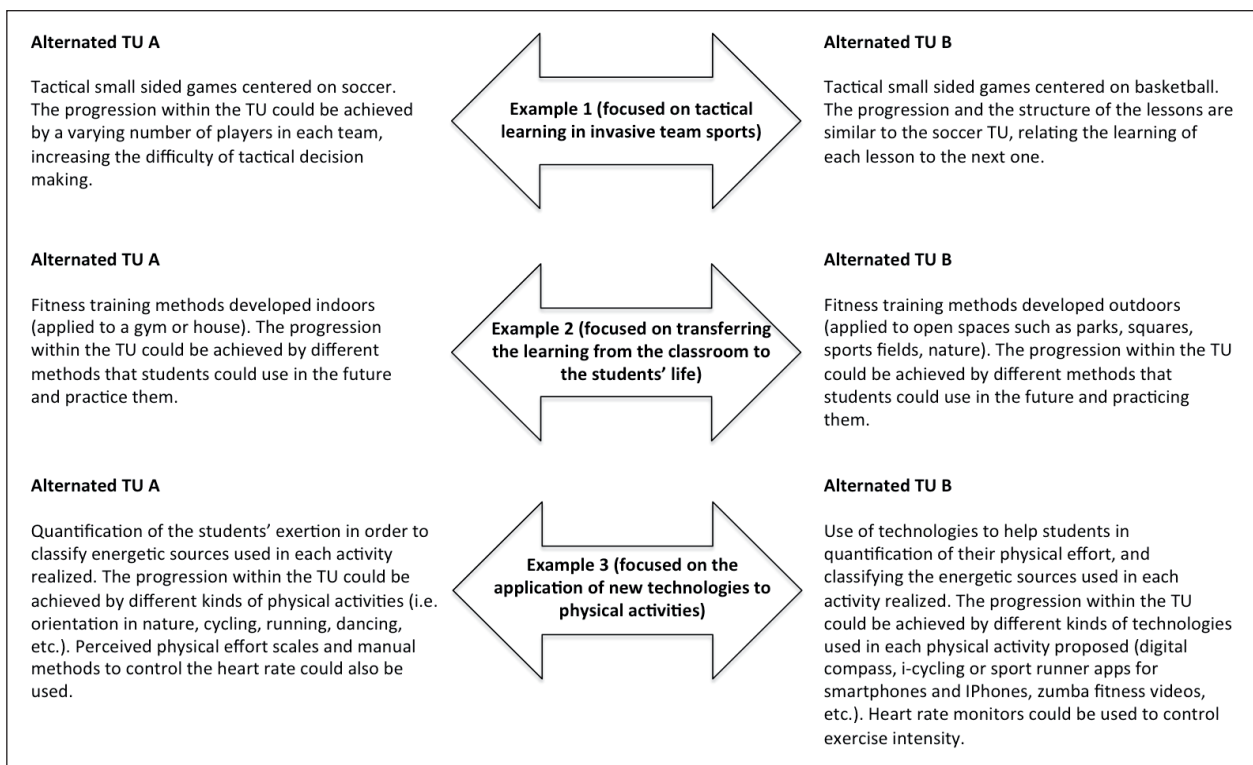


Figure 4. Examples of alternated teaching units.

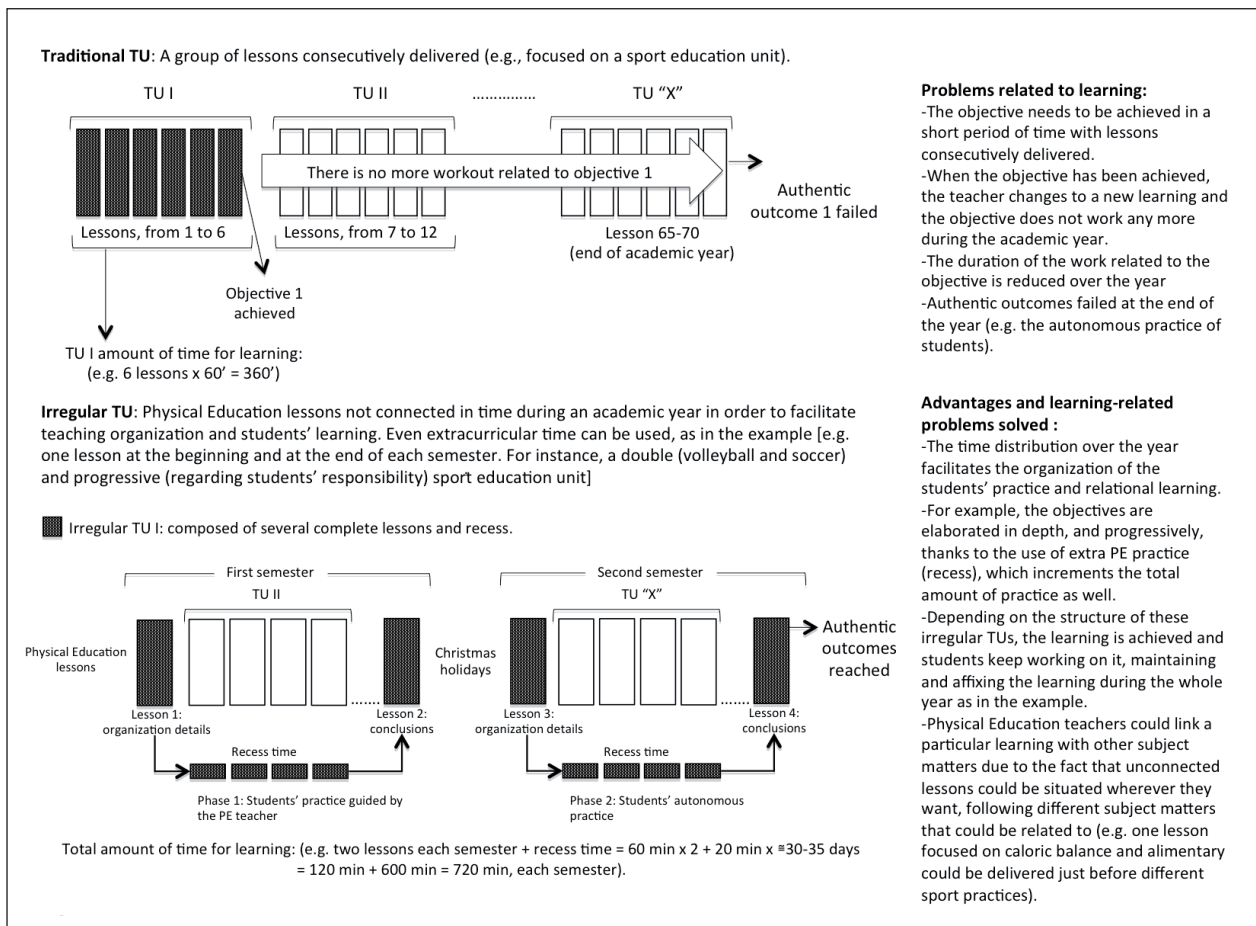


Figure 5. Comparison of irregular and traditional teaching units.

lies, or combining PE lessons with physical activity carried out during the weekend with families' collaboration in order to increase the students' fitness level). The increment of active time for learning in extra-curricular periods (i.e. after school time, recesses, weekends, holidays) allows teachers to pursue many important objectives (e.g. improve the alimentation, improve daily physical activity levels, reduce sedentary habits, increase the students' autonomy). For instance, if students have the required maturity and responsibility, teachers could use extra-curricular time aimed at increasing physical activity during leisure time, thus developing their physical fitness. This could be performed by means of providing the students with the methods of physical fitness development that are characteristic for PE classes, and delegating the responsibility of their development using an individualized style of teaching (individualized programmes performed in couples).

Proposal IV: Reinforced teaching unit

The reinforced TU deals with the quantity of practice needed to obtain an increase in a particular learning experience and its reinforcement along the academic course of PE in order to avoid the loss of the attained learning. The length of the unit needs to

be foreseen according to the objective pursued and revised according to previous experiences carried out in similar contexts. Delivering extra practice after learning (overlearning) is a crucial factor to provide successful practice for students.

A large problem related to physical fitness, motor skills, and tactical learning is the expected decrease after a period of detraining. Several authors confirm that, for instance, after five to 12 weeks of detraining children lose a significant part of their achieved physical fitness gains (Da Fontoura, Schneider, & Meyer, 2004; Ingle, Sleaf, & Tolfrey, 2006; Mayorga-Vega, et al., 2014). Therefore, applying intermittent reinforcements in order to maintain the gain obtained during the initial period is an inherent contribution of the reinforced TU (Figure 6). The intervals of detraining could be used by PE teachers to develop other contents of PE or to consider the holiday periods as detraining. It is necessary to clarify that the instructional approach and the content developed in the first intervention program could affect the detraining period (and the decrease or increase of the learning achieved). Recent studies demonstrated an increase in the levels of students' learning after a detraining period in PE, due to the voluntary involvement in practising physical activity during their leisure

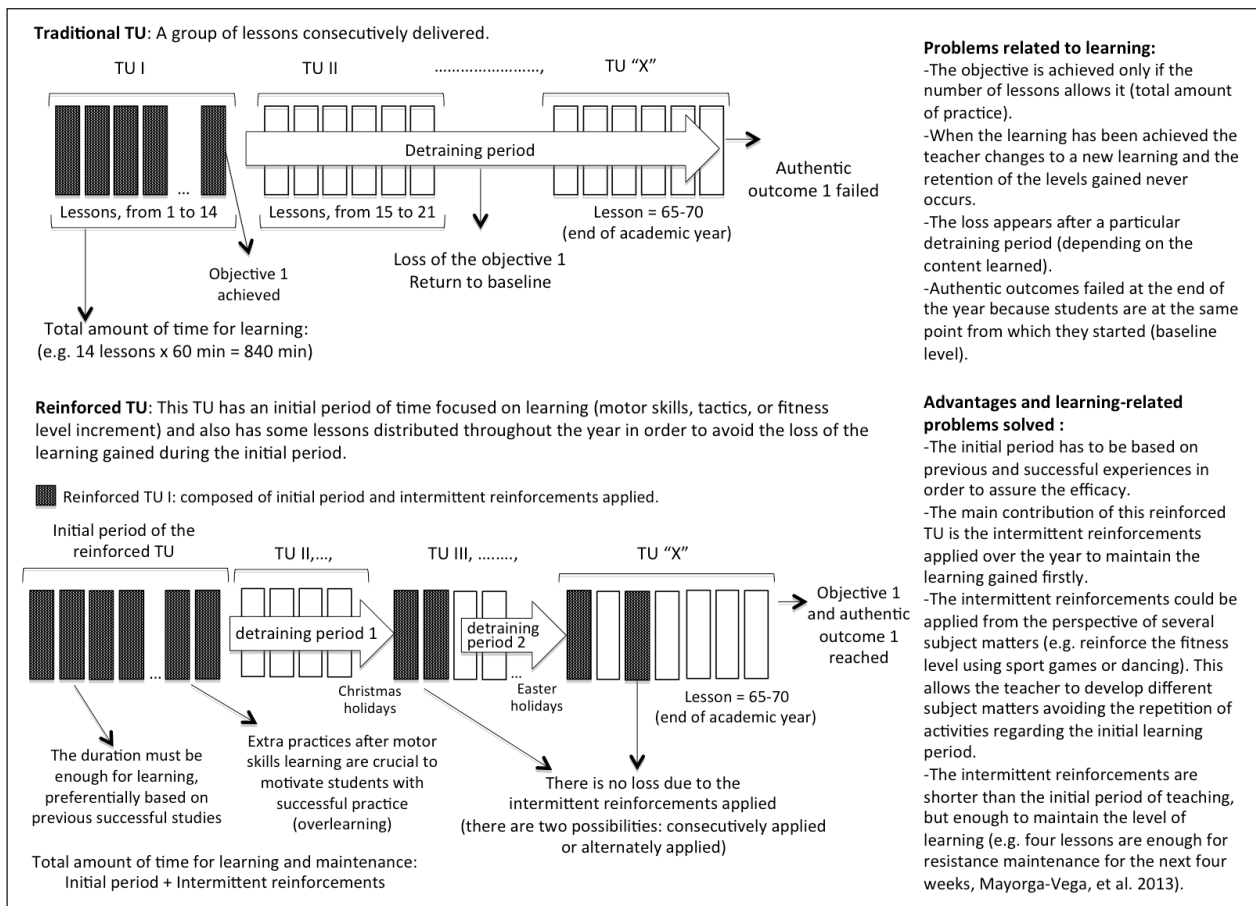


Figure 6. Comparison of reinforced and traditional teaching units.

time when they had been previously motivated by the teacher and content (i.e. sports) (Mesquita, et al., 2012; Pereira, et al., 2015).

It is important to know that the intermittent reinforcement will have a particular design of activities depending on the learning pursued. For instance, if students' cardiorespiratory endurance during the initial period is to be developed, the design of the tasks during the intermittent reinforcement will include a moderate-to-vigorous intensity performance of generic movements that involve most muscle groups, as well as tasks with continuous movements and with enough practice time. It is not important whether these tasks are developed through sports or dance, etc., if they follow an adequate methodology. Teachers could apply the intermittent reinforcement during several lessons consecutively delivered or alternating lessons between other contents. The moment for applying the reinforcements will depend on the learning contents (endurance, muscular strength, tactical sport, etc.), and always before students revert to the baseline levels. The study carried out by Mayorga-Vega, Viciano, and Cocca (2013) has confirmed effectiveness of the intermittent reinforcement in PE setting on physical fitness, creating the fundamentals of the reinforced TUs.

Discussion and conclusions

From the very beginning of educational planning, the characteristics of flexibility, efficiency, and being based on objectives were central to this concept. The current contribution has been based on the theory of authentic pedagogy (Newmann, et al., 1995), and proposes new approaches to teaching units planning that comply with the original attributes of planning recommended by UNESCO (1962). First, flexibility is one of the main characteristics of the developed proposals that discontinue the traditional concept of TU composed of sessions consecutively delivered, and provide a great variety of allocation and distribution of the time dedicated to learning. Efficiency in students' learning is the aim of the flexibility applied to these proposals of curriculum design, making possible a situational and meaningful learning, as well as retention of the learning achieved during the academic course. And finally, objective-based planning is the motor of the renovated concept of the teaching unit because these proposals have been designed in the form of an educational objective (searching for authentic experiences in PE).

The use of extended or longer units has been a common factor of all proposals throughout this

article (with variations according to each of the innovative unit proposed), as suggested by literature (Himberg, et al., 2003; Viciano, et al., 2012): (a) intermittent units have used the concept of pieces of lessons over the whole year in order to provide a higher learning time-opportunity for students; (b) alternated units have added their lessons (teacher efforts) in order to provide more time to learn related concepts and behaviours; (c) irregular units have used the extra-curricular time to increase the total amount of learning time, and at the same time, the unconnected distribution of its lessons along the months and semesters provide an intermittent stimulus focused on the same objective in order to provide situated learning and authentic outcomes in PE; and (d) reinforced units have used three aspects related to learning-time in PE. The first aspect was to extend the unit as far as other previous studies did in order to assure a certain guarantee of success. The second aspect was the applied overlearning that extended successful practice for learning, and higher motivation caused by successful practice for students. The third aspect related to learning-time was the application of the intermittent reinforcements in order to preserve the learning previously acquired during the initial period, and to avoid the loss of the acquisition.

As Harnischfeger and Wiley (1985) stated, the active learning time variable is mainly influenced by policy decisions at multiple levels (country, state, district, community, and educational centre). Examples of this influence have been shown by the "block scheduling" innovation made in the USA. This block scheduling consists of longer segments of time for learning provided by increasing the length of a traditional secondary school class period (Hackman, Hecht, Harmston, Pliska, & Ziomek, 2001). Models such as 4 x 4 ("four by four", four classes per semester), or A-B ("alternating day", classes met every other day for 90 min for an entire school year) have been applied, thus increasing time for learning and obtaining positive results (Bryant & Claxton, 1996; Shortt & Thayer, 1999; Stader, 2001). However, because scheduling modifications depend mostly on external decisions, the treatment of the students' learning time has been utilised in the proposals presented in this article from the perspective of the PE teacher, providing several strategies to increase it merely by the tool of planning. The proposed intermittent, alternated, irregular,

and reinforced TUs could guide teachers for planning relational PE contents; facilitate the consecution of situated and significant cognitive and behavioural learning, maintaining it over the academic year; and provide teachers with a planning tool for avoiding the usual loss of learning.

We must not forget mediational processes that occur within the classroom's relationships, between the teacher and student, and among students (McIlrath & Huitt, 1995). Variables such as teacher expectations, feedback (its quantity and quality), interactions provided by the tasks, communication between teachers and students, communication among students, autonomy support, or class size, influence the learning outcomes. Therefore, just as a boring or an unstructured curriculum is destined for failure, an exciting and relevant curriculum could also fail if it is taught ineffectively (Siedentop & Tanehill, 2000). As Silverman, Woods, and Subramaniam (1999) stated, many variables interact for learning to occur. In this article, the authors have pointed to several points as guidance for PE teachers, providing help to them in planning with the innovative structures of TUs, but the rest of the variables that interact in the students' learning process need to be taken into account and carefully designed. These variables may limit for the application of any of the proposals presented here. Teachers need to consider all these variables and decide in which cases the presented proposals could be limited, depending on the context in which they are to be applied. For example, a lack of students' maturity or autonomy could cause a failure in the application of irregular teaching units that use extracurricular time (i.e. recess, weekend), due to the absence of a teacher during that time. Future research could be developed into experiencing the provided proposals their effectiveness and difficulties arising from the nature of the learning and applied PE contents (i.e. sports, physical fitness, dance), as well as from different school contexts.

Using the original characteristics of planning flexibly, dynamically and based on objectives, the presented proposals have been supported by a new concept of teaching unit. It was modified from the traditional structure of a particular number of sessions consecutively delivered to a new distribution of time according to the educational objective, thus achieving the maximum learning efficiency based on time allocation.

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