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Effect of a computerized visual feedback on the adjustment of time in planning physical education

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Abstract

The planning in Physical Education (PE) is a crucial competency of Pre-service Teachers (PTs) that is developing throughout the university courses. The adjustment of the time planned is a common problem for PTs without experience, and they show high differences between the time that they program and the real time that they employ during the intervention phase of teaching PE. We created a computerized time sheet to deliver visual feedback to PTs about this difference. Our aim was to accommodate quickly the adjustment of the time in planning in PE in a few sessions of visual feedback and coaching meeting with the supervisor of the faculty. We expose the computerized sheet and its application on one PT (an individual case) with a repeated measures series (three trials of baseline and ten trials of intervention were carried out). The results show us the efficacy of the computerized sheet (visual feedback and coaching meeting). We could verify the inflection of the curve since the first treatment trials, decreasing the differences between the time planned and the real time employed during the classes. We conclude that this method is a good way for PTs training during their university courses and for in-service teachers who want to improve their accuracy of planning PE in the future.

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1. Introduction

Since the classic paradigm of Competency-Based Teacher Education (García-Álvarez, 1987; McDonald, 1974; Morgan, 1984), and the rise of these competencies' learning in the European Space for Higher Education, all the abilities that a Pre-service Teacher (PT) must have after his degree are again at the height of the science of teaching (Nizam, Mahmoud, Bani, & Mohammad, 2009). Among these competencies, the planning of teaching is one of the most important areas because all novice teachers find support in it to increase their security and their intervention into the classroom (Del Villar, 1993). Other authors also stated that planning was more important than intervention to assure a greater level of efficacy. Curtner-Smith (1996) measured the impact that an early field experience had on 28 pre-service PE teachers in secondary school. In this research the planning competency was more important than the intervention for achieving success in the teaching process. Fernández and Barquín (1998) declared that teachers considered the planning more important than the evaluation phase to improve as a professional, and to be a good curriculum maker and a good planner for assuring certain teaching efficacy.

One of the most important aspects in planning PE is the time management of the class; PTs need to adjust it for an accurate plan in PE and it supposes an added difficulty to planning PE correctly. Numerous researches have been developed around this issue (Viciano, Fernández, Requena, Zabala, & Lozano, 2003; Lozano, Viciano, & Piéron, 2006; Momodu, 2000). Among the time categories that we are necessary to plan and apply correctly, the Motor Engagement Time (MET) is perhaps the most important. MET is the time that the students are involved in physical activity, and motor learning depends on it. However, the time that students spend paying attention to the PE teacher while he/ she explains the tasks or theoretical contents [Student Attention Time (SAT)] and the time employed to organize the students before the tasks [Organization time (OT)] are also important. When these two categories of time increase they cause a decrease in MET. So if our goal is to get an effective motor learning session in PE, we need to reduce OT and SAT in order to increase MET as much as possible. Planning is the instrument to achieving this, but we need to teach this competency in the university and the PTs need to practice different plans to assimilate the strategies for good planning (Van Der Mars, 1994; Viciano, 2002).

It is well known that feedback helps teachers to be aware of their actions in teaching (Viciano & Salinas, 2008). Viciano et al. (2003) developed a computerized sheet to deliver feedback about the time management that PTs employed in a practical session of PE. In 2002, the University of Granada gave this computerized sheet an award in the first edition of the 'Teaching Innovation Awards'. For these reasons, we decided to apply the use of this computerized sheet to deliver visual feedback to a PT (in a coaching meeting) in order to teach him to adapt his intervention in the classroom. This could allow us to achieve good levels of MET with respect to the time of MET planned. Consequently, the purpose of the present pilot experience was to examine the effect of the application of a computerized sheet to deliver visual feedback on good levels of MET with respect to the time of MET planned in PE classes in a PT. We hypothesized that the application of the computerized sheet to deliver visual feedback could allow to the PT to achieve good levels of MET with respect to the time of MET planned.

2. The computerized time management register sheet

The computerized time management sheet has an entry screen where you can choose registering the time management in a practical PE session or registering the feedback that the teacher delivers to the student during the session. The figure 1 shows the sequence of different screens in this computerized sheet from the beginning to the results presentation.

In general, the computerized sheet has several buttons corresponding to the different time categories. It works like a continuous chronometer that only changes the amount of time to the category that you click on. Each category has its own display to see the chronometer working in each case or stopped if the category is not clicked. The categories and buttons that you can control and register in the computerized time management sheet are:

- a) *Motor Engagement Time*. The time that the students are involved in physical activity. There are three options inside (alternative tasks, consecutive tasks and simultaneous tasks). These three subcategories let us control if a student is doing physical activity the whole time that a task is being carried out or the time employed in the task we need to divide between two students (alternative execution) or more than two (consecutive execution). Simultaneous execution means that all the students are involved in physical activity during the tasks, and the global time registered for the task is equal to the MET.
- b) *Student Attention Time*. The time that the students are paying attention to the teacher's explanation. There are three options or subcategories (Initial session information; initial task information; and feedback given to the students). The three subcategories add time to the total amount of the general category SAT.
- c) *Organization Time*. The time that the teacher spends organizing the materials and the students prior to the task. There are two subcategories (material and resources organization; and student organization). Both categories add time to the general category OT.
- d) *External and Internal causes of unforeseen time are also registered*. They both add to the total amount of time in the general category of "unforeseen time" (UT).
- e) *Finish session*. This button stops the general time counter of the session. After this button is clicked, the computerized application generates an internal file to process the data.

After this process is finished, we can ask the computerized sheet to generate figures that show the different categories registered and the comparison to another model or a previous time value that you can introduce into the sheet (such as the time value of the categories planned prior to the practical session). These figures let us compare the time planned and the time employed in the categories of the PE session analyzed in a visual way (Martínez Álvarez, Cocca, Ocaña, Gómez-López, & Viciano, 2008).

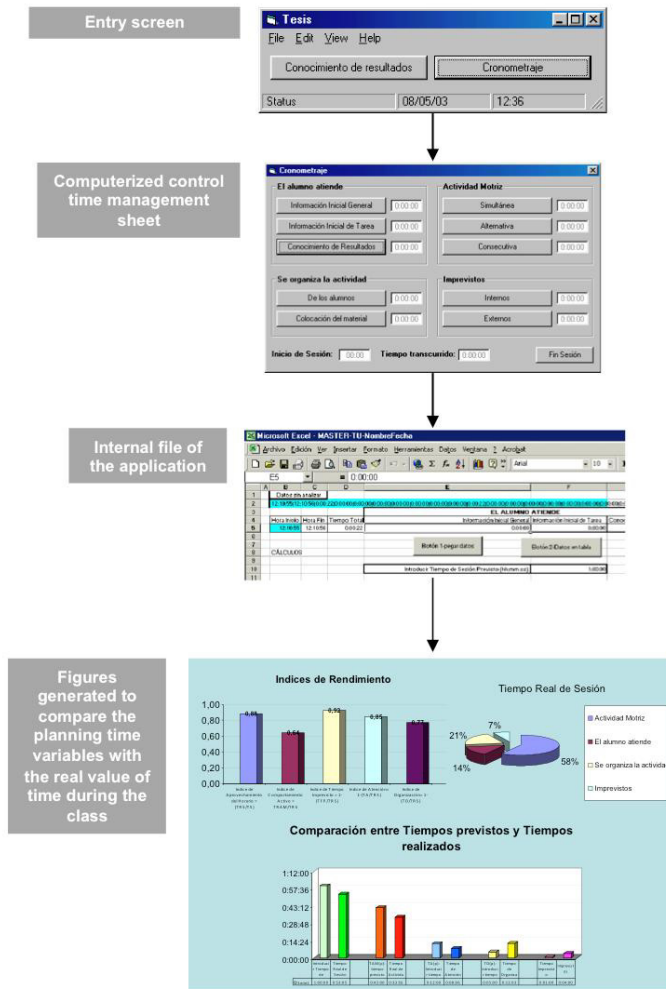


Fig. 1. Sequence of screens on the computerized time management register sheet

3. An experimental case to analyze the usefulness of the computerized time management register sheet

3.1. Participants

The participant was a male PT that studied in the Faculty of Physical Education and Sport of Granada University. He was 24 years old and he was in his last year at the university doing the internship programmed by the supervisor in a School Center. The observer and supervisor was the teacher of Planning in PE subject and he was the main researcher of this study. All sessions carried out in this study were applied to a secondary school group, formed by 27 students (10 females and 17 males, aged 14.0 ± 1.0).

3.2. Design and variables

We employed an observational dependent temporal series design. We used only one case to analyze the usefulness of the computerized sheet. We used three trials for the baseline (practical sessions) without treatment (feedback), and ten trials with their corresponding visual feedback of the management time categories made by the PT (registered and compared to the planned values).

The dependent variables were:

- a) Motor engagement time (MET). The time that the students are involved in physical activity.
- b) Student attention time (SAT). The time that the students are paying attention to the teacher's explanation.
- c) Organization time (OT). The time that the teacher spends organizing the materials and the students prior to the task.
- d) Unforeseen time (UT). The time employed in unforeseen causes during the class.
- e) Motor engagement time adjustment (METad). The difference between planned MET and real MET during the practical session analyzed.
- f) Student attention time adjustment (SATad). The difference between planned SAT and real SAT during the practical session analyzed.
- g) Organization time adjustment (OTad). The difference between planned OT and real OT during the practical session analyzed.
- h) Total absolute adjustment. This variable is composed by the sum of all adjustments in their absolute value.

The variables 1-4 were registered by the computerized sheet, and the variables 5-8 were calculated (planned time minus real time registered). The independent variable was the visual feedback given by the computerized sheet and the coaching meeting (PT and supervisor) carried out after the practical session was finished.

3.3. Instruments

The computerized time management register sheet was used for controlling the time during the practical sessions of the study. It works as a chronometer, changing the category depending on the button that the observer clicks during the practical sessions. The description of the sheet and some illustrations appear in figure 1. The variables controlled by the computerized sheet are described above.

3.4. Procedure

During a teaching unit, the PT and the supervisor planned a set of practical sessions with some special characteristics with the aim to control all possible contaminating variables. These characteristics were the following: (i) The same content was planned in all sessions (introduction to team sports); (ii) the different temporal variables were planned with the same amount of time in all practical sessions. MET was 30 minutes, SAT was 12 minutes, OT was 8 minutes, and UT had to try to be at zero; (iii) all the sessions were planned with 50 minutes, because it was the time available on the schedule; (iv) all sessions were applied to the same group of secondary school students in the same school center and at the same hour.

Principally, the PT applied the three sessions corresponding to the baseline, where no feedback was delivered to the PT after intervention. Secondly the ten sessions of the treatment were developed and a coaching meeting with the supervisor was carried out after each one. These coaching meetings had feedback as the main issue to discuss. This feedback gives visual information about the real time managed by the PT and the time planned as a criterion of efficacy. The adjustment or the difference between these two values of time

(planned and registered) was the main object of the discussion between PT and supervisor, and several strategies to solve the adjustment were discussed.

4. Results

The results of the temporal variables registered by the computerized sheet are shown in table 1. We had shown the results in minutes and seconds because it is the best way to interpret the differences with the criterion (MET = 30; SAT = 12; OT = 8; UT = 0).

Table 1. Data registered by the computerized time management sheet for each category

VDs	Sessions of the baseline				Sessions of the treatment								
	1	2	3	4	5	6	7	8	9	10	11	12	13
MET	22'18"	24'30"	23'50"	23'51"	25'42"	25'50"	26'30"	27'28"	27'42"	29'30"	30'30"	28'52"	29'25"
SAT	16'34"	15'13"	16'40"	13'52"	12'40"	10'06"	14'30"	13' 20"	11'14"	9'21"	10'27"	11'38"	10'33"
OT	6'56"	8'57"	9'10"	9'12"	10'31"	8'34"	8'15"	8'04"	09'32"	9'09"	8'35"	8'48"	9'12"
UT	3'12"	1'20"	0'25"	3'05"	1'07"	5'30"	45"	1'08"	1'32"	2'00"	28"	42"	0'50"

Note: MET = Motor engagement time; OT = Organization time; SAT = Student attention time; UF = Unforeseen time. VDs = Dependent Variables measured.

Table 2 shows the calculated variables. They represent the differences between the times registered during the practical session and the times planned prior to the intervention. They are also shown in minutes and seconds to facilitate the interpretations of the adjustment. We can observe that the total adjustment (the sum of the absolute adjustment of all variables) decreasing across the sessions of the treatment.

Table 2. Calculated variables (difference between registered variables by the computerized time management sheet for each category and the planned variables)

Temp. adjust.	Sessions of the baseline				Sessions of the treatment								
	1	2	3	4	5	6	7	8	9	10	11	12	13
METad	-8'12"	-5'30"	-6'10"	-6'09"	-4'18"	-4'10"	-3'30"	-2'32"	-2'18"	-30"	30"	-1'08"	-35"
SATad	4'34"	3'13"	4'40"	1'52"	40"	-1'54"	2'30"	1' 20"	-46"	-2'39"	-1'33"	-22"	-1'27"
OTad	-1'04"	57"	1'10"	1'12"	2'31"	34"	15"	04"	1'32"	1'09"	35"	48"	1'12"
UT	3'12"	1'20"	0'25"	3'05"	1'07"	5'30"	45"	1'08"	1'32"	2'00"	28"	42"	50"
TOT. adjust.	17'02"	11'	12'25"	12'18"	8'36"	12'08"	7'	5'04"	6'08"	6'18"	3'06"	2'30"	4'04"

Note: METad = Motor engagement time adjustment; OTad = Organization time adjustment; SATad = Student attention time adjustment; Temp. adjust. = Temporal adjustment; TOT. adjust. = sum of all absolute adjustments; UF = Unforeseen time.

Next, figure 2 represents the curves of the evolution of the adjustments (METad and Total absolute adjustment) across all the sessions developed (baseline and treatment).

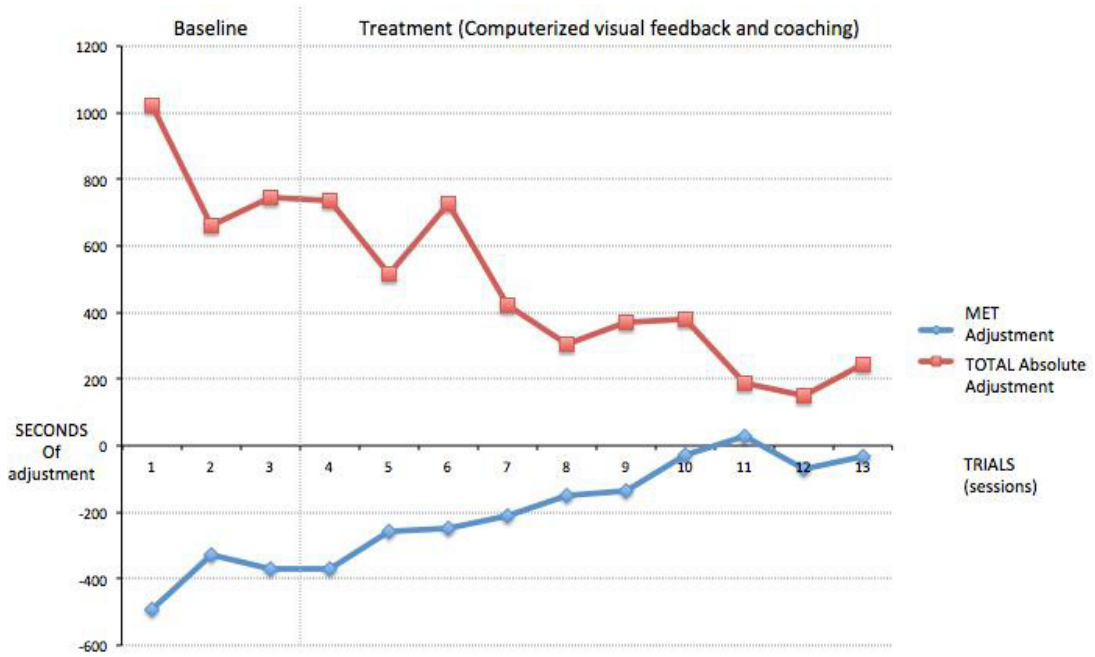


Fig. 2. Curves of adjustment of MET and Total Absolute Adjustment during all the sessions carried out in this study

5. Conclusions

The computerized time register sheet is easy to use and it contributes efficiently to the pre-service teacher training in PE. The PT who experienced this formative process valued it as a very positive experience. He highlighted the help that the computerized sheet gave him to be aware of his mistakes in planning and intervention. The use of this computerized sheet in PE faculties could contribute to better teacher and coach training using the visual information from their practical actions. Finally, the use of the present computerized sheet could be a better pedagogical resource than the traditional manner that we used to put into practice (only verbal recommendations for PTs after their interventions).

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