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Written Composition Process, Evaluation Difficulties and Modalities: An Experimental Study

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The underlying processes used in written compositions are currently a very interesting subject. Participants in this study were 326 people between 10 and 16 years of age, divided into two groups and compared by means of a writing log. *One group was provided assistance in the writing task by means of a graphic organiser, whilst the other was not given any help. Each of these groups is divided into two subgroups and evaluated with a time interval register, with an average interval temporal range of 45 seconds for one group and 90 seconds for the other, marked by a beep sound during the writing task (Kellogg`s procedure). The pupils must register their activity in the process categories when the beep is heard. The results indicated that both the recording interval and the presence of the graphic organiser alter the processes in writing-time (time and order), while there was no effect of text genre. The educational implications relevant to the study are discussed.*

Keywords: Written Composition, Cognitive Processes, Writing Log, Graphic Organiser, Written Processes

The current increase of studies about written composition, seen from psychological and instructional perspectives, is promoting the development and implementation of instruments to assess the processes and psychological factors involved in written composition (García & Arias-Gundín, 2004; García & de Caso, 2004; 2006; García & Fidalgo, 2003; 2006; García & González, 2006; García & Marbán, 2003). We are, however, facing a situation in which pupils' written composition development does not seem appropriate. This casts some doubts among professionals dedicated to the study of education (Rock, 2004; Santangelo, 2005). The processes involved in composition writing, which is carried out during a continued period of time, are thinking about ideas, transferring them clearly onto paper, and revising the written text. These processes are repeated provided that all different subprocesses are organised (Alamargot & Chanquoy, 2001). Considering it in this way, the effective writer chooses, adopts, or invents strategies that will improve his/her aims (Buttler,

Elaschuk & Poole, 2000; de la Paz, 2001a, 2001b), that is, in an self-regulating way (Graham, 2006a, 2006b; Graham & Harris, 2005). Writing is by its very nature a complex process that requires a number of prerequisite skills such as the ability to consider the aim, readers, rhetorical elements, outline, details, complexity, result, and coherence of the piece of writing (Alamargot & Chanquoy, 2001; García & de Caso, 2006a, 2006b, 2007; Torrance & Galbraith, 2006; Wong, 2000).

It therefore seems appropriate to carry out a study of the assessment of the processes involved in writing in order to determine the degree that such processes are present in the pupils. More specifically, we aim to explore how the students distribute the total time spent on the writing task, which processes are used most during this interval, etc. We also aim to determine whether specific educational practices have an effect on students' writing work by providing aid to the pupils. For example, scaffolding allows them to focus their attention on the expert processes of writing and to use diverse methods of planning, which is expected to have a positive effect on the quality of the work (Galbraith & Torrance, 1999; García & Rodríguez, 2007). There is some consensus about the nature of the processes: in this case, planning through scaffolding. Such planning can help clarify comprehension of the written composition, and improve the texts of the pupils with LD in terms of length and quality (García & Fidalgo, 2006; MacArthur, Graham, & Fitzgerald, 2006).

According to previous studies, the time spent to composition writing and the so-called *orchestration of the writing processes* is defined as "the temporary organization of the cognitive activities," emphasizing that these cognitive activities are distributed with intention (Braaksma, Rijlaarsdam, Van den Bergh, & Van Hout-Wolters, 2004). Some studies have investigated interventions in writing (Isaacson, 2004; Reid, Trout, & Schartz, 2005; Tucha & Klaus 2004) and showed that the *orchestration* of the processes involved in writing composition is an important factor in the quality and the productivity of writing (Braaksma et al., 2004).

Researchers often use concurrent thinking aloud protocols and/or retrospective reports to asses on-line covert processes involved in writing (Ericsson & Simon, 1993). In addition, the amount of cognitive effort associated with these mental activities can be evaluated by using reaction time (RT) tasks; these are very difficult to assess in groups of students. For example, there is a computer-assisted experimental tool that makes it possible to measure the time and cognitive effort allocated to the subprocesses of writing and other cognitive activities (*scriptkell*). It was designed to easily use and modulate Kellogg's (1986) triple-task procedure, which consists of a combination of three tasks: a writing task (or another task), a reaction time task (auditory signal detection), and a directed retrospection task (after each signal detection during writing) (Piolat, Olive, Roussey, Thunin, & Ziegler, 1999).

As for research on writing, such methods helped researchers to identify a number of basic subprocesses involved in this activity, such as planning, translating, and reviewing. However, it still remains an important research goal to measure (1) the degree of effort and cognitive load associated with each subprocess and (2) the way in which writers successively engage in these different subprocesses (time processing); for example, Kellogg`s procedure. The most important constraint of Kellogg's procedure is the choice of the time interval with which the auditory signal interrupts the writing process. Kellogg (1987, 1988) did not justify the choice of a particular

interval. For example, in Kellogg's (1988) Experiment 1, the interval between two auditory signals, in which the participant was also asked to make the retrospection, was 60 seconds. However, in Experiment 2 of the same study, it was reduced to an average of 30 seconds (ranging from 15 to 45 seconds to avoid an anticipation of the auditory signal).

In different studies, researchers addressed the question of whether the choice of a particular interruption interval affects the cognitive effort and the activation of different subprocesses involved in text composition (e.g., Piolat et al, 1999). The design included three groups: (1) short interval (auditory signal every 15 seconds varying between 10 and 20 seconds), (2) average interval (every 30 seconds varying between 15 and 45 seconds), and (3) long interval (every 60 seconds varying between 45 and 75 seconds). Note that the average interval was the one used in the studies by Kellogg. Results showed that the use of different writing subprocesses was not significantly affected by variations of the interruption interval—(1) slow cadence: planning = 33%, translating = 41 %, reviewing = 20%; (2) Kellogg's cadence: planning =29%, translating =45%, reviewing =19%; (3) fast cadence: planning = 36%, translating = 43%, reviewing =1 7% (Piolat, Roussey, Olive, & Farioli, 1996).

In contrast, RTs in the detection task were significantly longer in both the short-interval group and the long-interval group than in the average-interval group. In the long interval group, a rating after the actual experiment also revealed three interesting patterns: (1) writers in this group were disturbed to a low degree by the auditory signal; (2) they remained focused on the primary task; and (3) they reacted more slowly to the auditory signal. There seemed to be little competition between the primary and secondary tasks. However, in the short-interval group, writers indicated that they were disturbed to a high degree by the frequent interruptions and the competition between the primary and secondary tasks.

Participants seemed to neglect the secondary task (long RTs) in favor of the primary writing task. Although ratings in the average-interval condition were almost identical to those in the short-interval condition, RTs in the secondary task were shortest in the average-interval condition. It seems that, in the average-interval condition, writers were able to carry out simultaneously and efficiently both the primary task and the secondary task. Note that the three experimental groups did not significantly differ in terms of the quality (in the sense of Kellogg) of the written composition. Nevertheless, other Spanish literature does not support this (Garcia & Rodríguez, 2007).

In a recent study, Olive, Favart, Beauvais and Beauvais (2009) investigated the cognitive effort of 5th and 9th graders while writing a text. They manipulated genre (narrative text vs. argumentative text) and tested the degree to which the level of handwriting automatization contributes to cognitive effort and fluency in writing. In this study, participants wrote two texts differing in genre while performing a secondary reaction time task. Results showed that cognitive effort interacted with genre and the former decreased between Grades 5 and 9 when writing argumentative text.

Finally, in a review of cognitive effort in text writing Piolat et al. (1999) (see also Olive, Kellogg, & Piolat, 2002) showed that factors related to writers' skills and to the writing situation differently affect the cognitive effort of text writing.

However, cognitive effort and attention are limited when writing tasks are carried out (Alamargot & Chanquoy, 2001; Kellogg, 1994; García, Rodríguez, Pacheco, & Diez, 2009). Many processes are taking place at the same time, such as word finding, the written representation of the idea of the topic, the audience or the general plan of the written work, as well as self-regulation (García & Fidalgo, 2006, 2008; Graham & Perin, 2007). High cognitive effort is required to ensure an accurate distribution of these processes (Torrance, Fidalgo, & García, 2007).

Thus, it seems that varying the interval between auditory signals affects the distribution of attentional resources across the different tasks. It seems that the choice of the interruption interval provides a major constraint of Kellogg's procedure. It is clear that the choice of the interruption interval may affect writers' performance as a function of writing expertise: The younger or less experienced the writer, the higher the probability that critical interruption intervals produce what is often referred to as the cognitive overload during writing (Hayes & Flower, 1980; Olive et al., 2009). Together the above-mentioned studies underline the importance of being able to freely modify the interruption interval in Kellogg's procedure writing assessment (Olive et al., 2002). However, this writing register (*writing log*) needs to be further developed to accurately evaluate pupils' temporal organization of the cognitive activities during the writing task. We need to keep in mind that the increase of the cognitive cost in process registration (Vanderberg & Swanson, 2007) will be evident in the complex process of writing and in the productivity and quality of the writing (García & Rodríguez 2005; Gregg, Coleman, Stennett, & Davis, 2002; Johnson, Bardos, & Tayebi, 2003).

Considering the above, the proposed research aims to explore the effect of two mean time recording intervals used at the same time as a writing log (45 and 90 seconds) on the writing process measures. Moreover, this study attempts to describe the role that attention and cognitive effort play in the writing process. The independent variables are subjected to different kinds of manipulation in the evaluation of written compositions. The interval register is an on-line time-sample self-report technique (modified double and triple task) (Olive et al., 2002; Torrance & Galbraith, 2006). This technique was employed in two genre writing tasks: an argumentative and a cause-effect text.

Second, we also introduced aids, such as graphic organizers, in an attempt to understand their influence on the writing tasks, in terms of facilitating the textual planning and organization. We analyzed the effect of using a graphic organiser during the writing process in these two writing tasks.

Finally, we explore common influence on writing measures' process of factors, time recording intervals, and graphic organiser.

Method

Design

A four-group design was used, with two between-group factors: the time interval register (45 and 90 seconds) and the graphic organiser during the writing task (with or without). Dependent variables were different measures about writing process distribution in writing log.

Initially, four classes or groups were chosen in each of the school grades: 5th and 6th grade of Primary School and 1st and 2nd grade of Secondary School.. Next, the same process was carried out in each course: two groups were randomly chosen in which writing was assessed with the aid of a graphic organiser. In each of the remaining groups, one group was evaluated at 45s-intervals; the other, at 90s-intervals.

Participants

The sample consisted of 326 pupils, aged between 10 and 16 years, attending the 5th and 6th year of Primary School and the 1st and 2nd year of Secondary School. In total, there were 4 independent groups, matched for age and educational level with two between-group factors. There were no significant age differences between the groups in time interval register, $F_{(1, 324)} = .44$, $p = .834$, $\eta^2 = .000$; group 45 seconds (M=12.12; SD=1.40) and group 90 seconds) (M=12.08; SD=1.45). Moreover, there were no significant age differences in graphic organiser in the writing task [$F_{(1, 324)} = .842$, $p = .359$, $\eta^2 = .003$; group with graphic organiser (M=12.18; SD=1.35) and without graphic organiser (M=12.03; SD=1.45)]. In accordance with the characteristics of the study, the pupils belonged to different school groups for each course.

The majority of the children came from families of average socioeconomic status and the educational level of the families was mainly low (elementary school education). All participants were Caucasian, no child spoke Spanish as a as second language. The schools attended by the participants were in urban and semi-urban zones.

Finally, inclusionary criteria were absence of any cognitive deficit and learning disorder, neurological symptom and no history of behavioral or emotional problems at school or at home. The participants were not familiar with the tasks of the study, or with the assisting instruments, in this case a graphic organiser (Figure 1). The pupils came from five different public schools in the province of León (Spain), distributed as shown in Table 1.

Instrument and Testing Procedures

The instrument used in this experiment is the writing log (Olive et al., 2002). It registers the processes involved in composition writing, using a system of seven categories of direct retrospection (within the framework of on-line evaluation). These seven categories were reading information, thinking about the content, writing an outline, writing the text, reading the text, changing the text, and unrelated activities. The pupils should register the process being used the moment they hear the auditory signal. Before the main study, a training and reliability task was carried out, to ensure that the students were familiar with the mechanics of registering the processes (see Figure 2).

Table 1. ***Distribution of the Sample by Course and Gender***

Educational level	5th grade Primary School		6th grade Primary School		1st grade Secondary School		2nd grade Secondary School		Total gender/group		Total group
Gender	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	
With graphic organiser	19	16	20	16	22	17	27	23	88	72	160
Without graphic organiser	20	28	19	14	22	17	21	25	82	84	166
Total gender	39	44	39	30	44	34	48	48	170	156	
Total educational level	83		69		78		96				
Average 45 sec.	22	22	20	15	25	16	29	22	96	75	171
Average 90 sec.	17	22	19	15	19	18	19	26	74	81	155
Total gender	39	44	39	30	44	34	48	48	170	156	
Total educational level	83		69		78		96				

***Figure 1*. Graphic Organiser used in the argument text type.**

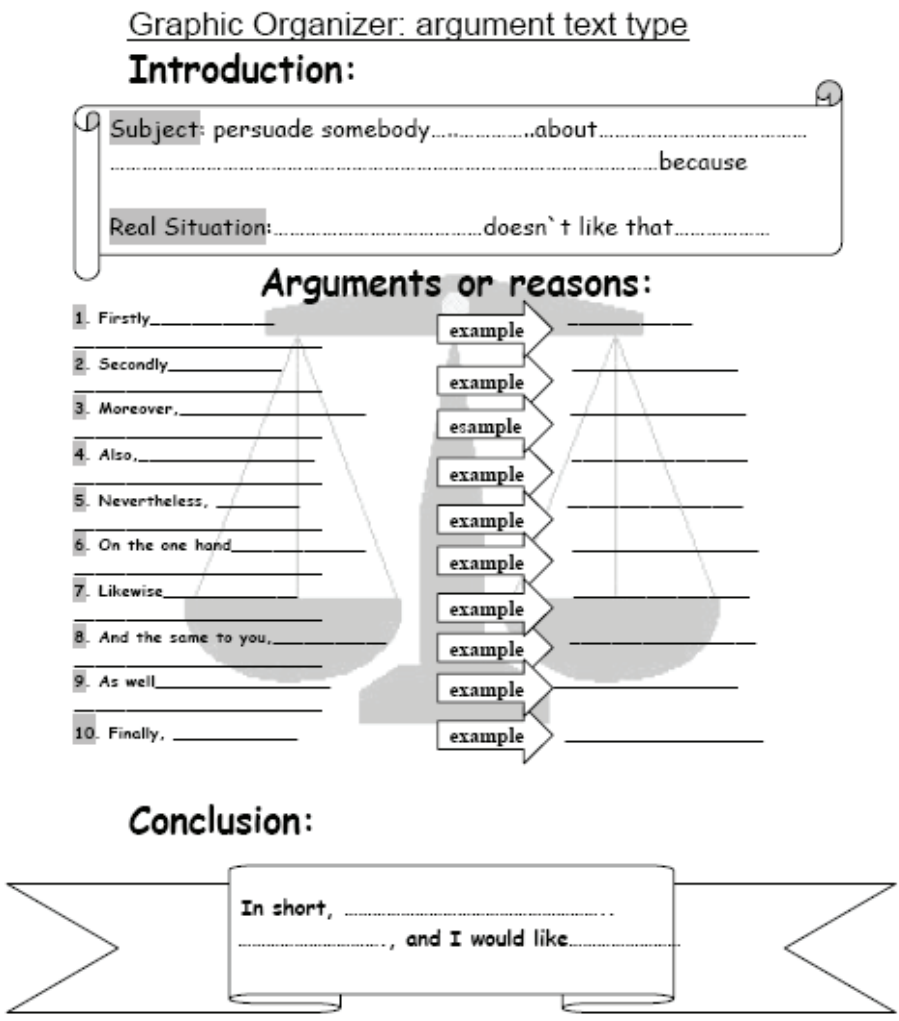


***Figure 2.* Writing log and categories**

DEFINITIONS	ACTIONS	1	2	3	4	5
I'm reading the reference materials.	READING INFORMATION 					
I'm thinking of things to say in my text.	THINKING ABOUT CONTENT 					
I'm writing a plan of what you going to write in the text. From notes to detailed outline.	WRITING OUTLINE 					
I'm editing my definitive text. A neat or a dirty copy of text.	WRITING TEXT 					
I'm reading though all or part of my text.	READING TEXT 					
I'm making changes to my text (orthographic mistakes, changing words, adding words, etc.)	CHANGING TEXT 					
I'm doing or thinking something unrelated to the text (for example: talking to my partner, looking for a pen; looking through the window…)	UNRELATED 					

During the actual test, the individual should perform a written composition task, performed twice in two different sessions, one with an argument text and one using a cause-and-effect type text.

At the same time as they carried out the writing task, the participants had to listen for the auditory signal, which was emitted at variable intervals, but within a temporal range (45 or 90 seconds). This tone signalled that the students should register the specific process being carried out at that time, using the direct retrospection protocol with the seven above-mentioned categories (trained in the previous task). The pupils had to specify only one process, and once completed, they had to continue with the writing task until they heard another auditory tone, when they were to repeat the same procedure. This pattern was repeated either until the students completed the task or after 20 auditory signals.

The students were trained in the use of this method before completing the assessment task. At the start of the assessment session, the students were presented with the names and definition of the seven categories of action used in the self-report task. This was to ensure that they knew how to register the processes. Immediately before completing each writing task, the students were reminded of the seven action definitions and were again encouraged to report only the activity that was occurring at the moment the toned sounded.

We determined students' accuracy in using the categorization scheme after initial training. This was done by means of an example of a writer's thinking aloud whilst planning and drafting a text, and asking the students to indicate their activity at each of 25 different points. The comparison of the students' categorization with

that of an expert judge yielded a mean agreement of .85 (Kappa = .83), with the by-category agreement varying from .80 for *Writing outline* to .94 for *Thinking text.*

Implementation Procedures

For 3 months, the evaluations were carried out by only one examiner collectively over two different sessions. In the first session, the training and reliability task was applied, followed by the writing log (Olive et al., 2002) to register the processes involved in composition writing, with one of the two text genres (argument or cause-and-effect). In the second session, the other subject was evaluated. The order was varied each time. Once the evaluation was completed, the register protocols for each case were coded, the measurements analysed statistically using the program SPSS, version 15.0.

Results

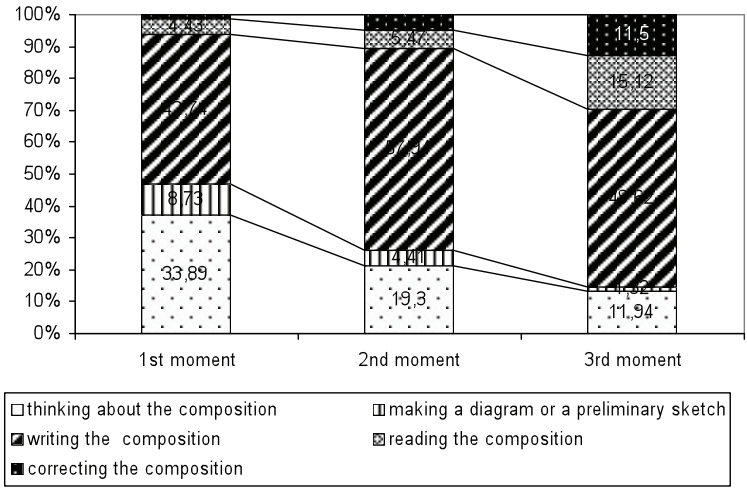
Differences by Time Register Used

First, the multiple contrasts in analysis of variance yielded statistically significant differences in the factor of the mean recording interval used in the writing log (Olive, et al., 2002), showing a large effect size [λ=0,153; $F_{(3,286)}$=40,636; p≤ 0,001; η^2=0,847].

The comparison by means of MANOVAS revealed significant differences between the average of the 45-second group and the 90-second group, for the argument-text task. As shown in Table 2 there were higher means in the 90 seconds group a number of dependent variables.

As shown in Figure 3, the development of the processes during the writing log (Olive, et al., 2002), as a function of the average used in this process, indicates differences in the percentage across the three moments of writing.

Figure 3. **Percentage of time used in each process for the 45 second group averaged over the 3 moments.**



Differences as a Function of the Presence or Absence of the Graphic Organiser

Regarding the second independent variable, the presence or absence of a graphic organiser used during the writing task, the multiple contrasts in the analysis of variance indicate significance differences for this factor, showing a large effect size [λ=0,780; $F_{(3,286)}$=2,072; p≤ 0,001; η^2=0,220]. The MANOVAS reveal significant group differences in the averages of diverse variables, within the argument text type. These differences show higher means in presence of a graphic organiser (see Table 3).

The Influence of the Textual Subject During the Evaluation

The application of the same task with two different textual subjects allows us to compare the results obtained in each task. As seen in Figure 4, the processes involved in the written composition do not vary from one text genre to the other (argument versus cause-effect). There were no differences in the time spent to each process, with both graphs following the same tendency and the same model. However, it can give an idea of differences in difficulty, since these means depend on one or another type of text.

Figure 4. **Percentage of time used in each of the different text typologies (argument and cause-effect).**

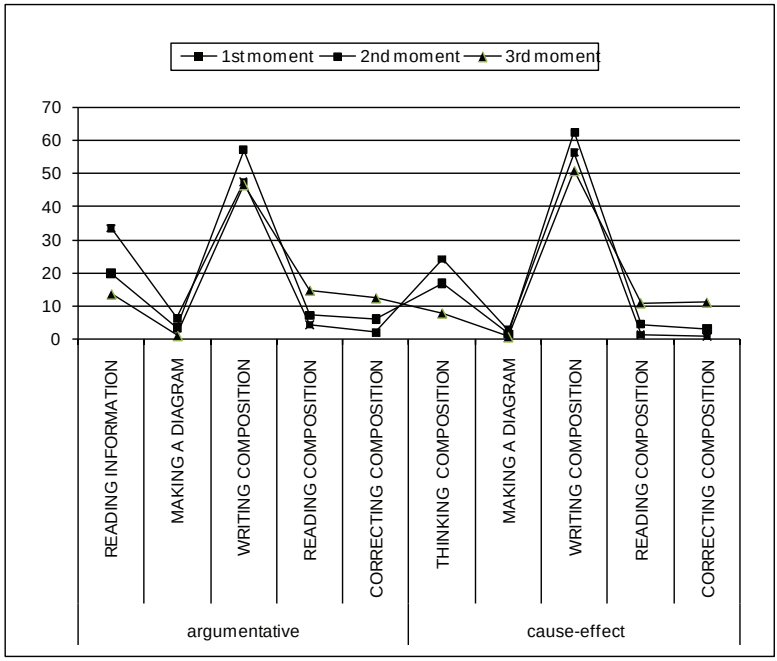


Table 2. ***Significant Variables (Argument Text) and MANOVA Results, for the 45- and 90-Second Average Recording Interval***

Moments		Average of beeps 45 sec. (N =171)		Average of beeps 90 sec. (N = 155)		TOTAL		Group differences (multivariate analysis)		
		M	*SD*	*M*	*SD*	*M*	*SD*	$F_{(3,199)}$	$p\leq$	η^2
Total time task	Total writing time	483.94	232.84	1013.22	490.58	730.59	460.95	159.452	.000	.330
	Frequency of Making a diagram or preliminary ketch	.64	1.51	.32	.85	.49	1.25	5.364	.021	.016
	Frequency of Correcting written composition	.67	1.00	1.01	1.31	.84	1.17	6.989	.009	.021
	Percentage of time Making a diagram or preliminary sketch	4.82	10.48	2.32	5.78	3.63	8.65	6.910	.009	.021
	Percentage of time Correcting written composition	5.73	8.44	8.07	9.97	6.84	9.26	2.285	.022	.016
1st Moment	Percentage of time Making a diagram or preliminary sketch	8.73	22.78	3.67	10.73	6.33	18.23	6.349	.012	.019
	Percentage of time Writing composition	42.74	31.65	52.71	35.33	47.48	33.77	7.218	.008	.022
	Percentage of time Correcting composition	1.34	5.45	2.63	7.89	1.96	6.74	2.982	.085	.009
2nd Moment	Percentage of time Making a diagram or preliminary sketch	4.41	13.14	2.35	7.68	3.43	10.92	2.844	.090	.009
	Percentage of time Reading composition	5.47	11.87	9.05	14.47	7.17	13.27	5.991	.015	.018
	Percentage of time Correcting composition	4.33	11.85	7.91	15.71	6.03	13.91	5.446	.020	.017
3rd Moment	Frequency of Doing something unrelated to the written composition	.29	.61	.47	.88	.38	.75	4.536	.034	.014

Note. We represent only the statistically significant ($p<.05$) or almost significant results.
Note. η^2 (eta-squared statistic) = estimates of effect size. According to Cohen (1988) .01 -.06 (small effect); >.06-.14 (medium effect); >.14 (large effect)

Table 3. ***Significant Variables (Argument Text) and MANOVA Results of the Groups With and Without the Graphic Organiser***

	WITH GRAPHIC ORGANISER (N=160)		WITHOUT GRAPHIC ORGANISER (N=166)		TOTAL		Group differences		
	M	*SD*	*M*	*SD*	*M*	*SD*	$F_{(3,199)}$	$p \leq$	η^2
Total number of beeps	13.21	5.38	10.59	5.16	11.88	5.42	20.028	.000	.058
Number of beeps excluding without relation (last category)	12.14	5.37	9.88	5.00	10.99	5.30	15.415	.000	.045
Total time of writing	822.65	512.28	65168	388.83	735.59	460.95	11.573	.001	.034
Frequency of Reading information	.30	.77	.12	.37	.20	.61	7.137	.008	.022
Frequency of Thinking about written composition	3.14	2.93	2.30	1.94	2.71	2.51	9.268	.003	.028
Frequency of Making a diagram or preliminary sketch	.75	1.57	0.24	.76	.49	1.25	13.892	.000	.041
Frequency of Writing composition	6.01	3.61	5.30	2.97	5.65	3.32	3.771	.053	.012
Frequency of Doing something unrelated to the written composition	1.06	1.65	.71	1.19	.88	1.44	5.059	.025	.015

Percentage of time Reading information	2.44	6.65	1.06	3.40	1.74	5.29	5.579	.019	.017
Percentage of time Making a diagram or preliminary sketch	5.49	10.77	1.83	5.40	3.63	8.65	15.254	.000	.045
Frequency of Doing something unrelated to the written composition (1st moment)	.32	.63	.18	.49	.25	.57	5.262	.022	.016
Percentage of time Reading information (1st moment)	3.46	10.10	1.22	5.36	2.32	8.11	6.316	.012	.019
Percentage of time Thinking written composition (1st moment)	36.65	26.97	30.51	24.07	33.52	25.68	4.702	.031	.014
Percentage of time Making a diagram or preliminary sketch (1st moment)	10.29	23.11	2.51	10.49	6.33	18.23	15.492	.000	.046
Percentage of time Writing composition (1st moment)	39.81	29.69	54.88	35.84	47.48	33.77	17.022	.000	.050
Percentage of time Reading composition (1st moment)	3.07	8.55	5.58	13.19	4.35	11.21	4.120	.043	.013
Percentage of time Making a diagram or preliminary sketch (2nd moment)	5.19	13.15	1.73	7.91	3.43	10.92	8.325	.004	.025
Frequency Doing something unrelated to the written composition (3rd moment)	.45	.88	.30	.60	.38	.75	3.400	.066	.010

Note. We only represent the statistically significant ($p<.05$) or nearly significant results.
Note. η^2 (eta-squared statistic) =estimates of effect size. According to Cohen (1988), .01 -.06 (small effect); >.06-.14 (medium effect); >.14 (large effect).

Discussion and Conclusions

This study aimed at investigating first the effect on writing of process measures of two mean time recording intervals (45 and 90 seconds) used at the same time as a writing log following Kellogg`s procedure (Kellogg, 1988). This technique was employed in two different writing text genres, an argumentative and a cause-effect text.

Second, the aim was to explore the effect of using a graphic organiser during the writing process in these two writing tasks.

Finally, common influence on (1) writing measures' process of factors, (2) time recording intervals and (3) graphic organiser was explored.

The results illustrate the negative effect of the interval register used during the use of writing log. It was found that a lower mean provides greater information, but at the same time, influences the task and the results. This may be the consequence of the greater cognitive effort that the double task requires. We also studied the extent of the practical use of the graphic organizer during the writing tasks and the consequent improvement on the text students write. However, the most important results indicate very interesting applications and future prospects, and a great applicability for the instrument used.

Firstly, the reduction of the recording interval during the evaluation led to a decrease in the time spent in performing diverse sub-processes in composition writing. That is, the presence of significant distractions during the writing task hinders the task processes, reducing the actual time dedicated to writing (Piolat et al., 1996). The increase of the cognitive load added to the writing task (Barkley, 2005) may be the cause, although there was no variation of the orchestration of the processes themselves, as the distribution in both the groups (45- and 90-s-intervals) was the same (Piolat et al., 1999).

According to these results, the recording interval does not affect one of the target variables of this evaluation test, considering the distribution of the different processes of writing and their orchestration (Braaksma et al., 2004; Torrance et al., 2007). However, if the recording interval affects the duration of these processes, this might affect the productivity and quality of the writing (García & Rodriguez, 2007; Lieneman & Reid, 2008). The presence of distractions may reduce writing time;in other words, greater pressure on attention resources results in a reduction of the time dedicated to planning and writing the text (García & Rodríguez, 2005).

With regard to the distribution of the cognitive activities, the participants spent a higher percentage of time on writing than on any of the other processes, in each one of the three moments. By the first moment, they had already reached high percentages in time writing. This is contrary to typical writing behavior, when students spend more time on thinking about the writing task or making a diagram or a preliminary sketch.

However, the presence of the graphic organiser considerably increased the cognitive activities related to planning, such as (1) thinking about the composition and (2) making a diagram or a preliminary sketch, and to a lesser degree, the activities related to writing and revising the composition. It is noteworthy that without any prior training or instruction, the graphic organiser was used correctly for planning. Furthermore, as a result of the organiser, the students spent more time on the actual writing

in a second moment, which is considered positive as regard the improvement of the teaching of writing strategies (Gersten & Baker, 2001; Graham, 2006a; Graham, 2006b).

It was also shown that the pupils presented similar patterns of organization in the writing processes in both text genres, and that they were not influenced during the evaluation, which was valid in both cases. Other text genres, appropriate to the educational level of the pupils, could also be assessed.

With this experiment, it can be suggested that the writing log (Olive et al., 2002) is an instrument which can clearly and accurately show how writers distribute their time during the process of writing. However, doubts arise about the use of the appropriate register interval. A short time interval with only a few categories may cause more distortion than a longer interval. The results illustrate the negative effect of the recording interval used while using the writing log. It was found that a lower interval provides more information, but at the same time, it distorts the task and the results obtained. This may be a result of the greater cognitive effort that the double task requires (García & Fidalgo, 2008; Olive et al., 2009).

The use of graphic organisers when planning the text is highly recommended in order to develop writing. It is also useful when studying similar materials, as it helps with the editing and revision of the written text. We also studied the extent of the practical use of the graphic organiser during the writing tasks and the consequent improvement in the students' compositions (Chalk, Hagan-Burke, & Burke, 2005). Moreover, it is important to highlight that the positive influence of the use of the graphic organiser for planning and organization is greater than the distraction after a lower average time range in the codification of the processes (45 and 90). There are a number of implications regarding the use of this aid for educational practice and also for future research projects (Garcia & de Caso, 2007; García & Rodríguez, 2007; Gonzalez-Castro et al., 2010). For example pupils with LD or ADHD usually present evidence of poor planning and supervision in their work, and they use very specific and basic writing processes. All of this negatively affects the final result, and these students tend to produce short pieces of work that display poor coherence and lack a number of fundamental components (García et al., 2009, González, 2003; Miranda & Melia de Alba, 2005).

On the other hand, regarding the writing processes, planning and revision are always more effortful than edition process and sometimes these are less frequently used (Olive et al., 2009). It is important to stress these problems in writing time distribution (orchestration) between the groups which would need to be considered in the different instructional programs. The experimental study revealed aspects that have scarcely been studied before, such as the contribution of the graphic organizer in helping focus students' attention and cognitive effort on the composition writing task. It helps through the reduction of interference and distraction that any situation can have. In our case, the interference took the form of the modification of the double and triple task *writing log*, and in the case of a real classroom situation, the interference could be any of the natural variables that could distract students, preventing them from focusing their limited attention on the writing task. Furthermore, the relationship between attention and writing was demonstrated, showing the writing processes which requires that the child's effort be constant until he or she finish the writing task.

The results of the present study are especially relevant to students with disabilities. Students with learning disabilities or attention difficulties find writing tasks more challenging than typical students (Fink-Chorzempa, Graham, & Harris, 2005; Graham & Harris, 2005). For example, children with LD spend much less time on processes such as thinking about the text, reading the text or correcting the text, and this is reflected in their resulting written work which has low coherence and quality. This signals an inadequate use of the planning and revision processes, which is directly related to the lower quality of their texts. It is important to highlight that such processes must be employed adequately along with use of orchestration(Rodriguez et al., 2009).

In conclusion, it is necessary to focus more attention on writing. We need to improve not only the way pupils write (Graham, Harris, & Larsee, 2001, Rijlaarsdam et al., 2008) but also our knowledge about the processes used, with a view to developing interventions and instruction programs to promote writing skills. Future studies can follow this line of research.

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