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# Dilemma: do they write with or without the use of ICT? - students' perceptions

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**ABSTRACT**

Students' perceptions can influence their performance in writing. In the Portuguese context, the number of studies on this subject is still small and has not provided a clear overview of typical perceptions, for example, of students by year of schooling. Even more significant is the gap in international and national research on the relationships between students' self-perceptions and their performance in writing, mainly when mediated by Information and Communication Technologies (ICT). In this sense, this descriptive-correlational study focused on study the correlations between 4th grade students' perceptions (n=338) regarding writing knowledge, attitudes, and self-efficacy in writing and their writing performance. The results of this study allow us to state that, in general terms, there are more positive perceptions of students' attitudes and self-efficacy in writing with ICT than those without using these tools. Even though students' perceptions may be different from their performance, it was found that their attitudes were more optimistic than their perceptions of knowledge and self-efficacy in writing. Understanding observed differences is essential for educational professionals to know their students' perceptions, better adjust their pedagogical practices and select the pedagogical tools for each stage of the writing process.

**KEYWORDS**

Self-perception; writing performance; primay education; information and communication technologies

## 1. Introduction

The student's perception of the value or utility he assigns to a particular activity (e. g, learning) affects his behavior, namely interest and involvement in the task, which will condition his performance (Wigfield & Eccles, 2002). Especially because, according to Bandura, Barbaranelli, Caprara, and Pastorelli (1996), "among the mechanisms of personal agency, none is more central than people's

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beliefs in their ability to exercise control over their levels of functioning or on environmental aspects"(p. 1026).

The students' performance in writing is influenced, according to the research, by the perceptions of knowledge, attitudes, and self-efficacy in writing (Brunning & Horn, 2000; Cruz, 2007; Graham et al., 2017, 2007; Harris & Graham, 2013; MacArthur et al., 2016).

In pedagogical terms, the students' perceptions regarding their knowledge and writing skills are particularly important in the sense that they can adapt the practices to the characteristics and needs of the students, promoting the improvement of writing performance since "students who believe that their writing skills, knowledge, and performance will improve with persistent effort are more motivated to perform well and are more willing to seek help when they need it" (Vue et al., 2015, p. 3) and that the road to gravity depends on the context in which writing takes place and changes in students' writing skills, strategies, knowledge, and motivation over time (Vue et al., 2015).

It should be noted that according to Graham (2006) aspects such as self-efficacy and attitudes are considered objectives for instruction and its differentiation, according to the characteristics and writing needs of the students.

### *1.1. Knowledge of the writing process*

The students' knowledge about the writing process is assumed as a fundamental aspect so that they can understand and use the different components of the writing process or effective strategies throughout the process and that will result in the construction and attribution of a clear message transmitted to the reader on the form of text.

Writing implies therefore mobilizing strategy and writing skills, such as: knowledge about the topic of writing, about textual genres, or target audience, use of appropriate vocabulary (Harris et al., 2012). As well as resorting to various capabilities (e. g, manual writing/typing, use of spelling rules, syntax) to meet the proposed goals (Graham et al., 2015).

In that sense, Graham, McKeown, Kiuhara, and Harris (2016) and Graham (2006) have identified a set of processes that help to develop students' knowledge of the writing process, namely: the opportunity to undertake diverse writing activities; writing to a real audience; the construction of routines for the use of the writing process (e. g, planning, elaboration and revision); personal accountability for writing projects; promotion of interaction with peers; creation of writing support environments; promotion of self-reflection and evaluation processes; and provide personalized individual instruction and assistance in a systematic way (e. g feedback, mini-sessions).

In Portugal also observed that in a study developed in Portuguese Primary Schools that interventions in the development of strategic knowledge among

students and teachers, learning strategic knowledge allowed for greater autonomy, modeling, and an increase in capacity reflective of the students (Araújo, 2017).

However, although we understand the possible influence of writing knowledge in the composition of texts since it is difficult to achieve success in an activity about which we know little. Graham, Hebert, Sandbank and Harris (2012) report a study by Saddler and Graham (2007) where they found that children's general knowledge about writing did not significantly affect their performance in this activity. Data evidencing the need to better explore the relationship between the knowledge of the writing process and the students' performance, to make possible the adjustment of the pedagogical practices in writing that enhance the performance of the students.

### 1.2. Writing attitudes

The influence of affectivity versus writing on performance has been studied and it has been found that positive attitudes towards writing are related to a greater commitment, involvement, and effort during the writing process (Barbeiro, 2011, 2012). On the other hand, Scherer (2005) defined the concept of preferences as relatively stable evaluative judgments that are manifested by liking or disliking a stimulus or preferring one over another and attitudes such as relatively long-term beliefs and dispositions toward objects and specific people.

In this field writing usually does not assume a positive preference position when compared to reading, either with students or teachers. Students with better skills in an activity manifest more positive emotions (e.g., adventure, sympathy, excitement, happiness, inspiration, interest, relief, satisfaction, surprise), and a lower frequency of negative-passive emotions (e. g embarrassment, confusion, depression, loneliness, shyness) than their colleagues with a lower level of skills (Brand, 1990).

In the field of attitudes, the role of motivational aspects involved the ability of subjects to set goals, build positive assignments about the task and be able to remain committed to the task (Boekaerts & Corno, 2005; Rosário, Costa, et al., 2009).

### 1.3. Motivation

Motivation is one of the most debated processes in research where controversy arises as to how best to motivate writing (Graham & Weiner, 2012; Veiga Simão, 2004; Zimmerman, 2000). This is presented as a fundamental aspect for the learning of writing because "writing is a complex and demanding task that presents motivational challenges even for proficient writers" (Graham et al., 2017, p.31).

According to Graham et al (2015) "good writing also requires engagement and persistence, and it is shaped by the writer's motivational state, as attributes such as efficacy, anxiety, and attitudes can enhance or how and what is created" (p.5). Also, Zimmerman and Bandura (1994) recognized the importance of

motivation for learning writing skills. It is known that the level of motivation influences the level of performance and learning since the way students position themselves influences their decisions and their willingness to learn (Kozlowski & Bradford, 2006).

Research has shown that motivation is influenced by aspects intrinsic to the subject writer (e. g, predisposition to writing activities, ability to define goals, attitudes and beliefs, self-efficacy, ability to direct actions and thoughts) (Hayes, 1996; Vue et al., 2015). In parallel, other studies have pointed out the existence of a relationship between writing performance and motivation. In this sense, it seems to make sense to prepare and equip writers to be able to manage attitudes, emotions, and behaviors during the writing process (Pajares & Valiante, 2006; Troia et al., 2012).

Also, the students with Learning Disabilities (LD) and writing problems have usually negative attitude about writing and a low motivation, which is accentuated by the perception of low achievement in this activity (McKeown et al., 2016). Thus, according to Graham and Perin (2007) to identify this aspect is assumed as essential for the delimitation of pedagogical strategies.

### *1.4. Self-efficacy in writing*

According to Bandura (1986) "self-efficacy is the individual judgment of the capacity to organize and execute an action to achieve a certain performance" (p. 391). In global terms, researchers have divided self-efficacy into three distinct categories: ideation, which involves cognitive processes to generate ideas and mobilize semantic and schematic knowledge (Schraw, 2006); conventions, related to the use of linguistic tools to express ideas (Hayes & Flower, 1980); and self-regulation, which involves processes to control writing behaviors and decisions using monitoring and evaluation processes (Zimmerman & Kitsantas, 2002).

Self-efficacy, related to student belief, influences the implementation of actions required to achieve desired performance (Schunk & Ertmer, 2000; Pastorelli et al., 2001), and influences how students use learning strategies Thus, it can be influenced by the environment in which a person enters (Schunk & Ertmer, 2000) and influence students' conceptions of their competencies, their choices of activities, effort, and persistence in the task, as well as the development of competencies (Bandura, 1997; Faria & Simões, 2002; Pajares, 2003). In other words, students who feel they are most effective learn to mobilize more effort and to persist for longer (Bandura & Cervone, 1983).

According to Bong (2006), high levels of self-efficacy are related to positive evaluations regarding goal setting, strategy learning and reduction of anxiety levels. A study by Brunning et al. (2013) that sought to analyze the dimensions of self-efficacy in writing (ideation, conventions, and self-regulation) found that ideation and self-regulation are more related to the taste for writing than conventions of writing. However, found in their study that the attention of less competent writers is

more focused on conventional aspects such as error-free writing and were responsible for 10–15% of the variance of writing scores.

According to Schunk and Zimmerman (2007) "self-efficacy and self-regulation are key processes that affect students' learning and achievement." (p.7). Similarly, MacArthur et al. (2016) reported that there was a consistent correlation between self-efficacy and writing performance of students with mastery skills. However, Pajares and Cheong (2003) identified differences in performance according to the school level (elementary school, middle school, high school or secondary), which was also reinforced by MacArthur et al. (2016) who found negative correlations between self-efficacy and student's age.

Schunk (2001) pointed out that positive results and self-efficacy allow students to improve their performance and help them to set goals they want to achieve by reforming self-confidence beliefs about their effectiveness in writing, as do other investigations (Elliot & Thrash, 2001; Pajares & Valiante, 2001). It should be noted that Pajares and Valiente (1989, 2001) define self-efficacy beliefs as judgments about the ability to perform tasks or to succeed in activities. In contrast, in the studies by Shell, Murphy, and Bruning (1989) the results indicated that self-efficacy perception did not predict writing performance, but when basic skills were analyzed, they proved to be predictors of quality, as had occurred in another study.

As for the relationship between the use of skills and writing strategies and self-efficacy Hidi and Boscolo (2006) verified strong relationships. Similarly, other investigations have found that self-efficacy is strengthened by motivation (Jacobs et al., 2002). In fact, several studies have found that self-efficacy, such as motivation, tends to decrease over the course of the learners' school (Jacobs et al., 2002; Zimmerman, 1994). Zimmerman and Bandura (1994) consider that the evaluation of self-efficacy in writing over the years is an extremely important factor for student evaluation.

### *1.5. Processes of self-regulation in writing*

Self-regulation refers to the process in which an individual activates and sustains their systematically oriented knowledge, affections, and behaviors to achieve the stated goals. The cognitive and metacognitive aspects of self-regulation play an extremely important role in the acquisition of knowledge and in the use of skills already acquired (Zimmerman, 2002).

In turn, the writing process tends to become progressively self-regulated at the metacognitive, motivational, and behavioral levels (Alexander, 1992, cited by Harris & Graham, 2016), according to the improvement of writing skills of the subjects since these processes and strategies are developed through a process of internalization and reconstruction of socially mediated regulations.

Competent writers are sensitive to their actual use of self-regulation strategies and are able to regulate the planning, drafting, revision, and editing of text (Carvalho, 2001). Thus, Schunk and Zimmerman (2007) and Festas (2002) considered that self-regulation and the presence of models help to promote reading and writing and learning of self-regulation processes. In this context, Carvalho (2001) and Festas (2002) refer to two strategies that are inserted in the perspective of the development of mechanisms of self-regulation, proposed by Bereiter and Scardamalia (1987) the accomplishment of objectives and the procedural facilitation.

Several researchers have studied the importance of perceptions of self-efficacy in performance, but more researcher in need because, as recognized by Bruning et al. (2013) these data may facilitate the standardization processes of expected average performance measures. This research also reflects the thinking advocated by Bandura e Pajares in the sense of studying attitudes and self-efficacy in writing.

So, this descriptive-correlational study, focused on 4th grade students' perceptions of knowledge, attitudes and self-efficacy in writing and the students' performance in writing opinion texts. These data will increase the knowledge about students' perceptions, and they were important indicators for the accomplishment of the future schools' interventions (e.g., capacity of maintenance in the task, perceptions of effectiveness, interest in writing), increase understanding about which are the perceptions of smaller and greater effectiveness in students writing performance.

The analysis of students' perceptions of their knowledge, attitudes, and self-efficacy in writing, through the scales related to knowledge, attitudes and self-efficacy, replies part of the work developed by Graham et al. (2017) and MacArthus et al. (2016), however only the data were collected in a single moment.

Our research goal was to study the correlations between students' perceptions regarding writing knowledge, attitudes and self-efficacy in writing and their writing performance.

## 2. Method

### *2.1. Sample*

The participants were randomly selected from a population of 1375 students of the 4th year of 12 public clusters of schools in Braga (25% of the population)-Portugal. Thus, 338 students from 23 classrooms and 4 public clusters of schools participated in this study. The sample description data can be seen in the following Table 1.

**Table 1.** Sample description.

| Measure | Descriptive statistics of the sample |
|---|---|
| N | 338 |
| Gender (N)* | |
| Male | 170 |
| Female | 168 |
| Ages (years) | |
| Average (SD) | 9.5 (. 578) |
| Min./Max. | 9/12 |

N = number of elements; M = mean; SD = standard deviation; Min. = Minimum; Max. = maximum; % = percentage.

### 2.2. Data collection instruments

In this research 4 data collection instruments were used. Three scales: a) Student Perception Scale for in Writing – ECE (a = .776); b) Students Perception Scale for Writing Attitudes- E.A.E (a = .919); and c) Students Perceptions Scale for Self-Efficacy in writing – EPAE (a = .927). These scales were translated, adapted, and validated from American versions into Portuguese (for more information, please see, Araújo (2017)).

An opinion text was also collected by the students involved, based on a mote question: Ex. What is your favorite game?, which was analyzed regarding the structure of the opinion essay, general quality of the texts produced, text length, and the number of linking words (for further information, see, please Araújo (2017)).

### 2.3. Data collection procedures

Data were collected on the same day, followed by instructions regarding the data collection procedures. Participants started by writing an opinion text for 45 minutes and completing the three scales.

The sample data collection took place over a week. We collected these data individually.

## 3. Results

The following data presented the descriptive analysis regarding students' self-perceptions in writing knowledge, attitudes, and self-efficacy. It also shows students' writing performance results and the correlational analysis of the variables under study. Note that a team realized performance writing assessment through blind analysis and later discussion of discrepancies.

### 3.1. Descriptive statistics for writing knowledge, attitudes and self-efficacy scales

Next, the set of data collected through the frequency of responses obtained for each of the ECE, E.A.E and E.P.A.E scales items, the minimum (Min.) and

maximum (Max.) Values observed, the mean (M) and the standard deviation (SD) of responses, in respectively Tables 2, 3 and 4.

**Table 2.** Descriptive statistics for each item of the scale of perception of knowledge in writing.

| Items | *N* | *Min.* | *Máx.* | *M* | *SD* |
|---|---|---|---|---|---|
| **Scale of perception of writing knowledge – C.E. C** | | | | | |
| **I – Produce Content (a =.746)** | | | | | |
| 1. I can write my texts in detail. | 314 | 1 | 5 | 3.88 | .924 |
| 4. I am attentive to what I am being asked to do when I write. | 331 | 1 | 5 | 4.28 | .777 |
| 5. My writing expresses the way I think. | 321 | 1 | 5 | 4.10 | .937 |
| 7. I use many examples and explain the meaning of some words so that my writing is clear. | 300 | 1 | 5 | 3.57 | 1.04 |
| 9. I can easily find the right words to describe my ideas. | 330 | 1 | 5 | 3.93 | .881 |
| 11. I write many of my own ideas in the text. | 325 | 1 | 5 | 4.42 | .735 |
| 12. When I write, I carefully consider the subject and the theme of my text. | 324 | 1 | 5 | 4.28 | .871 |
| 13. I know exactly what I want to say when I write. | 321 | 1 | 5 | 3.50 | 1.11 |
| **II – Planning (a=.570)** | | | | | |
| 6. I first start by preparing a detailed draft. | 328 | 1 | 5 | 3.61 | 1.19 |
| 8. I always think about what I have to do when I write. | 333 | 1 | 5 | 4.44 | .769 |
| 10. I always draw up a plan before I write and stick to it. | 320 | 1 | 5 | 3.88 | 1.06 |
| 15. When I write I always consider the target reader. | 317 | 1 | 5 | 3.40 | 1.37 |

**Table 3.** Descriptive statistics for each item of the scale of perception of attitudes in writing.

| Items | *N* | *Min.* | *Máx.* | *M* | *SD* |
|---|---|---|---|---|---|
| **Scale of perception of writing attitudes – E.A.E** | | | | | |
| 1. I take great pleasure in writing. | 329 | 1 | 5 | 4.08 | 1.12 |
| 2. I like to write. | 334 | 1 | 5 | 4.10 | 1.13 |
| 3. Writing is fun. | 333 | 1 | 5 | 4.05 | 1.13 |
| 5. I like writing in school. | 316 | 1 | 5 | 4.11 | 1.06 |
| 6. I like writing at home. | 333 | 1 | 5 | 3.81 | 1.21 |
| 7. Writing is a good way to pass the time. | 328 | 1 | 5 | 4.16 | 1.11 |

**Table 4.** Descriptive statistics for each item of the scale of perception of self-efficacy in writing.

| Items | *N* | *Min.* | *Máx.* | *M* | *SD* |
|---|---|---|---|---|---|
| **Scale of perception of writing self-efficacy – E.P.A.E** | | | | | |
| **I – Ideation (a=.813)** | | | | | |
| 7. I can come up with a lot of ideas for my writing. | 338 | 0 | 4 | 2.99 | 1.01 |
| 8. I can easily write down my ideas. | 338 | 0 | 4 | 2.79 | .989 |
| 9. I can use many different words to describe my ideas. | 338 | 0 | 4 | 2.73 | 1.05 |
| 10. I have many original ideas. | 338 | 0 | 4 | 2.78 | 1.07 |
| 11. I know how to organize my ideas in a text. | 337 | 0 | 4 | 2.87 | 1.05 |
| **II – Conventions (a = 784)** | | | | | |
| 1. I can write without making mistakes. | 337 | 0 | 4 | 2.07 | 1.13 |
| 2. I can write complete sentences. | 338 | 0 | 4 | 3.21 | .916 |
| 3. I can use punctuation correctly. | 338 | 0 | 4 | 2.76 | 1.03 |
| 4. I can write sentences that are grammatically cor- rect. | 338 | 0 | 4 | 2.75 | 1.04 |
| 5. I can write correct paragraphs. | 338 | 0 | 4 | 3.17 | 1.03 |
| **III – Self-regulation (a = .805)** | | | | | |
| 12. I can write for at least 35 minutes. | 337 | 0 | 4 | 2.99 | 1.160 |
| 13. I know how to block out distractions when I am writing. | 337 | 0 | 4 | 2.50 | 1.145 |
| 14. I can start writing quickly. | 336 | 0 | 4 | 2.67 | 1.123 |
| 16. I can think about the aims of my writing before I start. | 336 | 0 | 4 | 2.80 | 1.078 |
| 17. I know how to use "tricks" to help me write. | 336 | 0 | 4 | 2.54 | 1.174 |
| 18. I can continue writing even if it is difficult. | 336 | 0 | 4 | 2.81 | 1.086 |

Writing performance

Following the analysis of texts written by the students, we observed that with regards to text typology (i), the average score was 4.66 values with a standard deviation of 1.88 values, indicating that, the study participants did not have at least five essential elements for the text type being studied, i.e., at least one premise, 3 reasons to support their opinions and, a concluding sentence. We further noted that the final score for the text type values ranged from 0 (where the text was not an opinion text or did not answer the task question), and 10 values (which were revealed all kinds of elements: premise, reasons, elaboration, and conclusion).

When analysing the various elements of argumentative opinion texts, it appears that students used more elaboration to develop their ideas ($M = 1.52$; $SD = .97$), followed by reasons justifying their position ($M = .74$; $SD = .66$), and clear presentation of the student's position regarding the theme – premise ($M = .64$; $SD = .51$). It also points out most of the students did not include a conclusion ($M = .35$; $SD = .594$). Therefore, it seems important that students learn explicitly what an opinion text is and, what elements it comprises, so that all students will use at least one opening sentence, providing their position on the subject, three reasons that justify this and, a concluding sentence (conclusion).

Regarding the quality of the produced texts, (ii) they demonstrated an average score of 3.28 ($SD$=.76), which implies a good quality in the composition of texts. Regarding the different dimensions evaluated between 1 and 5 points, the average scores for each category are: a) the subject and type ($M = 2.9$; $SD = 1.0$); b) the consistency and adequacy of information ($M = 2.93$; $SD = .93$), c) structure and cohesion ($M = 2.86$; $SD = .96$); d) morphology and syntax ($M = 3.2$; $SD = .98$); e) vocabulary production ($M = 3.63$; $SD = .90$) and f) spelling ($M = 4.18$; $SD = 1.0$). From the analysis of the results, it can be said that students have more knowledge of the mechanical skills of writing like spelling and morphology and syntax, compared with their knowledge of the writing process (e.g., theme and typology, consistency and adequacy of information). The results obtained relating to the aspects of text length: number of words, number of sentences and paragraphs numbers (iii) showed that the average number of words written by students was 98.13 (range between 17–170 words), with a standard deviation of 23.22 words. In this sense, it can be said that the average student followed the instructions for writing a text using more than 90 words. The average number of sentences was 5.47 ($SD = 2.07$) and the number of sections was 4.41 ($SD = 2.02$). It is also clear that some students had difficulty producing paragraphs with more than one sentence, visible for a minimum number(1) and maximum (19) equal to these two variables.

Therefore, regarding the use of argumentative connectors (iv) we can say that the average was 3.53 per text (present values between 0 and 10) with a standard deviation of 1.40. Regarding the time students needed to construct the argumentative opinion text, this ranged from between 156 and 2700 seconds, which represents an average of 1564.94 seconds/approximately 26 minutes ($SD = 491.19$).

## 4. Discussion

The correlations between students' perceptions of knowledge, attitudes, and self-efficacy in writing and their writing performance (structure, quality, length, and the number of connectors) is presented in Table 5.

**Table 5.** Correlation between students' perception of knowledge, attitudes and self-efficacy in writing and performance in writing.

| Variables | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Elements | - | .719** | .241** | .339** | .156*. | .180* | .079 | .171* | .194* | .173* | .180* | .64* |
| 2. Quality | | - | .187*. | .215**. | .257**. | .291**. | .137. | .228**. | .292**. | .268**. | .323**. | .201** |
| 3. Length | | | - | .371**. | .311**. | .331**. | .199**. | .181*. | .360**. | .383**. | .213**. | .340** |
| 4. Linking Words | | | | - | .096. | .095. | .073. | .175*. | .182*. | .180*. | .068. | .215** |
| 5. Knowledge | | | | | - | .938** | .840**. | .504**. | .616**. | .604** | .466** | .551** |
| 6. Produce Content | | | | | | - | .599**. | .479**. | .600**. | .582**. | .493** | .513** |
| 7. Planning | | | | | | | - | .415** | .482** | .483**. | .304** | .468** |
| 8. Attitudes | | | | | | | | - | .397**. | .454** | .296** | .302** |
| 9. Self-efficay | | | | | | | | | - | .909** | .836** | .896** |
| 10. Ideation | | | | | | | | | | - | .684**. | .724** |
| 11. Conventions | | | | | | | | | | | - | .588** |
| 12. Self-regulation | | | | | | | | | | | | - |

*$p < .05$. **$p < .01$.

Significant correlations were found between perceptions of writing knowledge and text structure, as well as very significant correlations between these perceptions and text quality or length. In turn, no correlations were found between the perception of writing knowledge and the number of connectors used. However, there was a relationship between writing knowledge and performance variables (structure, quality, and length). Also, the correlations are significant and robust, as expected, between the dimensions of the scale of writing knowledge. Therefore, the results translated into practice reinforce that the teacher should try to stimulate a positive perception of the production of detailed writing in the students. Students can easily find the right words to translate their ideas and have many ideas for the text, i.e., work towards producing content that is careful and rich in concepts and vocabulary, as there seems to be a relationship between these variables and the student's writing performance.

It was observed, in this study, that perceived writing knowledge influences performance measures, which presents the opposite results from Saddler and Graham (2007). However, these results are supported by Hayes' revised model (1996, 2012), Bereiter and Scardamalia's (1987), and Hayes and Flower's (1980) model, where writing knowledge assumes an essential role in the whole writing process. As expected, writing knowledge shows statistically significant differences in text length. However, it contradicts the results obtained by Graham et al (2017). Although the correlations were weak, we found

significant or highly significant relationships between writing attitudes and the four performance variables (e.g., structure, quality, length, and number of connectors used). It should be noted that perceptions about liking to write showed significant relations with text structure and fundamental relations with quality, length, and the number of argumentative connectors used. These data reinforce the role of attitudes in writing, advocated by Barbeiro (2012) and Graham et al. (2007), and motivation in text writing supported by several authors (eg. Hayes, 1996). Therefore, the results obtained corroborate the results of Graham et al (2017). where motivation influenced the quality of writing of narrative texts, and the extent of the same coincided with what was expected. For example, there was a relationship between writing performance and motivation (Hayes, 1996; Hidi & Boscolo, 2006; Pajares & Valiante, 2006; Troia et al., 2012).

Significant correlations were also observed between perceived self-efficacy in writing and performance in terms of structure and number of connectors, and highly significant correlations with the quality and length of the text produced. This study also showed a stronger correlation between the perceptions of confidence regarding self-efficacy in ideation and self-regulation (e.g., cognitive, and metacognitive skills) than regarding writing conventions, as well as significant positive relations between the dimensions of the scale on writing self-efficacy, which corroborate the results of Bruning et al (2013). There were also significant positive correlations between attitudes and self-efficacy ($r = 397$) and writing knowledge ($r = 616$). Thus, it is revealing to consider students' perceptions of self-efficacy in the pedagogical intervention since they are related to students' performance. This result corroborates what has been argued by some authors (Bandura, 1997; Bruning et al., 2013) especially at the level of ideation (Schraw, 2006) or self-regulation (Zimmerman, 2002) and, although less intensely, the conventions (Hayes & Flower, 1980).

## 5. Conclusion

In summary, the results of this study allow us to conclude that:

(a) students have positive perceptions about knowledge, attitudes, and self-efficacy in writing, with and without the use of ICT. It found writing knowledge students' per- ceptions with the help of ICT show greater agreement than without these resources regarding the maintenance of attention in the reflection on what is asked before writing, as well as facilitating the process of finding good words for an essay. However, writing planning with ICT use is worse than not using this resource.
(b) Students' attitudes perceptions were more optimistic than their perceptions of knowledge and self-efficacy in writing.

(c) There are correlations between self-perceptions regarding knowledge, attitudes, and self-efficacy and students' writing performance. We emphasize that it is evident that perceptions of self-efficacy seem to correlate more strongly with performance variables.

These data reinforce the need for teachers to work on students' perceptions of writing in terms of knowledge, attitudes, and especially self-efficacy. Concerning attitudes, we highlight the importance of students' perception of attitudes enjoyment and of working on these issues in the classroom since it was significantly related to all variables of performance in writing. In turn, significant correlations were found between perceptions of knowledge of writing and text structure, as well as very substantial correlations between perceptions of writing knowledge and text quality or length. Still, no significant correlations were found in the remaining variables under analysis.

### 5.1. Contributions

This study is considered to have contributed to understanding changes in perceptions of knowledge, attitudes, and self-efficacy when using ICT for writing. It also enabled relationships between students' self-perceptions of their knowledge, attitudes, and self-efficacy in writing and their performance in this skill.

This data may help teachers to define appropriate methodologies, strategies, and resources to promote improved writing performance, given the relationship that students' perceptions may have on the quality of their writing.

### 5.2. Limitations

This study has some limitations: it only focuses on the self-perceptions of 4th-grade students, it concentrates on a specific geographical area, and it only involves the analyzing of one opinion text. We suggest in the future the replication of this study to other school years and the geographical regions, as well as the collection of different types of texts (e.g., narrative, descriptive, opinion, comics) and, possibly, at three other moments (e.g., at the beginning of each school term). Studies on the relationship between students' self-perceptions and their performance could extend to the analysis of socio-demographic and personal variables. In parallel, a longitudinal study of the change in students' perceptions throughout the 1st cycle of primary education may bring contributions to the field of writing among students with learning disabilities and writing problems. Some authors advocate this idea to test interventions with students with and without LD in writing (Harris & Graham, 2013; Harris et al., 2009).

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No potential conflict of interest was reported by the author(s).

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