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Improving Academic Argumentation through Online Training

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Abstract:

The task of writing a convincing argument based on a number of conflicting sources is challenging. As a means of supporting a formal viewpoint, it is important to grasp and organise arguments and counterarguments from a wide range of sources. Even though it's a difficult ability to learn, argumentative writing isn't widely taught at Spain's colleges and universities. Furthermore, there are just a few web resources for this sort of project. For this reason, we created and assessed a virtual training programme for distance learning university students to help them build cohesive and well-structured arguments. This pre-post research, which used a control group design, had 68 students. Through video lectures and practise activities with immediate feedback, the course provided comprehensive teaching in a cost-free and open-source manner (e.g., Moodle). Study participants' written outputs increased in structure, counter-arguments and integration into a single piece of writing after getting instruction.. Medium or maximum integration items, on the other hand, were still restricted in scope. As they show, online argumentative writing teaching may be employed in higher education with positive results for all participants. For their part, students still need help honing their skills in the area of integrative synthesis. These observations have led us to recommend additional changes to the training curriculum.

Keywords: Argumentation; academic writing; online training; self-efficacy

1. Introduction

1.1 Teaching how to write an argumentation in a virtual environment

To advance intellectually and personally, people must learn to dispute (Andrews, 2000). Active citizenship and political or institutional growth in democratic societies require the ability to both defend one's position and take into account the viewpoints of others (Andrews, 2010). In today's knowledge world, students must also be able to interpret, elaborate, organise, and integrate information (List & Alexander, 2019). Thanks to modern technology, we can now easily access an enormous number of Internet resources, some of which are complimentary and others of which are directly antagonistic, depending on where we are.

When presenting their arguments, students at all educational levels must be able to evaluate the numerous points of view on a particular issue, among other considerations. After reading many books, students are more likely to succeed in their writing if they are taught to synthesise their findings (e.g. Nelson, 2008). (van Ockenburg, van Weijen, &Rijlaarsdam, 2019). Students learn more when they are required to produce argumentative essays that draw on a range of sources. For the reasons outlined above (Mateos and Solé 2009; Nelson, 2008; Segev-Miller, 2004; Solé, Miras, Castells and Espino and Minguela 2013 to name a few), this form of hybrid work is exceedingly challenging but also offers significant learning opportunities. It's a regular occurrence in higher education to use evidence from sources to support an argument (Andrews, 2010).

The techniques necessary to succeed in this sort of assignment are rarely described, despite the obstacles it presents (Solé, Teberosky and Castello, 2012). Many empirical research have been undertaken on how to prepare students for writing argumentative texts concerning social sciences topics, but only a few have focused on the preparation of students for writing such texts particularly (Mateos et al., 2018; Nussbaum & Schraw, 2007). (De La Paz, Monte-Sano, Felton, Croninger, and Jackson, 2017; Jackson &Piantedosi, 2017).

Furthermore, in the twenty-first century, the relevance of e-learning and the existence of remote learning colleges should not be underestimated. Most universities now have virtual campuses (CRUE, 2017), and the number of students attending distance learning institutions has increased dramatically in recent years as a result (i.e. Poulin &Straut, 2016). Information and communication technology are therefore increasingly being used in educational settings.

As a result, it's not required to use the same instructional design or resources as in-person education in the online setting. Instead, training should be adapted to the online medium's unique features and challenges (Deane &Guasch, 2015; Hewett, 2015). As a result, we set out to find out if students' written reasoning may benefit from online education in terms of increasing the number of arguments, canonic structure, and degree of integration. We were interested in seeing if online education might assist students' written reasoning improve in terms of the quantity of arguments, canonic structure, and degree of integration. Aside from that, we wanted to examine the impact of two intervention components, namely, explicit teaching and practise with feedback, on their effectiveness (Kellogg, Whiyrford, & Quinlan, 2010; Mateos et al., 2018). Diverse researchers have devoted a lot of time and energy to online collaboration (for instance, see, for example, the work of, for example, Norozi and colleagues (2018), Norozi and colleagues (2018), Norozi and associates (2018), Norozi and associates (2012), Norozi and associates (2012), and Nusbaum, (2012)), but fewer have focused on the two features that allow for more independent learning.

For two reasons, we wanted to use the Moodle platform for our training programme.. Initial setup and ongoing maintenance were both quick and painless. The fact that Moodle is an open source platform makes it easier to include new features in the future. As a starting point, it is the most commonly used platform in the Spanish higher education system, as well as in many European institutions (Fuentes-Pardo, Ramrez-Gómez, Garca-Garca, et al., 2012).

1.2 Theoretical framework

1.2.1. Writing an argumentation from sources

Deductive reasoning may be used to support a conclusion by developing arguments and examining, evaluating, and weighing counterarguments from a variety of sources and perspectives (Nussbaum & Schraw, 2007). In order to overcome the difficulties that students have when asked to write argumentative texts, research suggests that undergraduates require more explicit instructional assistance for self-regulation (Ferretti & Lewis, 2013). As is the use and identification of counterarguments in the building of new and compelling arguments. (Hyytinen, Löfström, and Lindblom-Ylänne, 2016). (Nussbaum &Kardash, 2005). The integration and presentation of counterarguments to arguments is also a problem for students (Britt &Rouet, 2012; De La Paz & Felton, 2010; Hyytinen et al., 2016). All students,

particularly undergraduates, tend to have difficulty expressing their stance; considering various viewpoints; and, in particular, adding arguments from opposing opinions in order to overcome'my-side prejudice' (Wolfe et al, 2009). (Felton, Crowell, & Liu, 2015; Mateos et al., 2018; Nussbaum, 2008).

Students' ability to produce essays in a variety of styles can be improved by explicit genre-based teaching (Henry & Roseberry, 1999; Wingate, 2012). Students may benefit from learning about the canonical structure of argumentative texts since they often have problems comprehending what essay writing is and what an argumentative text's canonical structure should be. A well-structured introduction, a well-structured argument, and a well-structured conclusion may help authors better convey their ideas. With the help of this sort of layout, students may have an easier time describing the various postures.

High school writers who participated in an argumentative reading and writing intervention generated lengthier argumentative essays as a result of attending the intervention, according to De La Paz et al. (2017) Similarly, McArthur, Jennings, and Phillippakos (2019) have shown that essay length is a variable and that it is significantly connected to the quality of college students' argumentative writing when they write without utilising references. Van Weijen, Rijlaarsdam, and van den Bergh (2019) observed that longer texts were frequently scored higher in terms of quality using argumentative writing from sources. It was for this reason that the number of words written by each student was considered.

1.2.2. Technology-based writing instruction

Several studies have been carried out in the previous decade to find strategies to improve college students' argumentation abilities by using computers and a virtual tool. Many studies have revealed that, despite the increased use of technology in educational settings in recent years, it has had little impact on how students are taught or how they learn (European Commission, 2013). Consequently, new technologies have the potential to change the setting in which educational engagement occurs, but it is essential to define metrics that will really boost teaching and learning results (Coll, Mauri &Onrubia, 2008). The potential for new technologies to innovate and improve education is enhanced by the compatibility of certain of its qualities with a constructivist approach (Nanjappa& Grant, 2003). We're particularly interested in the technologies that allow for a more personalised learning experience and are

capable of holding multimedia assets while also delivering timely feedback. Technology-based writing instruction is not tied to the confines of a single physical classroom, allowing students to access the intervention at their own pace and from any place.

To help students practise some of the ideas and methods involved in constructing an argumentative synthesis, a virtual guide might include specific material and activities such as questions and exercises on the drafting of arguments and the management of many sources. As a result of the ability to offer immediate feedback to students, such as by providing them with an answer that is likely accurate, this virtual guide may be termed personalised material. To top it all off, there are training materials that may adapt what students are taught based on their responses from past sessions. It is therefore possible to have a more personalised learning approach in huge groups. As an added benefit, making these kinds of alterations can lessen the cognitive burden connected with the work accomplished and boost motivation for it (Brusilovsky, Sosnovsky&Yudelson, 2009).

Incorporating multimedia material is also made possible with the use of such technologies. With the use of these two channels, the aural and visual, this content helps students learn by lowering the strain on their working memory by allowing them to choose, organise, and integrate the information they need for learning (Mayer, 2005). However, this can only be accomplished with the proper organisation of multimedia content. Combining the representation formats in such a manner that accessory information is minimised and critical information and knowledge development is prioritised, by enabling the learner the opportunity to build relationships using their own knowledge and prior experience, is necessary (Clark & Mayer, 2011). As a result, in addition to the standard book, the virtual guide includes audio information and graphic resources to aid with the aforementioned activities. Because the contents may be reviewed as many times as needed, a more recursive learning process can be achieved than with face-to-face education.

Even while we know that explicit teaching is a crucial component of writing instruction (Ockenburg et al., 2019), it's especially true for conflicting synthesis writing (Ockenburg, van Weijen, and Rijlaarsdam, 2019). (Mateos et al., 2018). Some researchers found that a brief lecture that simply defined topics and offered some explanations might help alleviate some of the students' problems (e.g. Butler and Britt, 2011; Wolfe and colleagues, 2009). Students

may benefit from video courses, which have been shown to help them improve their writing abilities (Lundstrom et al., 2015; Numrich& Kennedy, 2017). The use of videos and examples in virtual learning environments, as previously noted, may also be effective in boosting student motivation. An increasing number of studies have found that (Raads and colleagues in the Netherlands; Van Steendam et al. in the Netherlands; De Grez et al. in the Netherlands; Hernando de Grez et al. in the Netherlands; Hendrickx in the Netherlands; Masui et al. in the Netherlands).

Additionally, research shows that guided practise and feedback improves writing and argumentation skills (Boscolo, Arfé and Quarisa, 2007; Brasch et al., 2013; De La Paz & Felton, 2010; Nusbaum, 2008). Recent years have witnessed the introduction of a number of essay scoring and feedback systems that automatically score essays for students (Allen, Jacovina, & McNamara, 2016; Kellogg, Whiyrford, & Quinlan, 2010; Palermo & Wilson, 2020). For some reason, there are no comparable tools in Spanish. This is probably owing to the fact that we do not yet completely comprehend the language's distinctive grammar and syntax. In addition, you must be able to provide other types of feedback, thus mastering this skill is vital. According to Wingate (2012), feedback should highlight the connection between declaring one's position and the text's structural aspects. Comparing their own work with an example will help pupils verify that their text arrangement is successful.

Technical tools must be evaluated based on the user's enjoyment and sense of their value (Mateos et al., 2018). So we wanted to know how the intervention was received by the students, as well as how happy they were with the overall outcome of the intervention. Writing self-efficacy and other motivational variables are also important in the writing process (Pajares, 2003) and are often taken into account in the evaluation of training outcomes (i.e. Raedts et al., 2017).

Spanish colleges do not currently teach students how to write an argumentative essay because of the reasons outlined above; in fact, writing is still just a slightly taught topic there. This study is part of a bigger effort to investigate ways to assist undergraduate students enhance their synthesis writing abilities. With regard to argumentation skills development, we have created and conducted training that has made use of proven techniques such as clear teaching and practise with quick feedback to aid university students in developing their argumentation

abilities. Specific knowledge and skills acquisition and practise were the key aims of this intervention, which focused on the acquisition of knowledge and practising of specific critical skills in the development of argumentative texts. These explicit instruction principles, which will be discussed in more detail below, included features such as the following: introducing some writing strategies and explaining the importance of them; modelling the strategy, providing guided practise with feedback, and also providing independent exercise (Perin, 2013). There are many ways to assist students to build writing techniques, but our intervention did not include all of them. However, despite the fact that there are several elements on which interventions can be targeted (van Ockenburg et al., 2019), this one was aimed to enhance understanding of certain key conditions for argumentative writing and appropriate writing processes. Our primary goal was to see how these elements may be included into an educational design for remote learning university students in order to support them in their studies. The purpose of this study was to look at how effectively students were able to adapt to a genre structure in their argumentative writing as well as their ability to synthesise two seemingly disparate texts.

1.3 Online training is available.

We created a virtual guide as part of an educational package to help students write an argumentative synthesis utilising sources that offered conflicting data about a tough problem. Each activity or resource in the training is accompanied by a written description of the numerous steps that must be performed in order to successfully finish the training in the Moodle platform.

This course was built on the design principles that were previously addressed. In addition to characterising teaching and learning activities in line with Rijlaarsdam, Janssen, Rietdijk, and van Weijen, it is analytically characterised in Table 1 (see Appendix A) (Rijlaarsdam et al., 2000). (2018).

Students were taught how to identify and use arguments, as well as how to create an integrative conclusion based on the material in the sources (see Table 1) in order to improve their writing skills for argumentative texts. Training sessions were supported by Moodle, Google Forms, Google Sites, YouTube, connections to other websites and Padlet, as well as a number of other frequently used online tools. Video, links, and feedback could all be added to

the Moodle quiz used for the intervention, and they appeared as soon as students submitted their answers to the quizzes.

1.4 The current investigation

In a pre-post research with a control group design, preliminary data were utilised to evaluate the instructional aid presented in Table 1 for increasing argumentative writing in online university education. We wanted to know how the students felt about the education they had received as part of our research. Finally, the participants were asked how much they thought they had improved as a consequence of the instruction they had received in reasoning skills. In addition, we asked them to score their overall satisfaction with the training programme, and they did so, to our relief.

We hypothesised that only those who participated in the training group observed an increase in the quality of their argumentative writing structures.

- For all other students, the training group would produce a more integrated argumentative synthesis with a bigger number of arguments and a larger number of words.
- As a result of this research, students' self-efficacy in writing an argumentation will rise.
- This course is going to be well received by the students.

2. Method

2.1 Participants

This research was conducted with the help of 68 college students who were either in their first or second year of college (Age = 32.4 years old – ST = 8.09; 57 females). A faraway university in Spain delivered the instruction as part of an academic task on the topic of "Psychology of Learning," as part of the Degrees in Education and Psychology. Teachers made it clear to students that the quality of their written replies to the assignment would not determine their final grade, but rather their thoughts on the learning experience would be. There were no linguistic barriers among the attendees, all of whom spoke Spanish as a first language. They were divided into two groups at random and given two lectures, each presented by the same teacher. For the control group (N = 35), or training group (N = 33),

they were all the same. The average age, year of studies, and perceived past teaching (that is, how much they feel they have gotten over their academic career) were also comparable between the two groups (2.9/5 vs 3.3/5).. A whole range of the University's ethical responsibilities were satisfied. Students frequently used the Moodle platform since it was the primary online learning environment for all of their degree-related learning activities.

2.2 Procedure

The two professors worked together on a series of exercises for the course "Psychology of Learning," that included a task aimed at teaching students how to create stronger argumentative texts and how to reflect on their own learning process. 74 percent of the students who were offered the option to engage in the activity began their involvement. Ninety-five percent of the students completed the prescribed activity and agreed to participate in the study. There were two groups: experimental (training) and control. The original author allocated participants to one of these two groups at random. A small percentage (13%) of individuals who started the activity, although being in the experimental group, did not complete it despite this. A total of 68 participants who had completed all of the prerequisites were able to take part in this investigation. According to the training group, just 79 percent of participants knew how self-confident they were.

Over the course of four weeks, the data was acquired. While each student was expected to complete a series of assignments in the prescribed order over a month, they may do so at their own leisure. Students who want to take part in the research were required to fill out an informed permission form and complete a questionnaire requesting basic information about themselves (such as their sociodemographics, the degree they were pursuing, and their educational level). They next studied two books that gave conflicting opinions on a controversial issue and came to a decision about them, explaining their stance logically. Only the experimental group continued to use the virtual training environment after the posting of this first product. The majority of participants spent between two and three hours completing the instructional material (minimum time 45 minutes and maximum 373 minutes). A new synthesis that contained arguments from both of the original papers had to be composed and uploaded by all students after they had read two new texts, each one dealing with an entirely different but equally important issue. The training group was expected to complete a final

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questionnaire and publish a link to their Padlet, which served as a last reflection on their learning journey.. (the control group also had to carry out this reflection). After the second synthesis had been uploaded to the server, the control group was given training as well. Lastly, participants fill out a final questionnaire to rate their happiness with the programme and their perceptions of their own growth in self-efficacy.

2.3 Materials

2.3.1. Texts from which information was gathered

There was a lot of difference between the two sets of source materials on two educational themes: instructor evaluation (pre-test) and student assessment (external) (post-test). The word count and readability of the texts were similar (between 630 and 815). (Szigriszt-Pazos index between 44.8 and 56.8). In addition, each pair of competing texts included the same amount of explanations for each perspective as the preceding pair of texts had (nine for the pretest and five and six for the post-test text pairs).

2.3.2. Measures

Table 2. Description of the categories 'Introduction', 'Body' and 'Conclusion' applied to the participants' written products

Category	To include a fragment as the category it must have...
Introduction	▪ At least one paragraph or sentence that raises the common topic of the source texts. ▪ At least one paragraph or sentence that establishes the writer's own opinion about the common topic of the two source texts. This paragraph or sentence must be followed by at least one more paragraph. ▪ At least one paragraph that gives a short description of each source text. This paragraph or sentence must be followed by at least one more paragraph.
Body	▪ At least one paragraph that includes an argument from any source text.
Conclusion	At least one paragraph or sentence that allows an answer to the question "so what?" by: ▪ synthesising arguments from the sources. ▪ presenting the writer's opinion about the topic. This paragraph or sentence will not be considered as a conclusion if it is the explanation of the writer's opinion is on a different, even though related, topic.

Those taking part in the study were asked to write an argumentative essay in which they discussed their findings on the topics at hand. The following factors were taken into account when judging their literary works: This includes the use of a canonical structure, how many words there are, how many arguments there are, and how much integration there is.

A canonical structure is used in this instance. Each argumentative student's output was categorised based on the presence or absence of an introduction, a body paragraph, and a conclusion paragraph. Table 2 breaks down the essay into three sections: introduction, body, and conclusion. To be eligible for participation, a participant must not have any arguments or topics that are directly relevant to the source materials. While the first author coded each and every student's work, the second author only coded 20 percent of the first author's texts, which were picked at random. 87 out of a possible 1 was the inter-rater agreement (Kappa).

The overall word count. Each student's written response had its words counted.

The students incorporated arguments from each source material into their written work. Analysis of the essays revealed the amount of reasons in favour of and against the thesis that could be gleaned from them. For each source text, we computed a percentage of the total number of arguments that were provided in the text (for example, the number of arguments divided by nine possible arguments in the pre-test texts). Scores are given out in the range of 0 to 1.

A degree of integration. The first author, who was schooled by one of the creators of the coding approach, coded the students' reasoning pieces (Mateos et al., 2018). As a result, the first author received instruction from the second author. There are six distinct levels of integration: in which the author presents solely his or her own personal viewpoint without citing any other sources; also known as self-reference When the author does not state a stance, it is considered neutral. when one of the views is not taken into account in the argument; neutral: when the author does not clarify or justify his or her stance; a neutral statement A stance that is neither clearly stated nor well defended is said to be neutral. the author does not specify and argue for his or her own perspective in a neutral statement; "neutral" means that the author does not state or advocate a particular point of view. "neutral" means "not defined or argued" argument that takes into account an opposing position solely for rebuttal purposes; When the author adds numerous integrations along with the text

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(weighing or synthesising both viewpoints), medium integration happens; and maximum integration occurs when the author includes several integrations plus a global integrative conclusion. Randomly selected works were coded by the second author for 50% of the total number of writings. Discussion and deliberation among the participants led to an inter-rater agreement of.82 (Kappa).

Student satisfaction was assessed using two items on a 1-10 scale, and five items on a 1- 6 scale were used to determine how much they thought the virtual training had boosted their self-efficacy levels (see Appendix H). The internal consistency was assessed using Cronbach's alpha (.95).

3. Results

To arrive at our conclusions, we relied on descriptive and mean contrast analyses. Table 3 provides a breakdown of the data in an easy-to-read format.

Table 3: Descriptive statistics of the variables for each group in the Pre- and Post-tests

	Conditions							
	Control group (n = 33)				Training group (n = 35)			
	PRE		POST		PRE		POST	
	M	SD	M	SD	M	SD	M	SD
Presence of introduction	.69	.47	.54	.51	.48	.50	.79	.41
Presence of body	.94	.24	.91	.28	.85	.36	1	0
Presence of conclusion	.43	.50	.40	.50	.42	.50	.91	.29
Proportion of arguments in favour selected	.30	.18	.31	.22	.31	.20	.38	.19
Proportion of arguments against selected	.29	.24	.26	.18	.25	.21	.47	.17
Number of words	467.6	226.3	408.9	214.5	627.0	335.9	476.7	170.9
Degree of syntheses' integration	1.9	1.19	1.83	0.95	2.09	1.2	3.06	1.60

3.1 Training's Effects

Analyses were undertaken to determine whether any changes occurred between the two conditions (Pre and Post) and the two time periods (Pre and Post). For nominal and interval variables, we employed McNemar's test and Chi-Square, respectively, and repeated measures ANOVA for the latter (number of words, number of arguments, and degree of integration).

The argumentation's structure is discussed in Section 3.1.1.

We ran two distinct analyses for the structural variables, which are defined as the presence of an introduction, a body of text, and a conclusion.. When comparing pre- and post-test syntheses for the control condition, there are no significant variations in the three structural variables according to McNemar's test. As a result of the training, both introductions (p =.031) and conclusions (p.001) were more common in the experimental group than in the control group. While the Chi-Square test shows no significant differences between the training and control groups for these two structure variables in the pre-test syntheses, the experimental group has a higher score for the presence of introduction and conclusion variables in the post-test syntheses (p =.001) (p =.037).

3.1.2 The number of arguments in the entire text

For the pre-test and post-test, both groups employed a similar amount of reasons in favour of the in-favour stance since there were no statistically significant differences.

When comparing the number of against-position arguments, there was a main impact of time (F(1, 65)=11.44, MSe=.05, p=.001, p2p=.15). To make matters more complicated, the data indicate an interaction between time and group variables (F(1, 65)=17.60, MSe =.005, and the significance of this effect is called into doubt (P(001, p2)). As a result, in the post-test syntheses, the training group had an increase in the number of counter-position arguments, whereas the control group had the opposite increase (see Figure 1).

3.1.3 The extent to which integration has taken place

Neither the condition nor the time had a significant effect on degree of integration (F(1,66)=11.60, MSe=31976.05; p=.001; 2 =.15); written argumentative synthesis scores were higher on post-test syntheses than pre-test syntheses; written argumentative synthesis scores were higher on post-test syntheses than pre-test syntheses; and Considering that there

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was a significant interaction between time (before and after) and group (control vs training), this result should be regarded with caution (F(1. 66)=5.94, MSe=1.42, p =.017, p=.08). The training group outperformed the control group in the synthesis post-test results..

3.1.4 Word count

When compared to a control group, the trained participants used more words, showing that they were not equivalent (the findings indicated a main impact of condition F(1,66)=5.04, MSe=8698.47, p =.028, p2p =.07) as well as a major effect of time F(1,66)=11.60, MSe=31976.05, p =.001, p2p =.15). Vocabulary-wise,

Thirdly, the students' self-perceptions as well as their evaluations of the intervention

Study of participants' self-efficacy and satisfaction with training was undertaken as part of an exploratory descriptive analysis. This information was only supplied by a small percentage of students. Students were asked how much they believed the intervention had improved their competence in several parts of argumentative writing in order to gauge their sense of self-efficacy. Using the scale of 1-6, the results in Table 4 were consistently greater than 4.

Table 4: Means scores with standard deviations of the training group's perception of self-efficacy increment for different abilities after the training

Variable	N	M	SD
Providing supporting arguments	26	4.35	1.23
Providing contra arguments	26	4.46	1.14
Rebate others' arguments	26	4.27	1.07
Weigh or synthesis opposite arguments	26	4.42	0.94
Reaching a solution to the controversy	26	4.62	1.09

Note: Scores range: 1-6

Students in the training condition were asked to assess their level of satisfaction with the practise and training on a 1–10 scale, which was used to gauge their opinion of the task. In their opinion, having the chance to practise with two syntheses was a huge plus. Students were also pleased with the instruction (n = 18; M = 7.89; ST = 1.45), with an average rating of 7.89 out of 10.

4. Discussion

Results and educational consequences are outlined in the following sections: Students in higher education can benefit from this study's findings, which show how to use training to improve argumentative writing abilities in a completely online teaching environment. According to our findings, the bulk of our hypotheses are supported by our findings.

The initial hypothesis was confirmed to be right. Students who participated in the training group, on the other hand, were more likely to generate well-structured papers with an appropriate introduction and conclusion than their peers. Following the workshop, our participants were able to better arrange their writing and convey a more unified integrative position. In addition, it is probable that the training helped create the link between structure and placement, which Wingate (2012) has recognised as an important component of teaching in written argumentation.

The second proposal has gotten some traction, but only in a small way. Students in the training group had a greater number of arguments against the viewpoint they were taught as a result. This shows that they were more inclined than the average person to add reasons that argued against their point of view. As a consequence, no evidence was found to support a study looking at the impact of argumentation length on training programme effectiveness when it comes to the amount of words used in each group's arguments. This variable should be considered in future studies because just one study, that of van Weijen and colleagues (2019), has looked at the link between word count and the quality of written arguments from sources

A study conducted by the researchers found that in their final written products, the experimental group achieved a better level of integration than they did in their first written products. It appears that at least to a certain extent, the training offered in this study is appropriate for dealing with the obstacles of integration (Britt and Rouet, 2012; De La Paz & Felton, 2010; Hyytinen et al., 2016), as well as presenting the writer's stance (Britt &Rouet, 2012; De La Paz & Felton, 2010; Hyytinen et al., 2016). This study was conducted by Wolf, Britt, and Butler (2009).

In spite of the experimental group's increased integration, the goods that earned medium and maximum scores in this variable were still in low supply despite this. However, despite

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taking into account both viewpoints from the sources to a greater extent than they had previously, the students were still unable to come up with high-integrative conclusions A conclusion we may draw from this study is that participants' capacity to produce new integrative arguments has to be enhanced, and they demand more training in this area. More research is needed to find out which aspects of explicit instruction on writing strategies are most effective in improving students' self-regulation (Barzilai, Zohar, and Mor-Hagani, 2018), as well as how to implement them in distance learning contexts, even though our instructional design had positive effects on students' self-regulation (Deane &Guasch, 2015). Most of this study's findings are in line with prior studies showing that a vocabulary and idea clarification scaffold can help students improve their writing abilities (Butler & Britt, 2011; Wolfe et al., 2009).

They reported that they were happy with their instruction and that they felt more confident as a result of the training, according to these two assumptions. These are noteworthy results, in part because Pajares (2003) found a link between students' belief in their own writing abilities and their writing success. Most of them also finished the virtual guide, which they found useful and acknowledged for what it was. If you're going to be doing any distance learning, it's especially important to provide a stimulating atmosphere without putting too much strain on your resources (Mayer, 2005; Milligan et al., 2013). Providing "user-friendly" instructional assistance is crucial to the success of virtual learning environments, because students may feel more isolated than they would in a traditional classroom setting (Roddy, 2017).

At distant university teaching or higher education institutions with virtual campuses, this study aims to analyse a learning environment that utilises widely available resources. For this reason, the training is meant to stimulate learners' engagement and teach them some key skills in writing argumentative essays. Students in this class are given the opportunity to practise and receive immediate feedback through the use of a Moodle quiz. In addition to YouTube, Google sites and forms, Padlet, Kazam, and connections to numerous web pages, this course covers a wide range of Google resources. As such, it is a set of tools that are easy to use and can be used to present large groups of students with learning tasks that will help them improve their academic writing skills.

Training that adheres to instructional principles may be implemented utilising the most popular technologies while simultaneously enhancing students' writing skills, as demonstrated in this research. Students who took the course were able to improve their writing skills by learning how to better structure their texts, take into consideration conflicting viewpoints, and integrate their writing tasks more effectively. To help students become better writers of argumentative texts based on conflicting sources and, by extension, better citizens in today's society, the assistance provided established a valuable training environment. In terms of helping to raise the standard of higher education, drawing research results on online interventions is undoubtedly useful.

4.2 Constraints and possible future advancements in the field.

Despite the positive outcomes of this training programme, there are still areas for improvement. More education on textual organisation (according to Benetos and Bétrancourt, 2020) and more instruction on the integration of metacognitive processes are our recommendations for future improvements in the integration of metacognitive processes into writing output. The next phases are designed to provide more complex explicit teaching on writing processes, taking into account the fact that some writing abilities may be improved in this sort of learning environment. Future intervention attempts will have to deal with some of the issues raised by this study's findings.

In addition, a slew of new technological developments are on the horizon. In Moodle, students' interactions with the learning environment may be logged and analysed. If a student refers to the guide many times, for example, it maintains track of that activity. On the other hand, if the amount of time that users spend using a given resource was recorded, this information might be gathered more accurately Aside from the difficulty of collecting this information, it may be valuable in gaining insight into how people acquire new skills and talents. More time spent on one resource may be useful to a certain student profile, but it may not be beneficial to a different student profile. It is also a drawback of this research because the intervention supplied does not yet contain customised paths for the various types of student responses. Another limitation of this study could be alleviated in this way. Since this research uncovered some important new information, it is possible to devise new approaches that concentrate on the many problems that were discovered, such as offering alternative

explanations and further practise on the various components that were discovered. As a part of this process of personalization, teachers can offer feedback to students in the form of comments on their replies or by using Inputlog's new capabilities for process-oriented feedback and the platform's new features for personalization (Vandermeulen, Leijten& Van Waes, 2020). Possibly, Moodle will be able to provide more precise information in the future, which will be extremely helpful in adjusting the virtual tool in future studies with an iterative method, especially if Moodle is used. No question that these elements might be useful in making subsequent changes to the design of the instructional package.

In addition, there are a few limits. However, it would be interesting to compare self-efficacy evaluations between the pre- and post-intervention periods. Secondly, in order to assess the importance of teaching argumentation in certain academic disciplines, future studies should involve bigger samples and persons from a range of disciplines rather than just education or psychology. Adaptations for alternative teaching scenarios, such as blended learning, would have been intriguing to investigate as well. To sum up, qualitative research might provide insight into how students view the tool and how to promote a more reflective and optimum use of technology. No matter how small its scope may be, the research presented here sheds light on the potential of open-source online environments for teaching argumentative writing.

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Appendix A: Table 1 - Training description

Design principle	Phase	Learning activity		Instruction/task, that leads to learning activity	
		Description	Explanation	Description	Explanation
Representation of the task and attribution of meaning	Problem centred	Representing the aim of the instruction via reading a short text	This learning activity is effective in motivating the students and focuses their attention on the goal.	The student begins a Moodle quiz. The first question briefly introduces the whole instructional setting, indicating that the objective of the training is to get to know better the argumentative texts.	This element in the instruction leads to an understanding and involvement in the task by reading a written paragraph.
- Meaningful verbal learning - Learning by the observation of a model	- Activation of existing knowledge - Demonstra-tion of new knowledge	Explorative thinking fostered by a lesson with a modelling part	This learning activity aims to foster meaningful learning about reading and writing argumentative texts.	Continuing the first content of the Moodle quiz, a 15 minutes master class with PowerPoint support is presented. It was recorded in a TV studio. The students can watch this on a Youtube video embed within or through a link. We recommend that the students take notes or open it in a different window, so that they can watch it again during the training. The training video lesson includes explanations and a modelling by the teacher. Content of the video in order of presentation: - definition of argumentation. - objectives of the argumentative texts vs expository texts	This element in the instruction is intends to activate prior knowledge and to offer an explanation of the main characteristics of the argumentative texts. The observation of the model leads to identify the elements of the texts structure and the arguments included in the text. (see Appendix B)

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	- combination of the expository and argumentative parts in written argumentation - linguistic characteristics: opinion verbs, textual organizers, discourse markers and connectors. - text structure: introduction (approach to the topic), argumentative body (thesis and reasons), conclusion (synthesis of the thesis and main arguments), modelling of the structure analysis of an argumentative text about immigration law (244 words). The teacher shows students how to identify which elements of the text refer to the introduction, the thesis, premise and argument 1, counterargument, rebuttal of counter argument 2, premise and conclusion. - types of arguments - types of argumentation: positive: present arguments that support our position; negative or refutation: presentation of arguments that refute the arguments of the opposite position; mixed: integrates arguments and counterarguments of the two positions to reach a conclusion (the teacher highlights that this is the one that is of particular interest). - most common mistakes in argumentation. - how to write a text? (writing instructions): read the source texts, identify the arguments, weigh up the reasons and rank them. It is important to present both arguments in favour and those that support the opposite thesis; adopt a position or establish a conclusion that takes into account what

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				has been said in the source texts. It is possible to add arguments but not mere opinions.	
- Learner's activity - Self-regulated learning	Applying new knowledge	Analysing the intentions of different fragments in a given text.	Exercise 1. This learning activity is aims to foster the learners' practice of their new knowledge. Specifically, it is aimed at promoting a better analysis of argumentative texts. The online environment makes it possible to include immediate feedback, which may improve the processes of self-regulated learning.	The next question presents the same text about immigration law. The students are asked to do an exercise by identifying the expository fragments and copy-paste them in the space for the answer. Written feedback is provided immediately after sending the answer: the clear argumentative fragments are shown. An explanation is offered regarding other possible dubious fragments.	This element in the instruction leads to the autonomous practice of identifying expository and argumentative fragments in a text. After the practice, automated feedback is provided. (see Appendix C)
- Learner's activity - Self-regulated learning	Applying new knowledge	Structuring the text by adding missing key elements.	Exercise 2. This learning activity is aims to foster the learners' practice of their new knowledge. Specifically, it is intended to promote learning of important elements	The next question presents a new text of 385 words, about the value of television for society. It explains that the text lacks a title, paragraph divisions, textual organizers and connectors. The students are asked to do an exercise by copying it in the space for the answer and to improve it by introducing the missing elements. The modifications have to be appropriate to connect the different ideas within the text and to organize the discourse.	This element in the instruction leads to the autonomous practice of better organizing an argumentative text. After the practice, automated feedback is provided. (Appendices D and E)

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			for text organization. The online environment makes it possible to include immediate feedback, which may improve the processes of self-regulated learning.	Written feedback is provided immediately after sending the answer: "the previous text comes from this web page. Click and check to see how the original text was written. (http://www.ejemplosdetextos.com/ejemplo-de-texto-argumentativo-sobre-la-television/#more-49) Your solution may have been correct, even if it does not fully match this version. The key point is to practice the use of the linguistic elements of the argumentative texts".	
- Learner's activity - Meaningful verbal learning	Applying new knowledge	Practicing the generation of arguments and writing a text about a given topic.	Exercise 3. This learning activity aims to foster the learners' practice of their new knowledge. Specifically, it is aimed at promoting the writing of an argumentative text. The student is encouraged to learn more about the types of arguments immediately after the practice, which may enhance the connection to their prior knowledge.	The next question briefly explains that it is crucial to identify and create different types of arguments. It then asks the student to build a short text of about 200 words or 15 lines, providing an argument about how the Internet has improved people's lives, including underlining different types of arguments and at least one false argument that they have invented. A link with further information about the different types of arguments is provided in case they want to go explore this topic further. (http://elarlequindehielo.obolog.es/selectividad-lengua-castellana-tipos-argumentos-138776)	This element in the instruction leads to the autonomous practice enabling the students to be able to build proper arguments. After the practice, students can expand their knowledge about different types of arguments. (Appendix F)
Learner's awareness	Integrating new knowledge	Analysing the self-learning process.	This learning activity aims to foster learner's awareness about their learning. Specifically, it encourages a reflection upon the new knowledge acquired and what may yet still to be known.	The next question provides a 11-minutes tutorial video. It was aimed at teaching students how to create diagrams with Padlet and, specifically, one that makes explicit their process of knowledge acquisition. The students are asked to create a Padlet showing their previous knowledge about argumentative texts, their new knowledge and their doubts. The video was recorded using Kazam Screencaster, uploaded onto Youtube and embedded.	This element leads to an analysis of the self-learning process by constructing a diagram. For it, it provides instruction on a proper technical use of a graphical tool. (Appendix G)

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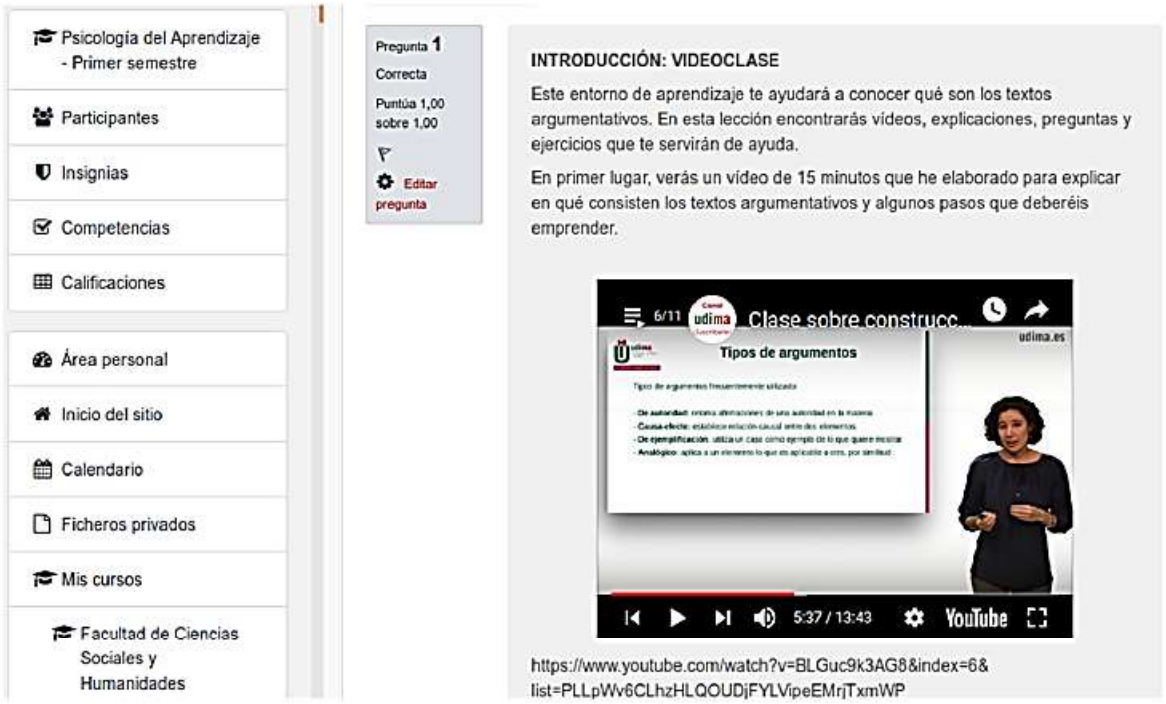
Appendix B: Video Lesson Included in the First Question of the Moodle Quiz



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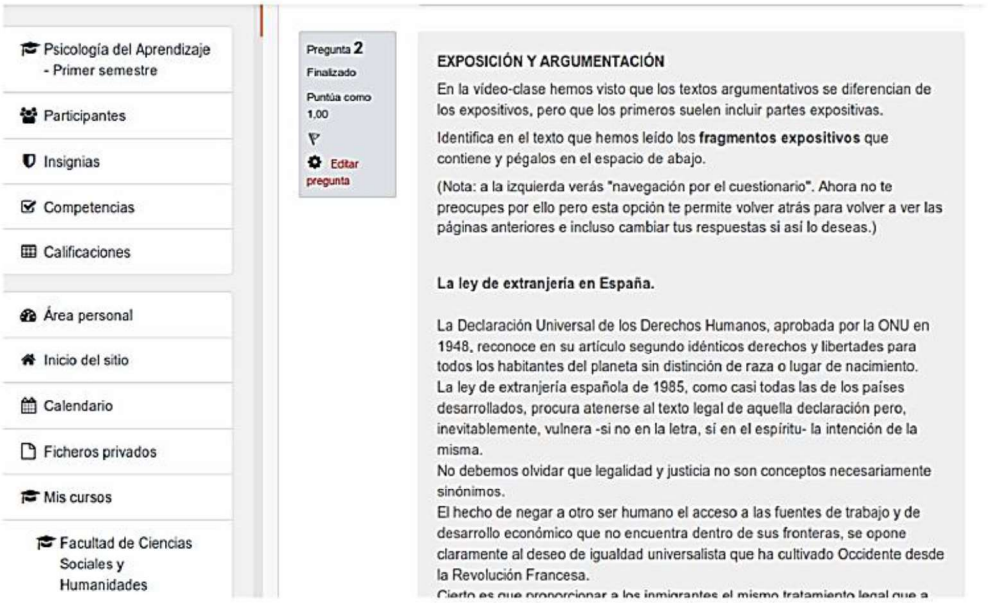
Appendix C: Exercise 1

Approach: Identify and Copy Expository Fragments of a Text in the Answer Space



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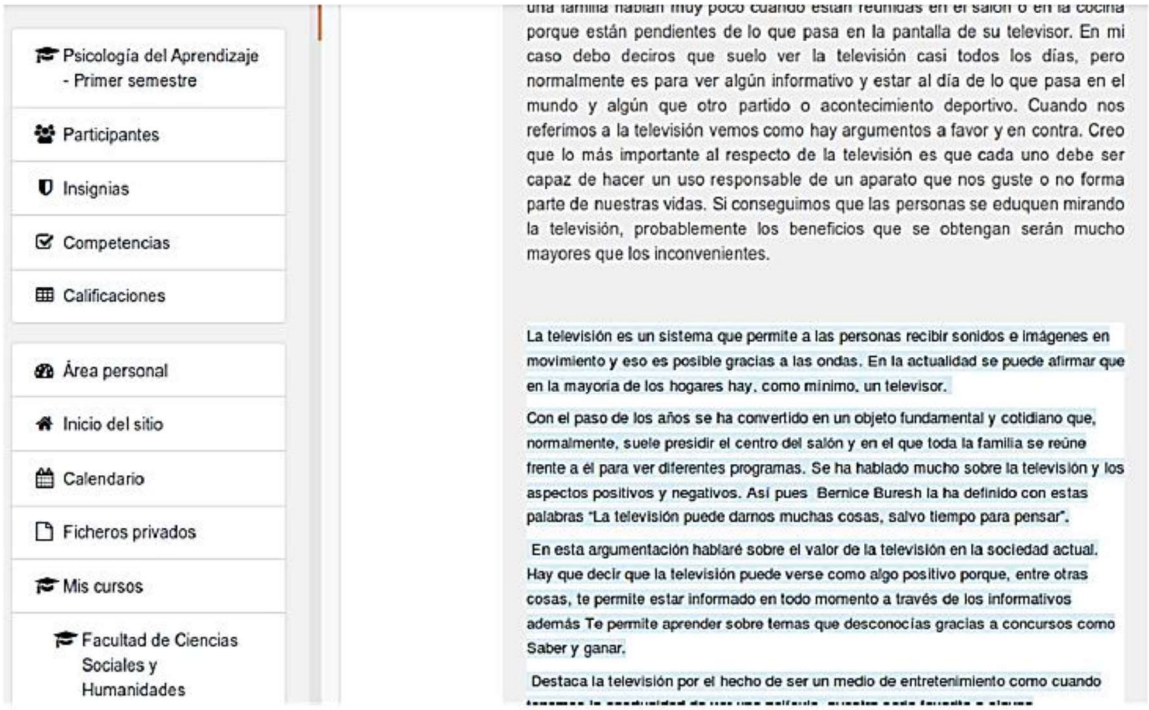
Appendix D: A Student's answer to Exercise 2

Introduce Title, Paragraph Divisions, Textual Organizers and Connectors



Appendix E: Explanation of the Feedback on Exercise 2

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Appendix F: Approach and a Student's Answer to Exercise 3

Write a Text which Includes Arguments and False Arguments

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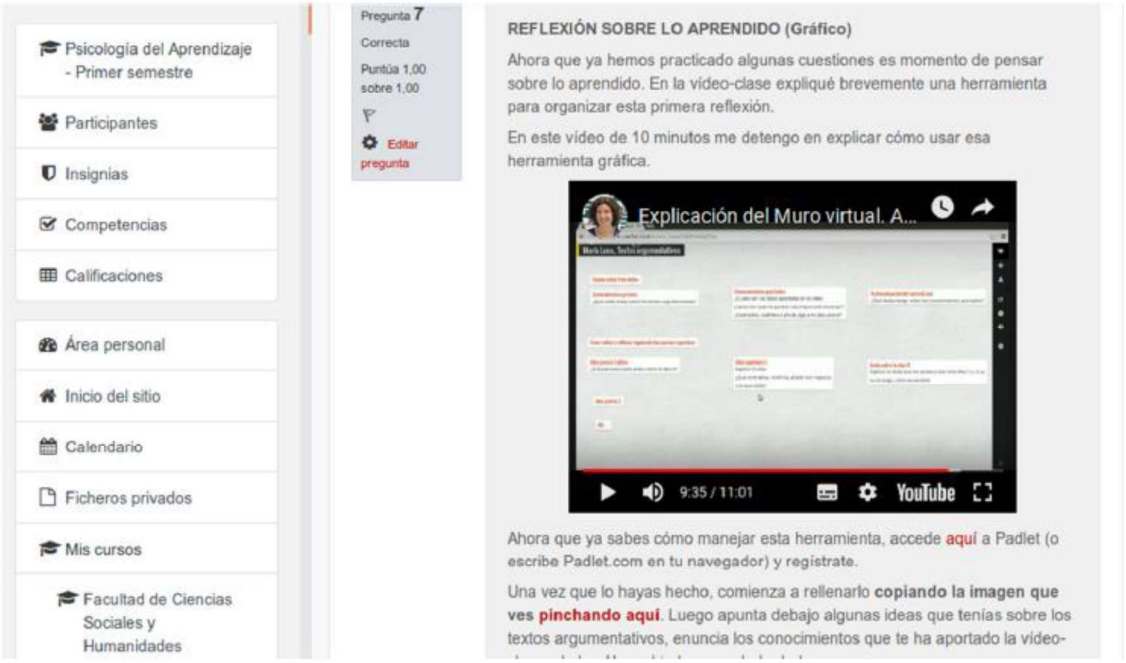
Appendix G: Video Tutorial to Create a Padlet to Organize the Reflection about Self-learning Process



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Appendix H: Items to Assess the Students' Perceived Change in their Self-efficacy

1- Assess the extent to which you think your competence has changed, when you argue in writing, to make arguments in favor of the position you defend.

2- Assess the extent to which you believe that your competence has changed, when you argue in writing, to raise counterarguments (reasons that could be used by those who disagree with you).

3- Assess the extent to which you believe your competence has changed, when you argue in writing, to refute counter-arguments (show that the counter-arguments are false or incorrect).

4- Assess the extent to which you think your competence has changed, when you argue in writing, to weigh arguments and counter-arguments (to decide which position is stronger).

5- Assess the extent to which you think your competence has changed, when you argue in writing, to propose solutions that take into account both arguments and counter-arguments.