Revista de Psicodidáctica, 2018, 23 (2), 117–127

Revista de Psicodidáctica

www.elsevier.es/psicod

Original

The instructional effectiveness of two virtual approaches: Processes and product☆

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ARTICLE INFO

Article history:
Received 21 August 2017
Accepted 14 February 2018
Available online 27 April 2018

Keywords:
Intervention in processes
Intervention in product
Skills
Learning management system
Moodle

ABSTRACT

We tested the relative instructional effectiveness of two virtual approaches delivered via a free online training programme: *product* and *process*. By *product*, we mean that learning focuses on analysis of performance, execution, success or final results, which can be measured by indicators such as productivity or quantity of ideas. By *processes*, we mean that learning focuses on the orchestration, dynamics and deployment of the learner's mental process, and other variables that modulate the acquisition of any skills. To this end, we designed and implemented a virtual instructional skills programme as a free university continuing education course delivered online and lasting 75 hours, using a learning management system (LMS), namely the University of Leon's External Moodle, in which 286 people participated. The results indicate that the two virtual approaches designed using the LMS exerted a positive effect on the acquisition of diverse contents, skills and strategies, and an increase was observed in self-efficacy, generalisation, the emotional component, practical application and positive attitudes towards written communication skills.

La eficacia instruccional de dos enfoques virtuales: procesos y producto

Palabras clave:
Intervención en procesos
Intervención en producto
Competencias
Sistema de Gestión de Aprendizaje
MOODLE

RESUMEN

Se examina la eficacia instruccional de dos enfoques virtuales de un programa formativo en línea. Uno, con énfasis en el *producto*, centrado en la calidad y en el desempeño adecuado de una serie de indicadores tales como productividad, coherencia, estructura y otro, en los *procesos* focalizado en la orquestación dinámica, en el despliegue de los procesos y en su recursividad. Para ello, se diseña e implementa un programa instruccional virtual en competencias como curso en línea de extensión universitaria de 75 horas, a través de un *Learning Management System* (LMS), en concreto el Moodle Externo de la Universidad de León en el que participan 286 personas. Los resultados demuestran que los dos enfoques virtuales diseñados a través del LMS tienen efectos positivos en el aprendizaje de contenidos, habilidades y estrategias diversas, observándose incrementos en la autoeficacia, en la generalización, en el componente emocional, en la realización práctica y en las actitudes positivas hacia la competencia comunicativa escrita.

PII of original article:S1136-1034(17)30213-7.
☆ Please cite this article as: García-Martín J, García-Sánchez J-N. La eficacia instruccional de dos enfoques virtuales: procesos y producto. Rev Psicodidáct. 2018;23:117–127. https://doi.org/10.1016/j.psicod.2018.02.002
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Introduction

The incorporation of the information and communication technologies (ICTs) into higher education has led to major changes in the instructional process, as a result of which new teaching and learning scenarios have emerged, including online courses and the massive open online courses known as MOOCs (Hone & Said, 2016) which are primarily based on e-learning (Jung, 2011), collaborative learning (Gu, Shao, Guo, & Lim, 2015), and skills instruction (Torres-Coronas & Vidal-Blasco, 2015).

Along these lines, it has been shown in recent years that basic skills are essential to encourage life-long learning (Méndez-Alonso, Méndez-Giménez, & Fernández-Río, 2015; OECD, 2013; Torres-Coronas & Vidal-Blasco, 2015), that job skills are indispensable in order to enter the labour market successfully (Méndez-Alonso et al., 2015; OECD, 2013), and that both are essential for successful personal realisation.

This has given rise to extensive debate about the importance of delivering interventions and instruction online via learning management systems (LMS), and about two clearly differentiated approaches: *product* and *process*. By *product*, we mean that learning focuses on analysis of performance, execution, success or final results, which can be measured by indicators such as productivity or quantity of ideas. By *processes*, we mean that learning focuses on the orchestration, dynamics and deployment of the learner's mental process, and other variables that modulate the acquisition of any skills.

Online learning through Moodle as a learning management system (LMS)

These days, learning management systems (LMS) have become the cornerstone of online learning and e-learning, and they are becoming increasingly ubiquitous in the educational scenario (Brown, 2010). As Zacharis (2015) has pertinently noted, an ever greater number of educational institutions, especially universities, employ at least one learning management system, such as Moodle or Blackboard, to deliver courses and/or instructional programmes online. In this respect, previous research on LMS has shown that the use of these systems in education has emerged because (a) they provide new instructional settings (Zacharis, 2015), facilitating here and now learning; (b) they promote the creation of customised content (Hirumi, 2012; Zacharis, 2015); (c) they engender collaboration (Zacharis, 2015); (d) they facilitate assessment and feedback (Hirumi, 2012); and (e) they enable both synchronous and asynchronous communication between the various educational agents (Zacharis, 2015).

As a result of the above, many international studies have been conducted on the use of these systems for educational purposes. A considerable number of these have analysed the different effects produced by traditional teaching and online instruction, while others have examined the effect that the use of these systems has on various psychological variables related to education such as *academic performance* (Huang, Lin, & Huang, 2012), *motivation* (Alias, 2012), *satisfaction* (Liaw & Huang, 2013), *self-efficacy* (Joo, Bong, & Choi, 2000), *self-regulation* (Kim, 2012; Liaw & Huang, 2013) and *blended learning* (Zacharis, 2015) but not *the instructional approaches* (processes and product) via an LMS.

Virtual instructional approaches: product and process

When all of the above is applied to teaching a core skill such as written communication, considerable debate arises about the best virtual approach to adopt. On the one hand, advances in traditional writing and rhetoric have consistently reflected a desire to determine the principal indicators of productivity or quantity, and above all the quality of written texts, as well as to design useful instructional strategies aimed at improving the texts produced by students at different educational levels (Klein & Boscolo, 2015; Koster, Tribushinina, Jong, & van den Bergh, 2015).

Several instructions and interventions in written composition have placed an emphasis on the *product* (Frydrychova, 2014; Hasan & Akhand, 2010; Hashemnezhad & Hashemnezhad, 2012; Iandolo, Esposito, & Venuti, 2013; Koster et al., 2015; Nguyen & Abbott, 2016; Nordin & Mohammad, 2006; Shahrokhi, 2017). These are embodied in the analysis of performance, execution, success or final result of writing according to various indicators, such as *productivity*, or quantity of ideas in the written product (García, Fidalgo et al., 2014; Iandolo et al., 2013; Robledo & García, 2013); *structure*, or the organisation of ideas that is inherent in writing (García, Fidalgo et al., 2014; Graham & Sandmel, 2011; Iandolo et al., 2013; Robledo & García, 2013; Thulasi, Bin, & Bte, 2014); *coherence*, defined as a mental representation of the text (García, Fidalgo et al., 2014; Iandolo et al., 2013; Robledo & García, 2013), and especially *quality* (Beauvais, Olive, & Passerault, 2011; García, Fidalgo et al., 2014; Graham & Sandmel, 2011; Thulasi et al., 2014).

It is worth reiterating that when we speak of *product*, we are referring to learning focused on analysis of performance, execution, success or final results, which can be measured by indicators such as productivity or quantity of ideas. And when we speak of *processes*, we are referring to learning focused on the orchestration, dynamics and deployment of the learner's mental process, and other variables that modulate the acquisition of any skills.

On the other hand, the advances achieved in the psychology of writing and the paradigm shift in education have engendered a major interest not only in results but also in the processes the learner engages in. Together, the different core skills involved in written composition have been defined as a complex activity that entails the execution of three major processes (planning, translating or editing or executing, and revising), and this has become the focus of many studies on the psychology of instruction. Conceived as a fundamental cornerstone in the study of human cognition, research has particularly focused on the processes and sub-processes that enable production as well as their dynamics, orchestration and necessary recursion (Graham & Sandmel, 2011; Hayes, 1996; Olive, Kellogg, & Piolat, 2001; Thulasi et al., 2014), giving rise to interventions and instruction that place emphasis on *psychological processes and variables* (Beauvais et al., 2011; Frydrychova, 2014; Hasan & Akhand, 2010; Hashemnezhad & Hashemnezhad, 2012; Koster et al., 2015; Nguyen & Abbott, 2016; Nordin & Mohammad, 2006; Robledo & García, 2013; Shahrokhi, 2017).

Previous studies have shown that writing involves thinking about the purpose, target audience, organisation, details, coherence and results (Álvarez & García, 2015; Hasan & Akhand, 2010; Thulasi et al., 2014). Thus, the orchestration, dynamics, deployment of the writer's mental processes (planning, editing and revising) and other variables that modulate the acquisition of any skill (motivation, beliefs about capacity and attitudes) have acquired a fundamental value but without focusing specifically on areas of core skill performance such as productivity, coherence, structure or quality (García, Fidalgo et al., 2014; García, Robledo et al., 2014). Bearing the above in mind, it is clear that rather than being mutually exclusive, both *approaches are essential* for effective instruction in core skills (Madrigal, 2015; Nordin & Mohammad, 2006).

Problem statement, objective and hypothesis

In general, research on these two approaches has been conducted in face-to-face situations and has focused primarily on

the analysis of academic writing (Reguera, 2014), usually within compulsory education contexts, mainly in primary education (Álvarez & García, 2014a; García & De Caso, 2006a; García & De Caso, 2006b; García & De Caso, 2007; Iandolo et al., 2013; Robledo & García, 2013) and secondary education (Álvarez & García, 2014a; Arias-Gundín & García, 2007), but also in non-compulsory education, particularly university education (Camps & Castelló, 2013; Hasan & Akhand, 2010; Reguera, 2014). Thus, little research attention has been paid to the adult population outside the educational and academic system, or to the possibilities offered by virtual instruction (Álvarez & García, 2014a; Arias-Gundín & García, 2007; Hasan & Akhand, 2010, Reguera, 2014).

In this regard, the objective of this study is to test the relative effectiveness of these two approaches (process and product) in instruction in occupational skills through a free online course that uses Moodle as an LMS. In addition, the following hypotheses are proposed: (a) it is expected that both virtual instructional approaches will promote acquisition of the skills and strategies necessary for seeking, managing and retaining employment, as well as the development of written communication skills, though in different ways; (b) it is envisaged that the two virtual instructional approaches will increase motivation for writing, though in different ways; (c) both are expected to exert a positive effect on participants' attitudes towards writing, though in different ways; (d) it is envisaged that the two virtual approaches will increase self-efficacy in job seeking and employment retention and in writing, though in different ways; (e) it is expected that both will exert a positive influence on learning by different means; and (f) it is predicted that the instructional effectiveness of both approaches will be comparable in terms of instruction in skills, but in different ways.

Method

Participants

Participants initially included 425 unemployed adults who were actively seeking employment, had basic level computer skills and had given their informed consent to voluntarily participate in a free continuing education online course provided by the University of León. The individuals did not have to be linked to the university that is, anyone who was interested in the course could take part in it.

Of these initial participants, only 286 concluded the course satisfactorily, of whom 83 were men and 203 were women aged between 19 and 51 ($M = 21$; $SD = 6.97$). More specifically, 21.33% (61) were aged below twenty-two years old, 24.13% (69) were aged between twenty-two and twenty-three years old, 24.83% (71) were aged between twenty-four and twenty-six years old, 18.88% (54) were aged between twenty-six and thirty, and the remaining 10.84% (31) were over thirty years old. This classification was employed because digital competence varies according to generation, being higher among digital natives or the Net generation than among others such as the X and Y generations (García-Martín, Merchant, & García, 2016).

It is in our view essential to clarify that 43.15% (123) had prior professional experience with an average of 7.55 years compared to 56.84 (162) who did not. Of the 43.15%, the average period of experience observed in the men was 6 years and that of the women 5 years in both approaches.

As regards level of education and training, almost all subjects had a university degree and 82% (235) had not previously participated on a course aimed at improving written communication skills. The main reason given for enrolling on the course was the need to obtain free-elective credits, followed by others such as recognition of the qualification in public sector recruitment, the subject, and the usefulness of the course given the high rate of unemployment in the country.

Table 1
Distribution of participants according to virtual instructional approach, sex and age

	Approach	Processes	Product	Total by sex
Sex	Males	42	41	83
	Females	106	97	203
	Total by approach	148	138	286
	Min–max age	20–51	19–51	

As Table 1 shows, all participants were randomly divided between the two virtual instructional approaches (processes and product) employed on the free continuing education online university course lasting 75 hours.

Design

To contrast instructional effectiveness, a 2×2 repeated measures factorial design was employed, where the between-subject factor was the instructional approach (processes versus product) and the within-subject factor was the time of assessment (before versus after).

Instruments

Both before and after the virtual instructional programme, several instruments and tasks were administered online via SurveyMonkey in order to assess job seeking skills, written communication skills and various psychological variables related to education. Five psychological measures were applied to *job seeking skills* (HSO-BE-CE – Emotional component of job seeking skills-, HSO-BE-CP – Practical component of job seeking skills-, HSO-ME – Employment retention skills-, HSO-AEBE – Self-efficacy in job seeking-, HSO-AEME – Self-efficacy in employment retention-), six to *written communication skills* (MOES-II – Motivation towards writing-, CA – Beliefs about writing-, SEN – Feelings about writing-, AEF – Self-efficacy in writing-, PROD – Textual product via text-based measures (productivity, etc.) and reader-based measures (coherence, etc.).-, WL – Processes involved in the writing task (planning, editing and revising).

As Table 2 shows, all these instruments presented satisfactory and acceptable psychometric properties; nevertheless, their properties were calculated in the present study, obtaining evidence of internal consistency reliability with Cronbach's alphas close to .70 and a construct validity that broadly corroborated grouping by scales. The composite reliability (CR the majority more than .90), the average variance extracted (AVE higher than .50) and the McDonald omegas (similar to alphas) confirm the satisfactory psychometric properties.

In the case of argumentative texts, the indices of agreement between encoders were also acceptable (Cohen kappas above 0.85). On the one hand, these formed the basis for assessment of the textual product, analysing text-based measures (García, Fidalgo et al., 2014; García, Robledo et al., 2014) and reader-based measures (García, Fidalgo et al., 2014). On the other, they constituted the basis for assessment of the cognitive processes involved in the task of writing, using a variant of Kellogg's triple task procedure (Olive et al., 2001) whereby students wrote an "Online Writing Log" while performing the writing task, in which they recorded the specific action that they were carrying out at the moment they were prompted by a visual signal (Álvarez & García, 2014b). Eight actions in the log concerned the processes

Table 2
Pre- and post-intervention assessment instruments and tasks

Instruments	Aspect assessed	N° ítem	Cronbach's alpha (α)	McDonald omega (ω)	Composite reliability (CR)	Average variance extracted (AVE)	Previous instrument validation and implementation studies	Administration	
								Pre-test	Post-test
			Self-reports						
HSO	Job seeking skills								
HSO-BE-CE	Emotional component of job seeking skills	66	.741	.730	.959	.658		X	X
HSO-BE-CP	Practical component of job seeking skills	19	.737	.720	.735	.581	Méndez and García (2007)	X	X
HSO-ME	Employment retention skills	42	.690	.671	.904	.515		X	X
HSO-AEBE	Self-efficacy in job seeking	16	.762	.752	.938	.558		X	X
HSO-AEME	Self-efficacy in employment retention	23	.751	.747	.917	.502		X	X
Others	Written communication and psychological variables								
MOES-II	Motivation towards writing	32	.784	.780	.831	.534	García, Marbán and De Caso (2001)	X	X
CA	Beliefs about writing	21	.735	.726	.935	.546		X	X
SEN	Feelings about writing	5	.885	.874	.894	.819	García et al. (2001)	X	X
AEF	Self-efficacy in writing	11	.782	.773	.959	.679		X	X
			Measures of the writing product						
PROD	Textual product via text-based measures (productivity, etc.) and reader-based measures (coherence, etc.).						García, Fidalgo et al. (2014); García, Robledo et al. (2014)	X	X
			Measures of the writing process						
WL	Processes involved in the writing task (planning, editing and revising)						Álvarez and García (2015); Álvarez and García (2014a); Álvarez and García (2014b) García et al. (2010)	X	X

of planning, editing and revising the text, and another action referred to processes that were not related to written composition.

Instructional approaches

The virtual skills intervention programme delivered as a free online course via a learning management system (LMS) encompassed two very different instructional approaches: one based on the product and the other on processes. Nonetheless, both were virtual, and had been designed and developed using two web 2.0 tools, specifically HotPotatoes and SurveyMonkey, which facilitated and encouraged creativity and motivation in the proposed tasks. The designed tasks followed a recursive, dynamic and simple instructional process, and as a result automatization in the learning and enjoyment process were guaranteed due to their interactivity, as was in consequence the generalising of their application to the occupational sphere.

Both comprised the same number of sessions and activities, entailed similar levels of demand and difficulty [identical treatment and instruments (pre-test post-test)] and met the criteria of quality and rigour (existence of two experimental groups and social relevance and usefulness) necessary for replication and publication in high-impact journals. To this end, we adhered to the guidelines agreed in the scientific meeting of the European Research Network Learning to Write Effectively (ERN-LWE IS0703), which include identification of the target population, instructional sequence, activities, objectives and assessment (AHRQ, 2016; García & García-Martín, 2012; Graham & Harris, 2014). Only the data for the 286 participants who completed the online course were taken into account for the pretest analyses, since it was only for these subjects that posttest information was available.

Instructional approach with an emphasis on the product

As Figure 1 shows, this approach was characterised by its emphasis on the end result, on formal aspects, on performance, on the overall quality and on constant self-assessment of the final product. Written communication is perceived as a complex task, emphasising instruction in formal aspects and the execution of a series of indicators, to which is added the learning and use of argumentative texts as a text type. Thus, this approach was embodied

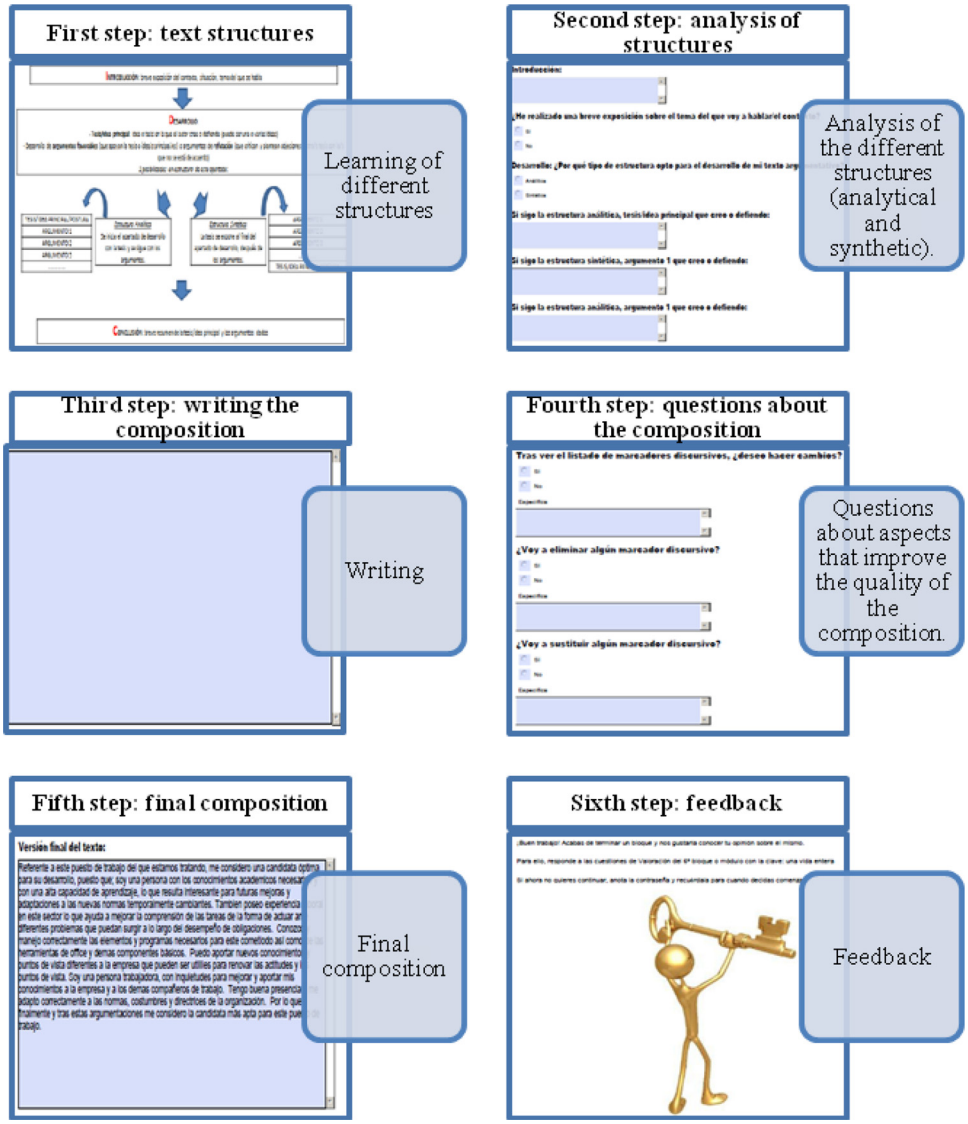

Figure 1. Graphic illustrating of online strategy.

in the development of a range of skills and strategies that would be sufficient to increase the overall and final quality of written compositions.

Instructional approach with an emphasis on processes

As Figure 2 reveals, this approach is characterised by its emphasis on recursion, interaction, self-reflection and constant self-assessment. Written communication is understood as a sophisticated cognitive and emotional process that consists of several hierarchically organised sub-processes, thus emphasising the multidimensional nature of writing. The approach therefore focuses on providing instruction on the cognitive and psychological processes and sub-processes involved in the process of written composition and on the influence and control exerted by intrapersonal variables such as prior knowledge, motivation and emotional state, and by interpersonal variables such as target audience, purpose and context. This was embodied in the development of the various cognitive processes (planning, translation/execution/editing and revising) involved in the macro-process of writing, and of the respective sub-processes through explicit teaching of intrapersonal and interpersonal strategies to optimise each of the three processes in the different instructional activities.

Procedure

First, Spanish and international scientific research was examined to identify the psychological variables of active job seeking and employment retention that influenced the candidate profile for holding a particular occupational position and which provided the rationale for this study. Subsequently, selection, adaptation and design of the assessment instruments and tasks (pre- and post-test) were conducted, referring to skills related to job seeking, employment retention and written communication. Next, the programme was designed in accordance with previous research and instructional programmes. Two versions of the two approaches were devised that were assayed by novice and expert educators in the subject, classifying and assessing the activities in detail. Then, the programme was designed using SurveyMonkey and Hot Potatoes in an LMS (the University of León External Moodle-Ariadna). These tools were used to record performance of activities, duration, the mark and any type of incident. The LMS recorded the date and

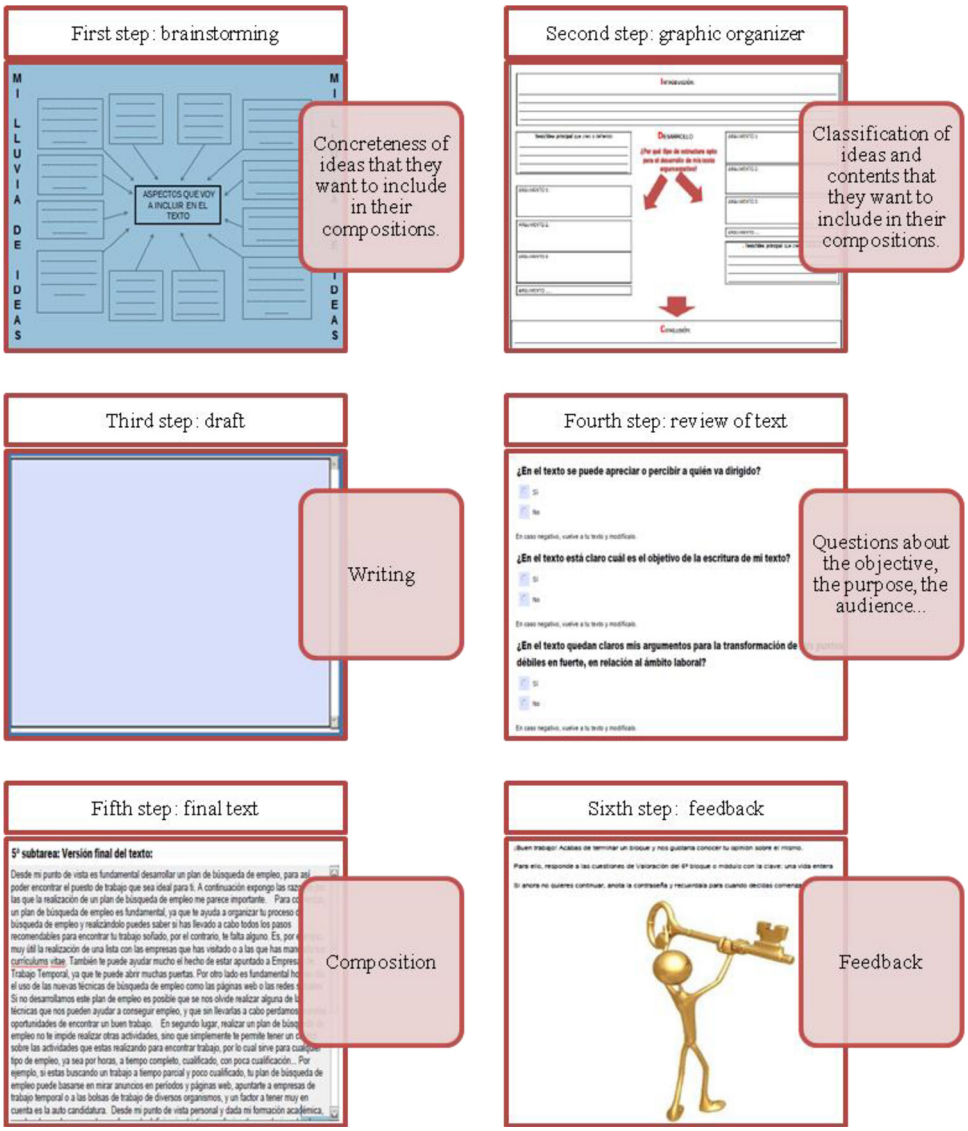

Figure 2. Graphic illustrating of online strategy about process approach.

time participants logged in, and the tasks and activities carried out. This was combined with a record of logging in and logging out of the SurveyMonkey tool and an online writing log counter which recorded the time students spent editing texts.

In addition, in order to refine the approaches, five people external to the design process and with no knowledge of the subject took the online course, providing meaningful data about its accessibility and usability. Having concluded the above steps, in January 2016, the programme was delivered as a free continuing education online course provided by the University of León, with a duration of 75 hours, and which was accessible twenty-four hours a day, seven days a week, for six months. The 286 participants who successfully completed all programme activities obtained a certificate of attendance and progress issued by the university. After the course, the SurveyMonkey and Moodle matrices for the 286 students were downloaded, the relevant coding was performed, data analysis and the pertinent statistical analyses were carried out using the software package IBM SPSS Statistics, version 22.

Data analysis

Means and standard deviations of the results obtained in the analysed descriptive variables (sex, age, approach and so on) were calculated to obtain descriptive data on participants. Then, normal distribution of the sample was determined by means of skewness and kurtosis tests, confirming that most measures satisfied the assumptions of normality. Next, differences between the pre-test psychological measures used for both approaches were analysed using multivariate contrasts (GLM), confirming the absence of statistically significant differences before the course was taken. Lastly, multivariate analyses (GLM) were performed to compare the 2×2 repeated measures factorial design, in which the between-subject factor was the instructional approach employed (processes versus product) and the within-subject factor was the time of assessment (pre-test vs. post-test). In general, statistically significant increases from pre- to post-test were observed in both approaches in the different aspects analysed (as described below), but no interaction between them from pre- to post-test was observed (and hence is not discussed). In other words, statistically significant differences were not observed in the different aspects examined based on approach and moment. That is, both the product and the process approaches gave rise to statistically significant improvements in occupational skills, written communication competencies and psychological measures, with no greater effectiveness of one relative to the other in a particular aspect being revealed.

Results

Results for psychological measures of job seeking skills

The statistical analyses performed on the pre-test showed that there were no significant differences between the two virtual instructional approaches (processes and product) as regards psychological measures of active job seeking skills.

Once the programme had been implemented, statistically significant differences were observed between the instructional approaches in all the variables analysed, such as *job seeking skills*

Table 3
Descriptive statistics and results of the analysis of measures of job seeking skills where the instructional approach employed (processes versus product) is considered as the between-subject factor and time (pre-test versus post-test) is considered as the within-subject factor

	Processes				Product				Pre-test versus post-test[*,**]		
	Pre		Post		Pre		Post		$F_{(1.284)}$	p	η^2
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*Σ*			
HSO-BE-CP: Job seeking skills	18.25	4.94	31.74	11.83	18.58	4.95	32.17	12.09	.383	≤.001	.617
HSO-BE-ME: Thoughts after a job interview	7.80	.75	8.09	.82	7.75	.72	7.98	.98	.946	≤.001	.054
HSO-AEBE: Job seeking actions	12.24	1.70	14.63	2.12	12.28	1.69	14.40	1.97	.416	≤.001	.584
HSO-AEBE: Candidate profile	14.13	2.03	15.97	2.24	14.05	2.00	15.62	2.36	.653	≤.001	.347
HSO-AEBE: Employment goal	7.99	1.14	8.09	1.06	7.82	1.14	7.79	1.19	.965	.001	.035
HSO-AEBE: Self-efficacy in job seeking	122.18	19.74	132.48	15.31	122.91	19.52	133.62	12.82	.804	≤.001	.196
HSO-AEBE: Self-efficacy in finding appropriate means	7.91	1.96	8.67	1.36	7.84	1.85	8.59	1.42	.888	≤.001	.112
HSO-AEBE: Self-efficacy to find employment offers in the press	8.36	1.89	8.80	1.58	8.00	2.21	8.80	1.42	.929	≤.001	.071
HSO-AEBE: Self-efficacy to visit companies without employment offers	6.21	2.69	7.39	2.33	6.14	2.88	7.28	2.39	.867	≤.001	.133
HSO-AEBE: Self-efficacy to seek employment online	8.87	1.63	9.11	1.29	8.80	1.80	9.10	1.23	.979	.013	.021
HSO-AEBE: Self-efficacy in visiting the Temporary Work Agency	7.94	2.11	8.20	2.11	7.86	2.53	8.29	1.97	.985	.036	.015
HSO-AEBE: Self-efficacy in writing a CV	8.48	2.06	9.16	1.18	8.46	2.14	9.41	.93	.886	≤.001	.114
HSO-AEBE: Self-efficacy in writing a CL	6.56	3.02	9.01	1.32	6.77	3.01	9.28	1.13	.607	≤.001	.393
HSO-AEBE: Self-efficacy to prepare for a job interview	7.55	2.20	8.99	1.19	7.67	2.152	9.12	1.05	.724	≤.001	.276
HSO-AEBE: Self-efficacy to present for a job interview with a suitable physical appearance	9.32	1.34	9.51	.89	9.53	.91	9.67	.68	.980	.016	.020
HSO-AEBE: Self-efficacy when attending a job interview	8.54	1.82	8.66	1.68	9.03	1.16	9.14	1.12	.939	≤.001	.061
HSO-AEBE: Self-efficacy to express oneself correctly in job interviews	8.01	1.85	8.62	1.28	8.25	1.54	8.70	1.21	.924	≤.001	.076
HSO-AEBE: Self-efficacy to surmount rejections in job interviews	8.34	1.55	8.71	1.36	8.25	1.64	8.64	1.32	.958	≤.001	.042
HSO-AEBE: Self-efficacy to organise a job search	7.83	1.85	8.74	1.25	8.07	1.92	8.81	1.22	.858	≤.001	.142
HSO-AEME: Self-efficacy to compile a list of the companies visited	8.63	1.85	8.95	1.50	8.87	1.67	9.12	1.23	.981	.020	.019

[*] Only statistically significant differences when comparing before versus after for both approaches are shown. *Only statistically significant results are included ($p < .05$); η^2 (eta-squared statistic) = estimates of effect size. Cohen's rule (1988) states that.01–.06 (small effect); >.06–.14 (medium effect); >.14 (large effect).

[**] Since no statistically significant interactions were observed between pre- and post-test with measures of the instructional approaches, these analyses are not shown.

[$F_{(1.284)}$ = .383, $p \leq .001$, η^2 = .617], *job seeking actions* [$F_{(1.284)}$ = .416, $p \leq .001$, η^2 = .584] and *candidate profile* [$F_{(1.284)}$ = .653, $p \leq .001$, η^2 = .347], with large effect sizes, showing an increase in both according to Cohen's rule (1988) states that.01–.06 (small effect); >.06–.14 (medium effect); >.14 (large effect).

With regard to measures of self-efficacy in job seeking, the analyses indicated a significant increase for both virtual approaches as regards participants' beliefs concerning their *job seeking ability* [$F_{(1.284)}$ = .804, $p \leq .001$, η^2 = .196] and their ability to *find suitable means* [$F_{(1.284)}$ = .888, $p \leq .001$, η^2 = .112], *visit companies without explicit offers of employment* [$F_{(1.284)}$ = .867, $p \leq .001$, η^2 = .133], *write a curriculum vitae* [$F_{(1.284)}$ = .886, $p \leq .001$, η^2 = .114], *write a cover letter* [$F_{(1.284)}$ = .607, $p \leq .001$, η^2 = .393], *prepare for a job interview* [$F_{(1.284)}$ = .724, $p \leq .001$, η^2 = .276] and *organise a job search* [$F_{(1.284)}$ = .858, $p \leq .001$, η^2 = .142], with medium and large effect sizes.

Table 3 gives a summary of the descriptive statistics and results of the repeated measures GLM on job seeking measures considering the instructional approach employed (processes versus product) as the between-subject factor and the time (pre-test versus post-test) as the within-subject factor.

Results for measures of written communication skills

In the pre-test, no statistically significant differences were found between the two virtual instructional approaches (processes and product) for measures of written communication skills.

Once the intervention had been delivered, a significant increase was observed in both approaches for variables such as *attitudes towards writing* [$F_{(1.284)}$ = .979, p = .013, η^2 = .021], *self-efficacy in writing* [$F_{(1.284)}$ = .970, p = .003, η^2 = .030] and *motivation: attribution of failure to effort* [$F_{(1.284)}$ = .972, p = .005, η^2 = .028], with small effect sizes. However, this was not observed in other variables such as feelings about writing and motivation: attribution of success to effort.

In relation to measures of self-efficacy in writing, the analyses showed a significant increase for both virtual instructional approaches as regards the measures *write paragraphs with a clear idea* [$F_{(1.284)}$ = .984, p = .032, η^2 = .016] *include details in paragraphs that support the main idea* [$F_{(1.284)}$ = .970, p = .003, η^2 = .030], *end the text with appropriate conclusions* [$F_{(1.284)}$ = .965, $p \leq .001$, η^2 = .035], *write an organised text* [$F_{(1.284)}$ = .945, $p \leq .001$, η^2 = .055],

Table 4
Descriptive statistics and results of the analysis of measures of written communication skills where the instructional approach employed (processes versus product) is considered as the between-subject factor and time (pre-test versus post-test) is considered as the within-subject factor

	Processes				Product				Pre-test versus Post-test*,**		
	Pre		Post		Pre		Post				
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	$F_{(1.284)}$	*p*	η^2
CA: Attitudes towards writing	39.40	4.66	40.08	4.85	39.58	4.52	40.01	5.02	.979	.013	.021
AEF: Self-efficacy in writing	87.91	10.92	88.93	10.14	87.62	10.43	89.66	9.54	.970	.003	.030
AEF: Self-efficacy to write paragraphs with a clear main idea	8.68	1.33	8.75	1.45	8.62	1.44	8.90	1.10	.984	.032	.016
AEF: Self-efficacy to include details or examples in paragraphs that support the main idea	8.62	1.41	8.81	1.37	8.51	1.43	8.79	1.23	.970	.003	.030
AEF: Self-efficacy to complete paragraphs with appropriate conclusions	8.46	1.49	8.64	1.47	8.41	1.49	8.75	1.24	.965	.001	.035
AEF: Self-efficacy to write a well-organised text with a good introduction, body and conclusion.	8.39	1.59	8.58	1.56	8.30	1.52	8.80	1.27	.945	≤.001	.055
AEF: Self-efficacy to clearly express ideas in writing without straying from the main theme.	8.32	1.57	8.55	1.47	8.25	1.49	8.67	1.23	.943	≤.001	.057
SEN: Feelings about writing	6.99	1.79	7.16	1.91	7.15	1.64	7.17	1.73	.994	.185	.006
MOES-II: Motivation: attributions of failure to effort	10.96	2.77	11.41	3.06	10.69	2.72	11.22	2.89	.972	.005	.028
MOES-II: Motivation: attributions of success to effort	8.28	2.90	8.66	3.14	8.25	2.62	8.44	2.69	.992	.138	.008
PROD: Productivity in the argumentative text	240.59	180.55	418.35	293.41	285.65	189.69	431.01	192.76	.755	≤.001	.245
PROD: Number of textual units in the argumentative text	8.70	6.47	10.36	7.01	16.42	16.05	15.74	9.26	.815	≤.001	.185
PROD: Number of functional words in the argumentative text	79.15	60.42	134.52	90.10	93.73	63.49	141.73	65.41	.758	≤.001	.242
PROD: Number of discourse markers as connectors in the argumentative text	11.07	9.06	16.92	12.56	13.30	10.10	17.62	9.33	.874	≤.001	.126
WL: Coherence of the argumentative text	28.85	25.81	55.70	48.81	36.40	29.03	58.95	30.77	.773	≤.001	.227
WL: Relational coherence of the argumentative text	12.55	10.14	20.31	14.74	15.15	11.08	22.11	11.10	.814	≤.001	.186
PROD: Productivity in the argumentative text, with processes	534.55	56.66	517.55	92.68	546.13	71.58	542.38	109.80	.99	.07	.01
PROD: Number of textual units in the argumentative text, with processes	19.88	6.99	20.73	7.58	20.94	6.88	22.24	7.71	.976	.010	.024
PROD: Number of functional words in the argumentative text, with processes	185.65	24.07	175.28	36.92	190.54	28.86	185.60	41.36	.959	.001	.041
PROD: Number of discourse markers as connectors in the argumentative text, with processes	25.95	6.57	21.33	6.17	26.37	7.62	22.55	7.98	.78	≤.001	.22
WL: Relational coherence of the argumentative text, with processes	30.90	7.47	27.01	7.62	32.17	9.06	29.10	9.69	.89	≤.001	.11

* Only statistically significant differences when comparing before versus after for both approaches are shown. * η^2 (eta-squared statistic) = estimates of effect size. Cohen's rule (1988) states that.01–.06 (small effect); >.06–.14 (medium effect); >.14 (large effect).

** Since no statistically significant interactions were observed between pre- and post-test with measures of the instructional approaches, these analyses are not shown.

and *express ideas clearly* [$F_{(1.284)}$ = .943, $p \leq .001$, η^2 = .057], with small effect sizes.

Lastly, as regards measures of the textual product, a significant increase was observed for both approaches in the measures *text productivity without analysis of processes* [$F_{(1.284)}$ = .755, $p \leq .001$, η^2 = .245], *number of textual units* [$F_{(1.284)}$ = .815, $p \leq .001$, η^2 = .185], *number of functional words* [$F_{(1.284)}$ = .758, $p \leq .001$, η^2 = .242], *number of discourse markers* [$F_{(1.284)}$ = .874, $p \leq .001$, η^2 = .126], *coherence of the text without analysis of processes* [$F_{(1.284)}$ = .773, $p \leq .001$, η^2 = .227], *relational coherence of text without analysis of processes* [$F_{(1.284)}$ = .814, $p \leq .001$, η^2 = .186], and *number of discourse markers as connectors in the argumentative text with analysis of processes* [$F_{(1.284)}$ = .78, $p \leq .001$, η^2 = .22], with medium and large effect sizes, as shown in Table 4 which gives the descriptive statistics and the results obtained from the repeated measures GLM considering the instructional approach employed (processes versus product) as the between-subject factor and time (pre-test vs. post-test) as the within-subject factor.

Discussion

The results presented here demonstrate the effectiveness of the two virtual instructional approaches (processes and product) developed and delivered via an LMS, as regards acquisition of the skills necessary to seek and retain employment and the improvement and development of written communication skills. This evidence is supported by the results obtained for most of the measures analysed, which in turn are consistent with those observed in previous interventions (Beauvais et al., 2011; Frydrychova, 2014; Hashemnezhad & Hashemnezhad, 2012; Thulasi et al., 2014; Torres-Coronas & Vidal-Blasco, 2015) and previous developmental studies (Álvarez & García, 2014a; Álvarez & García, 2015), literature reviews (Camps & Castelló, 2013; Nordin & Mohammad, 2006; Quintero & Hernández, 2002) and meta-analyses of instructional interventions (Graham & Sandmel, 2011), thus confirming the first hypothesis proposed.

Furthermore, the results obtained indicate an increase in *motivation* towards written composition irrespective of the virtual LMS instructional approach employed, observed in the motivation measures examined (attributions of failure to effort, attributions of success to effort), thus confirming the second hypothesis. This finding is in agreement with the results obtained in previous research and interventions (Alias, 2012; García & De Caso, 2006a; García & De Caso, 2006b; García & De Caso, 2007; García, de Caso, Fidalgo, Arias-Gundín & Torrance, 2010; Nguyen & Abbott, 2016; Shahrokhi, 2017). In this regard, García and De Caso (2006a) and Shahrokhi (2017) observed that after the application of the implemented instructional programme students' motivation levels increased.

Similarly, with respect to *attitudes*, the results confirm that the two virtual approaches delivered through an LMS produced positive effects, and as a result there was an increase in the likelihood of greater dedication, as it has been proven that when a task/activity produces pleasure, it is more likely to be repeated over time (Shahrokhi, 2017). This finding is supported by the data obtained for the measures of the approaches analysed and by previous studies (Alias, 2012; García & De Caso, 2006b; García & De Caso, 2007; Liaw & Huang, 2013; Shahrokhi, 2017), thus confirming the third hypothesis. Along these lines, the research undertaken demonstrates an increase in positive attitudes towards learning. In addition, these results partially coincide with what has been observed in a recent study that asserted that students of the process approach expressed a more positive attitude in relation to written composition in English due to its structuring in parts, which reduced the level of complexity and therefore of frustration, without prejudice at any time to the value of the product approach, as it was also demonstrated that it was vital for students to have access to examples that ensured quality (Shahrokhi, 2017).

Furthermore, the results also show that both virtual approaches produced a significant increase in the *self-efficacy* measures examined, thus confirming the fourth hypothesis, and coinciding with findings reported in previous research (Alias, 2012; García & De Caso, 2006a; García & De Caso, 2006b; García & De Caso, 2007; Kim, 2012; Liaw & Huang, 2013; Shahrokhi, 2017). The study carried out by García and De Caso (2007) also demonstrated that an increase in participants' self-efficacy also came about after the instructional intervention.

A significant improvement was also observed in *learning* following instruction via either of the virtual LMS approaches designed. This finding is supported by the data obtained for most of the psychological measures analysed, and is in agreement with the results obtained in previous interventions (Alias, 2012; Beauvais et al., 2011; García & De Caso, 2007; García et al., 2010; García, Fidalgo et al., 2014; Hashemnezhad & Hashemnezhad, 2012; Nguyen & Abbott, 2016; Shahrokhi, 2017), in literature reviews (Nordin & Mohammad, 2006) and in meta-analyses (Graham & Sandmel, 2011; Quintero & Hernández, 2002; Thulasi et al., 2014), thus confirming the fifth hypothesis.

Lastly, the results indicate that there was no interaction between the measures of the two virtual approaches in relation to changes from pre- to post-test. In other words, there is no evidence that one approach is of greater instructional effectiveness than the other, since they each resulted in similar increases in the occupational, writing and psychological variables examined, coinciding with the findings reported in previous studies (Hasan & Akhand, 2010; Hashemnezhad & Hashemnezhad, 2012; Thulasi et al., 2014), thus confirming the sixth and final hypothesis. In this regard, the results show that both are effective for instruction in the described content, though what stands out is that clearly differential approaches produce similar results, thereby increasing the pertinence of considering the viability of combining the two (Shahrokhi, 2017). However, it should not be forgotten that the study presented focuses on the fostering of particular skills and competencies, and that results therefore may vary if instruction in others is given.

Conclusions and future research

To summarise, the study reported here suggests that the two virtual approaches are necessary rather than mutually exclusive. In view of the competencies worked on in this course, it is clear that it is necessary to acquire a number of online strategies, techniques and skills in order, for example, to produce a quality curriculum vitae and / or cover letter; but it is equally important to know how to reflect on their goal and purpose, and above all to make orchestrated and recursive use of plans, execute them and assess them for effective revision and improvement (Madrigal, 2015). In the specific case of written communication skills, it is evident that in order to succeed, it is essential to consider the formal and implementation aspects as well as the final quality, and to learn to reflect on the purpose of the text, the target audience, resources and results, as well as to dynamically deploy different cognitive and emotional processes at the right time (Gallego, García, & Rodríguez, 2014; Madrigal, 2015; Quintero & Hernández, 2002; Thulasi et al., 2014). In summary, it is indispensable to have acquired a series of rhetorical and production skills that together contribute to the quality of the text (product approach), as well as the capacity to reflect on its purpose and target audience in addition to the resources and the results. But above all, it is necessary to make recursive, dynamic, orchestrated use of the various processes deployed in textual production (Hasan & Akhand, 2010; Quintero & Hernández, 2002; Thulasi et al., 2014).

Therefore, it can be concluded that the effectiveness of this virtual instructional programme has been confirmed encompassing two approaches as regards the development of job seeking and employment retention skills (Méndez & García, 2007; Torres-Coronas & Vidal-Blasco, 2015) and the development of written communication skills (Frydrychova, 2014; Gallego et al., 2014; Thulasi et al., 2014) as part of non-formal education delivered outside the compulsory education context and aimed at adults, thus expanding the range of instructional possibilities for any skill (Frydrychova, 2014; García et al., 2010; OECD, 2013; Thulasi et al., 2014). It should be noted that throughout this intervention, the criterion of methodological rigour applicable to any quality intervention was strictly adhered to (AHRQ, 2016; Graham & Harris, 2014). Nevertheless, it seems pertinent to indicate the need for future studies in which virtual instructional programmes are designed and delivered that combine both approaches (mixed) for instruction on various skills in order to increase the quality and positive effects that mastery of these skills produces, as well as to conduct research that examines the instructional effectiveness of these approaches independently.

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