Evaluation and co-evaluation of learning in blended learning in higher education

Evaluación y coevaluación de aprendizajes en blended learning en educación superior

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Abstract

The study examines the use of technological tools to implement self and peer-assessment based on students´ autonomous learning and formal evaluation carried out by the teacher, taking advantage of the potential of instant feedback from the tools available in Virtual Learning Environments (VLE). The extensive implementation of VLE in higher education makes blended learning an emergent modality, automating and facilitating the monitoring of learning progress, through the pedagogical management of effective practices. The innovation proposal aims at fostering students' autonomy and their central role in the achievement of their learning. The methodological design is correlational seeking to establish the association between the preparation of questions and online test resolution by the students and their level in performance tests administered by the teacher. It was carried out in six groups of the 2016 and 2017 cohorts in the Educational Research subject within initial teacher training programs at a Chilean university. The main results show a significant correlation between the use of the virtual environment in the construction and application of a self and peer assessment instruments in a test- typed format and their results in performance tests. It is concluded that student learning is enhanced by integrating assessment as part of the teacher training process with an active and autonomous role of students supported by educational technologies.

Keywords: Autonomy, online evaluation, co-evaluation, learning, blended learning, higher education.

Resumen

El estudio evalúa la utilización de herramientas tecnológicas para implementar evaluación y coevaluación realizada por los estudiantes, en función del aprendizaje autónomo y la evaluación por parte del profesor, aprovechando el potencial de la retroalimentación instantánea de las herramientas que disponen los Ambientes Virtuales de Aprendizaje. La extensa implementación de estos ambientes virtuales en la educación superior hace que el blended learning sea una nueva normalidad, automatizando y facilitando el monitoreo de los avances en el aprendizaje, a través de la gestión pedagógica de prácticas efectivas. La propuesta de innovación propende al desarrollo de la autonomía y protagonismo de estudiantes en el logro de sus aprendizajes. El diseño metodológico es correlacional que busca establecer la asociación entre la confección de preguntas y resolución de test online por parte de los estudiantes y su nivel de desempeño en pruebas de conocimiento administradas por el profesor. Se aplicó en seis grupos de las cohortes 2016 y 2017 en la asignatura Investigación Educativa para carreras de pedagogías de

una universidad chilena. Los principales resultados apuntan a una significativa correlación entre uso del ambiente virtual en la construcción y aplicación de instrumento tipo test y los resultados de desempeño en pruebas de conocimiento. Se concluye que el aprendizaje de los alumnos se potencia, al integrar la evaluación como parte del proceso formativo con un rol activo y autónomo de los estudiantes con apoyo de tecnologías.

Descriptores: Autonomía, evaluación online, coevaluación, aprendizaje, b-learning, educación superior.

1. Introduction

Computing emerges in the mid XX century by a set of technologies responsible for the storage and automation of information that with the technological growth penetrated various social areas, particularly in basic educational centers, media and university. Currently, higher education has incorporated Information and Communication Technologies (ICT) into teaching processes, in order to support the teaching-learning processes of students and teachers (Luna et al., 2018). This generates demands for new teaching strategies that deal with it by incorporating strategies that include new technologies (Bahamondes & Ponce, 2012).

Innovation in education systems has become an imperative need in higher education, as it seeks change and greater dissemination of successful experiences, as the university needs to change at all levels to survive and thrive in the new "educational market" (Quesada et al., 2017). For professors, this means a significant use of resources and time, which makes it necessary to analyze its effectiveness in the academic result and the quality of teaching through the application of these new techniques (Vivel-Bua et al., 2015).

The integration and intensive use of digital technologies, specially web-based technologies, are transforming universities around the world (Duart & Mengual, 2015; Boelens et al., 2018; Dziuban, et al., 2018). Higher education institutions have incorporated media-rich technology platforms for the evaluation, as well as "personalized or adaptive courses and web

conferencing tools, capable of connecting students for synchronous distance activities, which are becoming common solutions for blended learning (b-learning, BL) designs" (Alexander et al., 2019, p. 12), as technology has the potential to increase access to education, improve learning experiences and reduce the cost of providing high-quality postsecondary education (Protopsaltis & Baum, 2019).

1.1. B-learning modality

B-learning modality constitutes the new normal in education, given its extensive adoption in higher education as an effect of the integration of technologies which enable new learning spaces, new teaching strategies and evaluation by professors. Different authors offer different definitions with an emphasis on either technology and how it is used in the face-to-face and online, or in strategies or pedagogical processes. Thus, Picciano et al. (2014) say that there is no consensus on a definition, however there is a common element, which according to Vaughan (2010, p. 23) is a "combination or integration of the face-to-face and non-face education based on Information and Communication Technologies (ICT)". Therefore, as Roza et al. (2019) conclude, the BL does not exclude one educational modality depending on the other, on the contrary, it proposes to use more and better the potential available in each modality for meaningful learning to occur through effective practices.

In terms of the effectiveness of the BL, there are good academic results in terms of lower abandonment rates (Lopez et al., 2013) and higher academic performance, with different degrees of statistical significance of the BL modality, compared to the traditional face-to-face (Carranza & Caldera, 2018; Essam, 2010; Halverson & Graham, 2019; Li et al., 2014; López et al., 2013; Rienties & Toetenel, 2016); although students' positive perception of BL courses does not always reflect an improvement in the learning outcomes (Sajid et al., 2016).

From the emergence of the BL revolution, new possibilities of interactivity are generated from the didactic perspective, in which "new ways of teaching and learning must be designed, studied and understood in their interactions with new means and learning contexts" (Bartolomé et al., 2018, p. 35). These new learning contexts and environments generate learning communities that facilitate and support learning while promoting interaction, collaboration, and building a sense of belonging among members, key elements of BL's success, which must be conducted in a dynamic, flexible and adaptive process.

1.2. Virtual classroom

Among the computer tools used in educational processes are virtual classrooms, whose greatest advantage in a face-to-face teaching model is that it frees the teacher and student from the temporal and spatial coincidence typical of traditional teaching by easing personal itineraries of process, exploratory and visualization capacity development (Barberà & Badia, 2005). Thus, the interaction occurs in a period of time and space where the student is able to work autonomously according to his/her own pace and learning times. This platform represents an attractive pedagogical tool that operates in e-learning modality as b-learning.

The use of ICT introduced changes in the educational system, for example, in distance learning (Cardona & Sánchez, 2010), given the emergence of Virtual Learning Environments (VLE) or Virtual Learning Spaces (VLS) supported by the Learning Management System (LMS) platform. The LMS is a type of software intended for the pedagogical service and designated to manage content and training activities of a specific organization (Arias & Venegas, 2013), which are distributed in virtual classrooms (a VLS) or traditional study classroom, whose difference is the communication channel that can be synchronous and/or asynchronous.

There may or may not be a time match in the virtual classroom, i.e., synchronous or asynchronous learning. Depending on the virtual context, synchrony translates into workshops, seminars or debates that require the coincidental presence in time, albeit distant, between the professor and the students, while in asynchronous they may not coincide in time and space (Rojas et al., 2014), allowing the student to become an active learner, and professors to move from a classic model to a facilitator of learning (Careaga & Fuentes, 2012).

The virtual classroom must be conceived as a social and educational tool due to its functions as a socializer, informative, formative, motivator, evaluator, communicative, organizer, analytical, innovative and researcher (Barberá & Badia, 2005), which give meaning to its inclusion in schools. It also facilitates the e-learning profile (development of distance learning), because it has generated that the b-learning model, typical of the undergraduate programs whose academic format combines face-to-face classes and activities in an e-learning way, incorporates it in the procedures by promoting a collaborative methodological design.

In this perspective, Garcia-Beltrán et al. (2016) state that the main advantages of using virtual environments for co-evaluation through objective testing lie in the individualized monitoring of the student´s learning, facilitating the establishment of a continuous evaluation in the learning process, the evaluation of knowledge and skills, the reduction of design, distribution and development time, and provides "a great flexibility and spatial temporal flexibility of the system, both for the configuration of exercises and its performance. In this sense it can be especially useful to allow the student to follow his or her own pace of learning" (2016, p. 4).

1.3. Objective testing in virtual spaces

Objective response tests in a virtual environment have the specificity of being implemented in a

simple way and having automatic correction and feedback. These can also be used to motivate and guide students in the training process and even as a means of self-assessment of each lesson or content of a subject (García-Beltrán et al., 2016). According to Pacheco et al. (2014) the use of the virtual classroom as a tool for the evaluation of content allows a follow-up to training processes and group learning through collaborative activities, in addition to ensuring teacher-student dialogue and promoting continuous monitoring of academic progress, which requires the student to prepare permanently.

In particular, the virtual classroom of Universidad Católica Silva Henríquez (UCSH) has the questionnaire activity (objective answer testing system) that allows the professor to design and propose exams with multiple choice questions, true/false, coincidence, short answer and numerical response. On the configuration of this activity, the professor can regulate the number of attempts allowed, set a time limit, formulate the test with sorted or selected questions from the question bank, have a summative and automatic grading for each attempt in the gradebook (except the essay-type questions) and determine when the correct results are presented, feedback and answers are displayed (UCSH, 2016). Immediate feedback from co-evaluations in virtual environments is critical in the learning process as a motivating and guiding element for the student (García-Beltrán et al., 2016).

1.4. Questions from autonomy

The concept of autonomy has a loose definition and is a typical example of the semantic diversity that terms have in the field of education. Autonomy is associated with the ability to make decisions according to one's own criteria and is opposed to "heteronomy", which means executing the decisions emanating from others (Sarramona, 2011). For Kamii and López (1982) autonomy is the ability to think with originality and critical sense from various points of view, where exchang-

es of information and negotiations with peers are important in the intellectual development. The autonomous student achieves a lasting, continuous learning and an attitude towards knowledge, from a collaborative, meaningful, synchronous and asynchronous teaching that requires a methodology to develop in the student the skills of self-training, association of the study with the formulation of questions and answers, search of information and promotion of the critical and creative mentality (Massié, 2010).

Autonomy must be understood as the ultimate end of education, which represents learning to learn, a person's own faculty who consciously directs, regulates and evaluates his/her training (Manrique, 2004). According to Castillo et al. (2006) learning to learn implies a reflective capacity on the means that generate learning, competence by which flexible and qualified strategies are developed to guarantee the mastery of adequacy. Learning strategies are a set of methods that favor the study, of which the following stand out:

- Pre-reading: it establishes the purpose of the reading. Specifically, it activates previous knowledge and develops predictions or questions.
- During the reading: are applied while interacting directly with the text, such as underlining an important phrase, creating notes or elaborating concepts.
- Post-reading: it occurs after the reading, the most typical are summaries, define main ideas and ask questions with their answers.

The formulation of a good question is an indicator of a positive learning process, because the ability to design good questions is an essential competence to develop critical thinking (López, 2011). Such skill is key in procedures to understand a text, its use supports the achievement of obtaining deeper levels of understanding, since the formulation of questions requires the reader

to be aware of the understanding processes, i.e., asking an adequate question involves having the ability to evaluate one's intellect and generate particular knowledge for the precise formulation of a question (Silvestri, 2006). For Morón (2015) the formulation of good questions is sometimes more important than the answers due to the cognitive process that occurs, which is suitable for acquiring the competence to learn to learn.

1.5. Evaluation from the constructivist theory

In recent years, the new culture of consumption, social demands and the need to be accountable to educational administration have brought about changes in the approach to learning assessment (Parra, 2008). This has made evaluation a phenomenon that causes anxiety in students and academic conflicts (Bausela, 2005). However, Alfaro (2000) notes that in a context where students are measured from a constructivist approach, evaluation is a fundamental, complex and relevant tool in the teaching work. Under these terms, the evaluation must be permanent in the teaching process, in addition to promoting the possibility of generating new learning in education, i.e., the evaluation is not only a mean of knowledge assessment, but also a form of teaching (Parra, 2008).

However, evaluation as an educational element has a political characteristic, so it can be addressed from different perspectives such as the conservative (the professor has absolute power) or progressive (power is distributed between the professor and the student) according to Quesada et al. (2017). In the field of didactics, it is required to encourage the participation of students in their evaluation through self-assessment and co-evaluation, so that they develop their autonomy and ability to learn to learn (González et al. 2007) by collaborating with the professor in the evaluation task.

In this sense, the co-assessment for teachers in training is an opportunity to develop the ability to create reliable assessment tools within

their acquired competences as observed in the pedagogical standard 6: "[the teacher] knows how to apply evaluation methods to observe the student´s progress and knows how to use the results to give a feedback of the learning and the pedagogical practice" (Ministerio de Educación de Chile, 2012, p. 43). The co-evaluation is defined as the moment in which a student measures the achievement of the learnings of his/her peers (Parra, 2008) and is part of the formative evaluation in the teaching-learning process, as it regulates and improves the learning of the student (González et al., 2007). This process has three important features (Alvares, 2008):

- Allows the student to evaluate the knowledge fact that is traditionally attributed to the teacher.
- Develops skills for the evaluation and design process of measuring instruments.
- The student self-evaluates his/her knowledge.

One of the techniques that have had the greatest dissemination in the evaluative pedagogical field is the *One Minute Paper*, which means questions that students must write at the end of each class and once the professor has reviewed the answer the professor will present the results obtained focusing on errors or deficiencies. This technique can incorporate the identification of key concepts, formulation of examples, drafting of ideas and opinions on the subject addressed, etc. However, the time required to review these questionnaires is excessive, so it is presented as one of its drawbacks, hence random sampling or the use of new technologies are recommended (Vivel-Bua et al., 2015).

2. Methodology

2.1. Participants

The study participants are students of a sample of 6 groups of the subject Educational Research

of the first and second semester, which is in the penultimate year of the initial teacher training, prior to the bachelor's degree seminar in education and professional practice of the General Pedagogical Training Program, common to all careers of initial teacher training of the UCSH.

2.2. Question and research hypotheses

The research question is: is there a relationship between the use of the virtual classroom through the assessment in the construction and application of a co-assessment instrument in a test format designed by the students and the performance in knowledge tests related to key concepts of educational research?

Based on the theoretical reference, the hypothesis is that there is a positive and statistically significant association between the score of the questions created by the students, a test that groups these developed in the virtual classroom and the performance in a knowledge test.

The approach adopted is quantitative with a non-experimental design and a correlated descriptive scope. Thus, through quantitative indicators added to the use of the virtual classroom (the assessment in the elaboration of questions and a related test resolution), it was sought to relate such intensity of activity to the level of performance of students in the knowledge test items related to key research concepts. The delimited variables are the use of virtual classroom (V1) and the performance knowledge tests (V2).

2.3. Description of the variables

Variable 1 (V1) use of the virtual classroom: it corresponds to the assessment of the use of the virtual classroom in the construction and application of a co-assessment instrument in the test format, designed by students of the subject Educational Research. The values of V1 are obtained from the average between the subvariable valuation of the questionnaire elaboration (V1.1) and the subvariable qualification of the online questionnaire response (V1.2).

Subvariable V1.1 refers to the objective assessment of the quality of multiple selection questions generated by the students, with the justification of the correct alternative and qualified by an expert on a scale from 1 to 7. Subvariable V1.2 is the grade obtained by the sample of students in each online questionnaire formulated with a selection of questions about the highest-rated total of subvariable V1.1.

The V1.2 subvariable is obtained by averaging the grades (scale from 1 to 7 with 60% requirement) obtained by the students in solving online questionnaires for each period. Each questionnaire has the possibility to use two attempts, where the students will test and evaluate their knowledge from the grade obtained in the first attempt, in addition to receiving feedback with the correct answers. These questionnaires include selected questions from the V1.1 subvariable among those whose achievement level is the highest. The question and answer behavior of the questionnaires is random so that the student does not memorize the alternatives, but instead remember the correct question and answer in order to promote the learning of key concepts from self-assessment and co-assessment.

Variable 2 (V2) knowledge domain: it corresponds to the performance results in knowledge tests in the grade (scale from 1 to 7) obtained by the students in the multiple selection item belonging to the first test of knowledge on basic concepts of the subject Educational Research of the semester with a requirement of 60% over a total of 16 questions.

2.4. Description of the variables

The V1 variable corresponds to the average between two subvariables named V1.1 and V1.2. The variable V1.1 (questionnaire processing assessment) is an objective assessment of the quality of multiple selection questions generated by the students, with the justification of the correct alternative and qualified by an expert. The

variable V1.2 (online questionnaire response grade) is the qualification obtained by the sample of students in each online questionnaire formulated with a selection of questions on the total with the highest assessment of the variable V1.1.

The V1.1 variable was obtained by averaging the grades (scale from 1 to 7) obtained by the students in the stages of developing questions related to understanding the text "Research Methodology" (Hernández et al., 2012) and "Educational Research" (McMillan & Schumacher, 2005).

The V1.2 variable is obtained by averaging the ratings (scale from 1 to 7 with 60% of requirement) obtained by students when solving online questionnaires for each period. Each questionnaire has the possibility to use two attempts, where the students will test and evaluate their knowledge from the grade obtained in the first attempt, in addition to receiving feedback with the correct answers. These questionnaires include selected questions from the V1.1 variable among those whose achievement level is the highest. The question and answer behavior of the questionnaires is random so that the student does not memorize the alternatives, rather remember the correct question and answer in order to promote the learning of key concepts from self-assessment and co-assessment. The variable V2 corresponds to the qualification (scale from 1 to 7) obtained by students in the multiple selection item belonging to the first test

of knowledge on basic concepts of Educational Research of the semester with a requirement of 60% on a total of 16 questions.

2.5. Instruments

The objective assessment in the construction of questions on compulsory literature (V1.1) lies in the criterion of an expert, who bases the analysis on the rules of construction of Parra´s multiple selection (2008), given the intention of keeping distance and ensuring objectivity in the process, as well as ensuring the correct content of the questions. To measure learning by using online questionnaires from the co-assessment content (V1.2) a scale from 1 to 7 is used with a requirement of 60% on the total of questions. The questionnaires were built with selected questions of the V1.1 variable among those with an achievement value of 7.0.

The virtual tool allows: Randomly sort both test questions on each attempt and the alternatives of each question and configure the display of the questions, present the results and the feedback instantly, limit the resolution time of the questions and solve or answer from anywhere in the world.

3. Results

The following describes in a single aggregate table a summary of the results obtained in the different categories:

Table 1. Statistical data

Statistics V1.1 and V1.2 2016(2)					
V1.1			V1.2		
N	Valid	47	N	Valid	47
	Lost	0		Lost	0
Mean		3,2			4,3
Median		2,7			5,2
Mode		1,8			1
Standard deviation		1,96			2,11
Variance		3,8			4,46
C.V.		61,25%			49,06%

Statistics V1.1 and V1.2 2017(1A)					
V1.1			**V1.2**		
N	Valid	115	N	Valid	115
	Lost	0		Lost	0
Mean		3,8			4,4
Median		4			5,3
Mode		1			1
Standar deviation		2,1			2,1
Variance		4,4			4,4
C.V		55,26%			47,72%
Statistics V1.1 and V1.2 2017(1B)					
V1.1			**V1.2**		
N	Valid	47	N	Valid	47
	Lost	0		Lost	0
Mean		3,9			4,9
Median		4			5,9
Mode		1			1
Standard deviation		2,23			2,18
Variance		4,96			4,76
C.V.		57,17%			44,49%
Statistics V1 and V2 second semester 2016					
V1			**V2**		
N	Valid	47	N	Valid	43
	Lost	0		Lost	4
Mean		3,75			4,2
Median		3,8			4,4
Mode		1,4			4,4
Standard deviation		1,72			1,65
Variance		2,99			2,73
C.V.		45,86%			39,3%
Statistics V1 and V2 2017(1A)					
V1			**V2**		
N	Valid	115	N	Valid	95
	Lost	0		Lost	20
Mean		4,15			3,86
Median		4,6			3,8
Mode		1			3,2
Standard deviation		1,78			1,07
Variance		3,16			1,14
C.V.		42,89%			27,72%

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Statistics V1 and V2 2017 (1B)					
V1			V2		
N	Valid	114	N	Valid	91
	Lost	1		Lost	24
Mean		4,37			4,07
Median		4,85			3,8
Mode		1			2,9
Standard deviation		1,99			1,14
Variance		3,97			1,29
C.V.		45,53%			28%

Keys: V1: Use of the virtual classroom; V2: Knowledge domain; V1.1: Quality of the questions; V1.2: Online questionnaire qualification; 2016(2): students of the second semester of2016; 2017 (1A): Students of the first semester of 2017, Group A, 2017 (1B): Group B

3.1. Correlational analysis

The relationship between the V1 variables, V1.1, V1.2 and V2, as V1 is the result of averaging V1.1 and V1.2 does not apply to seek a relationship between them and a correlation between V1.1 and V1.2 has no relevance to the problem, so the unwanted relationships are V1.1-V2, V1.2-V2 and V1-V2.

Pearson's correlation coefficient was used to measure the degree of relationship between variables, because these variables are continuous quantitative and linear. In addition, to prove that they are actually related and are not at random a statistical hypothesis test was applied to find the significance of that coefficient, i.e., to wonder about the probability that such a coefficient derives from a population whose value is zero. In this regard, there are two possible hypotheses:

$$H_1 : x_{ry} = 0 \rightarrow$$ The correlation coefficient obtained comes from a population with zero correlation (p-0).

$$H_0 : x_{ry} = 0 \rightarrow$$ The correlation coefficient obtained comes from a population whose correlation is higher than zero (p>0) and is expected to prove that are positively related.

3.2. Correlation V1.1: Quality of questions; V2: Knowledge domain

Table 2. Correlation V1.1-V2

Correlation V1.1-V2 second semester 2016		
Correlation		
Second semester 2016		V2
V1.1	Pearson Coef.	0,185
	T test	0,235

Correlation V1.1-V2 first semester 2017 (A)		
Correlation		
First semester 2017 A		V2
V1.1	Pearson Coef.	0,278
	T test	0,006

Correlation V1.1-V2 First semester 2017 (B)		
Correlation		
First semester 2017 B		V2
V1.1	Pearson Coef.	-0,002
	T test	0,985

3.3. Correlation V1.1: Quality of questions; V2: Knowledge domain

Table 2. Correlation V1.1-V2

Correlation V1.2-V2 second semester 2016		
Correlation		
Second semester 2016		V2
V1.2	Pearson Coef.	0,457
	T Test	0,002

Correlation V1.2-V2 first semester 2017 (A)		
Correlation		
First semester 2017 A		V2
V1.2	Pearson Coef.	0,054
	T Test	0,601

Correlation V1.2-V2 first semester 2017 (B)		
Correlation		
First semester 2017 B		V2
V1.1	Pearson Coef.	-0,046
	T Test	0,659

For the variables V1.2-V2 second semester 2016 the correlation is 0.457, i.e., moderate positive. In relation to the significance, the null hypothesis is rejected with 95% confidence since the result of the t-test is less than 0.05. Therefore, V1.2 is moderately and positively related to V2.

For variables V1.2-V2 first semester 2017 (A), the correlation is 0.054 very low positive. In relation to the significance, the null hypothesis is not rejected with 95% confidence, since the result of the t-test is higher than 0.05. Therefore, statistical data are not sufficient to ensure a relationship.

As for the variables V1.2-V2 first semester 2017 (B) the correlation is -0.046 very low negative. With respect to significance, the null hypothesis is not rejected with 95% confidence, since the result of the t-test is higher than 0.05. Therefore, statistical data are not sufficient to ensure a relationship between these variables.

3.4. Correlation V1 Use of virtual classroom; V2 Knowledge domain

Table 4. Correlation V1-V2

Correlation V1-V2 second semester 2016		
Correlation		
Second semester 2016		V2
V1	Pearson Coef.	0,377
	T Tes	0,013
Correlation V1-V2 second semester (A)		
Correlation		
First semester 2017 A		V2
V1	Pearson Coef.	0,222
	T Tes	0,03
Correlation V1-V2 first semester 2017 (B)		
Correlation		
First semester 2017 B		V2
V1	Pearson Coef.	0,022
	T Tes	0,839

In short, in the first two cases there is a positive, moderate or low correlation between the use of the virtual classroom (V1) and the knowledge domain (V2), which is statistically significant with 95% of confidence, confirming the research hypothesis. On the other hand, this situation does not occur in the third case.

4. Conclusions

B-learning is an effective modality in relation to the student learning, as well as the development of work skills and self-learning. The professor can extend the work in the classroom and monitor the work of the students by facilitating his/her role in the feedback through automation and instant delivery of the results.

Regarding the experiences in university teaching that favor the curriculum integration of computer resources and that innovate the evaluative strategies starred by students in the construction of their learnings, remain being a pending and scarce task in professors (Quesada et al., 2017), even more so if they are aimed at future educators in the context of their research training. Thus, the strategy of developing learning evaluative skills with an instrument as well as the elaboration of questions were statistically associated, only in one case out of the three studied, with knowledge domain. However, Silvestri (2006), Macías and Maturano (2010), among others reveal that the creation of good questions about reading has a positive effect on learning.

With regard to the research hypothesis of the work on the existence of association between the variable use of the virtual classroom and knowledge domain on key concepts of educational research, it can be said that in most cases this association occurred, but it is low.

The implications and applications of the study results suggest the innovation of the teaching practice in higher education. Particularly, this becomes much more efficient if it is integrated into the teacher training, as relevant teach-

ing professional development skills converge. In addition, the ease of recording almost the entire process in the Virtual Classroom allows to show the effectiveness of the experience.

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