Development of an online platform based on free software to generate and share knowledge among psychology students

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RESUMEN: El objetivo principal de este estudio fue desarrollar una plataforma de aprendizaje asistido por ordenador para potenciar el trabajo colaborativo entre los estudiantes de psicología, así como evaluar su viabilidad y la mejora en el aprendizaje. 45 estudiantes valoraron la

ISBN: 978-84-695-4073-2

viabilidad de esta plataforma basada en ELGG a través de un cuestionario en línea. En general, los estudiantes se mostraron satisfechos con la plataforma, apoyando así su viabilidad y destacando tanto sus fortalezas como debilidades. Los resultados también mostraron una mejora en el aprendizaje. En conclusión, esta prueba piloto muestra el potencial de una plataforma en línea para mejorar los conocimientos y competencias en el área de la psicología.

ABSTRACT: The main aim of this study was to develop a computer-supported collaborative learning (CSCL) platform for collaborative work among psychology students, as well as to assess its feasibility and students' improvement in learning. A group of teachers developed this platform based on an Elgg social network, and 45 students assessed its feasibility through an online questionnaire. In general terms, responses to the questionnaire showed that students were satisfied with the platform, thus supporting its feasibility, and highlighting both its strengths and weaknesses. Results also showed an improvement in learning. Altogether, this pilot test shows the potential of an online platform to improve knowledge and competencies in the area of psychology.

PALABRAS CLAVE: aprendizaje colaborativo asistido por ordenador, rendimiento académico, trabajo colaborativo.

KEYWORDS: Computer-supported collaborative learning; Academic Performance; Collaborative Work.

ÁREA DE CONOCIMIENTO: Ciencias Experimentales y de la Salud

ISBN: 978-84-695-4073-2

LA UNIVERSIDAD:
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ÁMBITO TEMÁTICO DEL CONGRESO: Innovación en el enseñamiento superior

MODALIDAD DE PRESENTACIÓN: Comunicación oral

SECRETARIA TÉCNICA
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ISBN: 978-84-695-4073-2

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Introduction

Collaborative work is considered important and essential to improve learning (McConnell, 2000) and has been given a high importance in educational models during recent decades. Indeed, a number of positive outcomes are associated with collaborative[1] processes, such as reinforced learning, improved social relationships, development of group skills, and making students more active at the cognitive level (see for example, Dewiyanti, Brand-Gruwel, Jochems & Broers, 2007; Jordana & Sánchez, 2010).

According to cooperation theory (McConnell, 2000), collaborative work is based on mutual reciprocity. Cooperation in learning involves working together on a task in a way that promotes individual learning through processes of collaboration in groups. Because of the existence of cognitive diversity (Järvela, Häkkinen, Arvaya & Leinonen, 2004 in Wang, 2009) in collaborative work, participants have the possibility to share expertise from different perspectives, supplement one another, and make reciprocal contributions to completion of the task. Nevertheless, working collaboratively also demands coordination, taking on responsibilities and perseverance throughout the task (Wang, 2009). It also provides validation of individual ideas and ways of thinking through conversation (verbalizing), multiple perspectives (cognitive restructuring) and argument (Steeples & Mayes, 1998).

Besides the advantages cited above, collaborative work is also essential in the higher education arena as it is required in today's knowledge society (Wang, 2009; Barron, 2000) and workplace. Students are expected to develop workplace skills including collaborative problem-solving skills (Tsai, 2010). For this reason, educational curricula should include competencies related to collaborative work (e.g. efficient collaborative learning, team work or effective

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ISBN: 978-84-695-4073-2

communication) beyond the acquisition of information and/or competencies in a particular area of knowledge. Along these lines, teachers must continually search for ways to create interactive learning environments in order to facilitate collaboration and team-work skills (see for example Jonassen, Peck, & Wilson 1999).

A considerable number of authors claim that technology facilitates collaborative work (i.e. Collis & Moonen, 2001; Garrison, Anderson & Archer, 2001; Brindley, Walti & Blaschke, 2009 among others), since it requires active participation from the students (Paulsen, 1992). Of particular relevance are social web tools. These are a specific type of software where content can be generated collaboratively, edited and published by users, and control of content is subjected to open, democratic processes (Kamel Boulos & Wheeler, 2007). Hence, social software facilitates interaction, the building of community, personal learning, a reduction in communication errors, collaborative work on projects or problems, and support for complex group functions (Kesim & Agaoglu, 2007).

Accordingly, social web tools do appear to provide a platform that can be used in education to promote more active engagement. Learning environments based on social software are called computer-supported collaborative learning (CSCL) environments. CSCL presents important opportunities for fostering learning over time as well as in geographically distributed ways (Lajoie & Azevedo 2006, Steeples & Mayes, 1998). Furthermore, it facilitates the acquisition of knowledge, skills and attitudes (Dillenbourg, 1999; Kaye,1992; Koschman,1996; Dewiyanti et al., 2007) by students who became active co-producers rather than passive consumers of content.

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ISBN: 978-84-695-4073-2

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The number of CSCL environments has increased dramatically in the past decade due to the advantages they offer. Nevertheless, there are few CSCL platform designed specifically for Psychology students, directed to help them to acquire and develop the necessary knowledge and competencies for their future professional practice. Therefore, the main aims of this study are: (1) to develop a CSCL platform to improve the learning of competences and knowledge through collaborative work among psychology students; and 2) to assess the platform's feasibility and students' improvement in learning. Two different studies were carried out according to these objectives. In the first study one the CSCL platform was developed, and in the second it was tested.

Study 1. Online platform development

1. Procedure

At the initial stage of the study, the research group assessed several tools (i.e. different wikis and social networks) in order to find the best one for the purposes of the project. Among these, an Elgg platform (version 1.7.1) was selected and implemented. Elgg is an open source social networking engine (http://elgg.org/) with multiple possibilities for academic purposes. This platform was selected because it presented some important advantages compared to the other alternatives available: 1) several groups of interest can be created inside of the same space (for this study just one group was used, but this characteristic was considered important for the potential future uses of the platform); 2) inside of the different groups the content can be organized hierarchically; 3) multiple pluggins are available (e.g., live chat, video); 4) it can be easily customized; 5) it is an open source tool; and 6) data can be stored on a secure server.

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ISBN: 978-84-695-4073-2

Once we had decided to use this platform, the research group initiated a discussion process to decide which elements and functionalities should be included in the tool.

The research team, who worked closely with an expert technician in using Elgg, supervised all of the design process and several meetings with the whole group were held to keep abreast of the platform's development.

2. Design

The Elgg platform was customized and adapted based on the list of functionalities and elements created by the research team. In the initial page of the online platform, a brief explanation of the project as well as a video-tutorial outlining the essential general norms and rules concerning the functioning of the platform was available. On this page, a login and a password were also required to access the online platform.

The structure of the CSCL platform includes several thematic virtual groups, all with the same structure and functionalities. Inside each group different pages can be created and inside of every page sub-pages can also be created. Therefore, a hierarchically organization can be created to organize knowledge inside of every group. For the purposes of this study, we will focus on the virtual group called "Assessment in Developmental Psychology". This is the group that was used to test the feasibility of the CSCL platform and from which the results presented in the next section are based. Figure 1 presents a general view of this group.

Three different pages were created inside this group, one for each of the three different areas of child development (Adaptive, Cognitive and Motoric areas). Moreover, inside of every page, sub-pages were created for every domain in each area. Additionally, students could make commentaries and suggest new items to include in each domain based on the content they

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studied in. All of these processes were supervised by the teachers. They were responsible for solving students' queries and for providing them with support. Likewise, they checked that students' behaviour was in line with the established CSCL platform norms. These norms included basically that: 1) they have to been respectful in their communication, 2) they were not allowed to delete any page or comment posted by their colleagues, and 3) the content and commentaries have to be adequate for the purposes of the task.

Figure 1. Screenshot of the general structure of the group "Developmental Psychology"

3. Context

This CSCL platform was designed to be used at the *Universitat Oberta de Catalunya* (UOC) (www.uoc.edu). Students at UOC access a virtual classroom for their subjects and they

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can choose from two types of evaluation systems. The first system, which is the most common and recommended, is the continuous evaluation system in which students are required to do several tasks during the course. If they decide to not follow the continuous evaluation system, they have the opportunity to pass the subject trough a final exam. In both systems, marks are assigned on the basis of the following qualitative ranking: A, B, C+, C-, D or N. Obtaining the first three grades meant that the activity (or final exam) was passed, the following two that the activity was not passed, and the last one that the student did not present (or participate) the activity.

Study 2. Assessment of the online platform

1. Procedure and participants

This study was conducted during the 2010-2011 course "Developmental Psychology" at UOC. Students could decide if they wanted to undergo continuous evaluation, that implies participating in the CSCL platform, or take a final exam in order to be accredited for the subject. 85 students from one of the virtual classrooms in "Developmental Psychology" were invited to participate in the study. Of these, 47 students chose continuous evaluation and 45 completed the online questionnaire to assess platform's feasibility and satisfaction. Most of them were female (77.55%; n= 35) and the mean age was 35.69 years old (SD=10.48; Range= 18-81 years).

2.Task

The task was conducted under the framework of the second learning unit in "Developmental Psychology", which looks at the most important biological, motor and cognitive developments in children. The main aim of this academic task was to improve learning in this area through shared knowledge among peers.

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The students' task was to collaboratively create a screening instrument to identify the most important changes in child development. For this purpose, the Battelle Development Inventory (Newborg, Stock & Wnek, 1984) was proposed as a basis and as a model for this activity. This inventory includes 5 areas related to child development: 1) cognitive, 2) adaptive (self-help), 3) motor, 4) communication, and 5) personal-social development. Within this context, the task was focused on the Adaptive, Cognitive and Motor domains.

A brief description of these domains was provided to students as well as references where they could find more information. Once the domains were outlined, they were asked to collaboratively design items aimed at assessing each of the three different domains (i.e. cognitive, adaptive and motor). They had to post these items on the online platform. The criteria were that these items should be useful in assessing the changes related to each of the three domains of child development. Moreover, they were also required to criticise and comment on the items proposed by their workmates and to suggest improvements. Students had a limited time of three weeks to perform this task.

3. Measures

3.1. Feasibility

To assess the feasibility of the online platform, a questionnaire was designed based on the one proposed by Alva (2005). Some of the original items were not included in order to shorten the length of the questionnaire and some other items were reformulated to improve their understanding and to fit better with the purposes of our CSCL platform. Besides these changes, the dimensions of the questionnaire were the same as in the original one: 1) learning (capacity of participants to quickly achieve an adequate level of knowledge of the platform functioning; 11

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items); 2) operability (use and navigation facility; 9 items); 3) communication (utility of the platform's communication tools; 2 items); 4) content (quality of the content available and created in the platform; 7 items); and 5) satisfaction (satisfaction with the platform; 6 items). Each of these items was ranked from totally disagree to totally agree in a five point Likert -scale. In table 1 the complete list of items used in the study is presented. This questionnaire was available online and responses were anonymous. All the scales have an adequate reliability as their Cronbach's alpha coefficients were higher than .70 (Nunnally, 1978). More specifically, alphas coefficients were .92 for learning, .91 for operability, .86 for content and .92 for satisfaction.

Two open questions were also included to ask students about the strengths and weaknesses of the platform. In these questions, they were asked to outline a maximum of five strengths and weaknesses.

3.2. Students improvement in learning

We were also interested in assessing student's improvement in learning. This was approached from the point of view of both the teacher's evaluation of student's learning and the students' self-evaluation.

The teacher assigned a qualitative mark (A, B, C+, C-, D or N; see context in study one for further details) to each student based on the teacher's judgement of the student's acquisition of competences and knowledge related to the activity. Both knowledge and competences were outlined at the beginning of the program, which was available to students in the virtual classroom. These criteria were compared with the criteria of a control group of students from the previous semester. The teaching activity was similar in both groups, the main difference being the use of the CSCL platform in the second group. The teacher was the same for both groups.

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For students' self-evaluation, two items were used in which they were asked to rate (using a 5-point Likert scale) the extent to which they thought the activity was useful in learning the material and competences related to the subject. More specifically, the contribution to knowledge acquisition was measured through one item and the contribution to competences through a 4-item scale (Cronbach's alpha for this scale was .88). These items are presented in table 1.

Table 1. List of items and variables

Learning
1. Have you been able to complete the task without help?
2. Is it necessary to learn new things before being able to begin using the platform?
3. Is it easy to understand the changes in the platform as a result of its use?
4. Your knowledge has proven to be sufficient for using the platform?
5. Did the help available (e.g. the introductory vídeo and the information made available by the teacher in the online classroom) proved useful to perform the tasks?
6. Do you think the help adequately explained how to carry out the task?
7. The amount of help available on the platform was sufficient?
8. Does the platform offer documentation on how to make use of it?
9. Did the help documentation (e.g. the introductory video and the information made available by the teacher in the online classroom) help you to complete task?
10. Is the help documentation (e.g. the introductory vídeo and the information made available by the teacher in the online classroom) sufficient and informative?
11. Is the help documentation (e.g. the introductory video and the information made available by the teacher in the online classroom) concrete and concise?
Operability
12. Is it easy to post information on the platform?
13. Is it easy at first sight to see the options on the platform?
14. Is it easy to remember how to use the platform?

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15. Were the links and tabs clear and easy to see?
16. When you are inside the platform, do you know where you are at each moment as you move through it?
17. Do you find the controls inside the platform easy to use?
18. Are the error messages easy to understand?
19. Can you see quickly when you have made a mistake?
20. Is it easy to upload audiovisual documents and/or resources to the platform?

Communication

21. Has the platform enabled you to work and communicate with other users when desired?
22. Did you find the platform's internal email useful?

Content

23. Is the name of the user and date a contribution clearly indicated?
24. Is the content being posted correct and up-to-date?
25. Are he different themes outlined in the platform related of the content of the course?
26. Are the proposed activities related to the skills to be developed in the course?
27. Is the content generated useful for your studies?
28. Is content developed for specific areas?
29. Is the content to a high standard?

Satisfaction

30. Are you comfortable working on the platform?
31. Is the general appearance of the platform pleasing to the eye?
32. Is the general appearance of the platform simple?
33. Have you felt satisfied with the way to navigate around the platform?
34. Is it easy to move from one place to another within the platform?
35. Is the information on the platform adequately organized?

Improvement in Knowledge

36. Has this activity proven useful in improving your knowledge of the evaluation instruments?

Improvement in Competencies

37. Has using the platform proven useful for acquiring the competency "analysis and

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synthesis of the information"?
38. Has using the platform proven useful for acquiring the competency "making critical and reasoned judgments and valuations"?
39. Has using the platform proven useful for acquiring the competency "communicating effectively through a virtual channel"?
40. Has using the platform proven useful for acquiring the competency "working in a team in a committed way with a group working online"?

4. Analyses

Two different sets of analysis were conducted to assess the platform's feasibility. On the one hand, several descriptive analyses and graphical representation were developed based on the responses obtained with the questionnaire. On the other hand, a content analysis was carried out to examine the responses to the open questions regarding the strengths and weaknesses of the CSCL platform. The coding process was interactive in order to increase its validity (Boyatzis, 1998) (i.e., two researchers met up to decide and reach agreement on a coding framework based on the patterns of the answers obtained). The coding process was crosschecked, and any differences in the codes proposed individually by the two researchers were discussed and agreed upon. As a check for validity, a reliability indicator was computed (Cohen's Kappa) once both researchers had coded the answers. The obtained indexes were acceptable, given that the ratio was 0.90% for strengths and 0.81% for weaknesses, exceeding the 0.80% recommended (Lombard, Snyder-Duch & Bracken, 2002).

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Two analyses were conducted to examine students' improvement in learning according to the collected measures. Firstly, marks awarded to two different groups of students in two consecutive semesters (one without using the platform and the other using it) were compared. To explore the differences, pair-comparisons by means of Z test were performed to compare the percentages of the A, B, C+ and C- grades awarded. Proportions of D marks were not compared as no student obtained this mark in the semesters assessed. Secondly, descriptive statistics and graphical representations were computed to examine students' self-evaluation.

Results

Platform's Feasibility

As can be seen in Table 2, the results showed that the platform's feasibility was positively assessed as all values were above 3.00 (in a five-point Likert scale).

Table 2. Descriptive statistics of platform's feasibility and students' self-evaluation of learning

	Mean	SD	Maximum	Minimum
Learning	3.84	.77	5.00	1.64
Operability	3.61	.77	4.89	1.44
Communication	3.04	.87	5.00	1.50
Content	4.03	.69	5.00	2.14
Satisfaction	3.65	.84	5.00	1.83
Knowledge	3.80	1.16	5.00	1.00
Competences	3.77	.93	5.00	1.25

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ISBN: 978-84-695-4073-2

The mean scores for the "Learning" and "Operability" scales were about 4.00 suggesting that the platform was perceived to be conducive to learning. Also, users quickly achieved the adequate level of knowledge required in order to use the platform, and they were quite satisfied with the level of usability and navigation (operability). Mean scores for the "Communication" scale were 3.04, therefore we can assume that the utility of the communication tools available were considered neither satisfactory nor unsatisfactory. Mean scores for the "Content" scale were 4.03, revealing that both the available content and the content created within the CSCL platform were more than adequate for users. Finally, the mean for the "Satisfaction" scale was 3.65. This value shows subjects' satisfaction with the platform's physical appearance and usability. Figure 2 represents the distribution of responses for these scales. Most of the students gave a response positioned in the right tail with regards to learning, operability, content and satisfaction. Indeed, all these variables presented a significant continual increase from values 2 to 5. For communication, figure 1 presents a normal distribution of responses for this scale, as most of the participants were positioned around a value of 3.

Regarding strengths and weaknesses, ten codes based on content analysis were identified to classify the strengths of the CSCL platform, and eleven for the weaknesses. A total of 361 comments were received, 189 referred to strengths and 172 to weaknesses. The most frequent comments concerning strengths were classified in the following codes: "Platform design" (14.81%; N=28), "Platform operation" (19.58%; N=37) and "Group interaction" (21.69%; N=41). See table 3 for the frequencies of the other comments.

Figure 2. Frequencies of Learning, Operability, Communication, Content and Satisfaction

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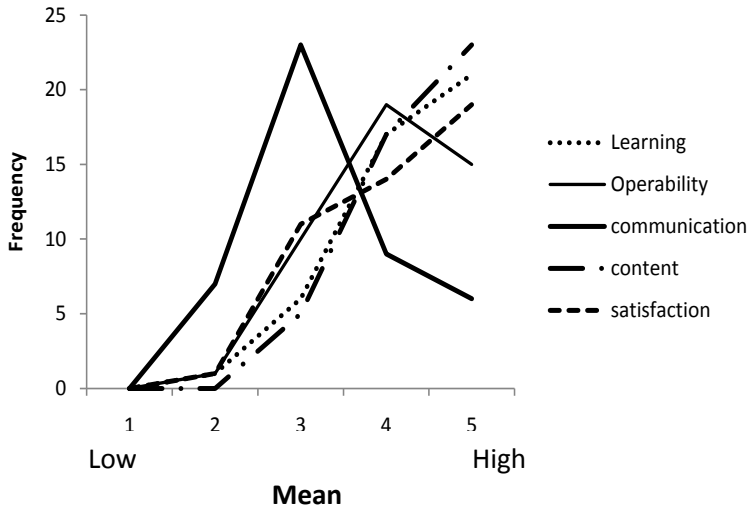

The code "*Platform design*" contained opinions related to the design and organization of the CSCL platform. These opinions gave a positive assessment of the hierarchical structure and the organization of content (e.g. "simple" or "pleasant"). The code "*Tools and functionalities of the platform"* referred to all the resources that the platform offers to users. In general, the capacity to upload additional information or resources and the possibility to organize or personalize the structure were positively assessed (e.g. "possibility to create specific web pages, upload files and records, allows an organization and clarity that it is not possible in other tools for group work"). The code "*Platform Operation"* reflected individuals' perception about how the CSCL platform works. Several positive points were highlighted such as: "easy to use" and "easy in its operation". The "Contents" code refers to the information or resources that were published on the CSCL platform. Users positively assessed the possibility to access additional information as well as the quality and quantity of this information (e.g. "to be able to access

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sources and information related to the subject"). The "*Role of teachers"* code referred to work and support given by teachers. The support, assistance and additional explanations that teachers gave were also assessed positively (e.g. "a lot of support from the teacher when there were doubts about how the platform worked"). The *"Group Interaction"* code reflected any reference to interaction among participants, such as teamwork, communication, social interactions, etc. Subjects positively assessed the possibility of being able to relate with classmates through this new system (for example, "connexion with classmates", "inter-communication" and "cooperation"). The "*Shared knowledge and resources"* code showed the CSCL platform's capacity to integrate, exchange and share knowledge and information among users. This was highlighted in quotes from participants such as: "Share material among ourselves" and "share your knowledge with others". The *"Individual knowledge"* code showed how the platform contributed to individuals' development (i.e. learning or knowledge). Participants mentioned "learning new concepts" and "being more informed about innovations in content, authors, etc." The *"Improvement in users' skills"* code reflected how the platform helped subjects to improve their skills, such as "synthesis of ideas" or "learning to work in a team". Finally, the "innovation topic" code highlighted the original and innovative character of the platform in the university context. Subjects pointed to aspects such as: "great possibilities as a thematic social network" or "innovative".

As regards the weaknesses of the platform, 11 codes were identified through the content analysis of the students' responses. Five of those 11 codes (design, tools and functionalities, operation, contents and the role of teachers) were also identified in the content analysis for strengths (i.e. some codes were common for weaknesses and strengths as they include positive

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and negative opinions from the students concerning the same topic). However, the number of opinions included in three of these codes (i.e. design, operation and contents) was higher for strengths than for weakness, suggesting that these were mainly assessed positively. The rest of the common codes (tools and functionalities, and role of teachers) had a higher frequency for weakness, suggesting that these aspects need special attention in order to be improved for better functioning of the CSCL platform.

The more frequent opinions for weaknesses were classified in the following codes: "Platform design" (13.95%; N=24), "Tools and functionalities of the platform" (22.67%; N=39), "Platform contents" (12.79%; N=22), and "Help and errors" (12.21%; N=21). See table 3 for further details about the frequencies of the other codes. The "*Platform design*" code was assessed negatively with quotes such as "confusing" or "non-intuitive". Regarding the code "*tools and functionalities of the platform"*, ,subjects mainly pointed out three tools/functionalities that should be improved or included: (1) the tool used to edit text needs to be improved; (2) a tool that allows users to quickly see the most recent activity should be included; and (3) ability to modify published content should be allowed. The "Platform operation" code included opinions concerning the need to have a better organized structure of the CSCL platform, which would allow users to navigate more easily among the different webpages in the platform (for example, "a better organization to surf in web"; "and "bad for surfing web pages, maybe there should be a space for new posts"). The *"Platform contents*" code presented subjects' concerns about certain aspects of the contents such as reliability, relevancy, quantity and format. It was mainly pointed out that teachers should intervene to a greater extent in order to guarantee the reliability and relevancy of published contents. These comments are strongly related with those included in the

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code "*role of teachers*" in which students directly expressed that teachers' have done little on the CSCL platform to supervise content (for example: "If content is posted by students, without any supervision, this platform cannot be completely reliable"). The *"Help and errors"* code referred to the assessment of help systems on the platform. In general, a greater development of this system was demanded. Participants pointed out that the existing help was insufficient in learning how the platform functioned (i.e. "there is some help information missing regarding how the platform works"). The *"Platform compatibility"* code reflected that the platform's lack compatibility with external software, especially with Microsoft Word (for example, "it has been impossible to write messages in some word processors, such as, Microsoft word, and to copy them onto the platform without problems"). The "*Operation norms in platform*" code highlighted the need to establish some behaviour norms for users of the platform; e.g., the length of their contributions or how to share their knowledge (for example, "Lack of behavior criteria/norms for users"). *"The access to the platform"* was not perceived to be an easy process. Indeed, subjects pointed out that it was problematic and slow (for example, "difficulty in accessing the platform"). "*Task design"* was criticized by several users, especially with regards to the demands on time (for example, "It takes a lot of time"). The *"Users' resources"* code referred to the quantity or type of resources that users should have in order to be able to participate in the CSCL platform. The issue of time was highlighted, and this is linked to task design and Internet connection (for example, "Dependency of internet connection"; "necessity of time to learn how to use it").

Table 3. Descriptive statistics for the coding framework

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	Strengths		Weaknesses	
	N	%	N	%
1. Platform design	28	14,81	24	13,95
2. Tools and functionalities of platform	18	9,52	39	22,67
3. Platform operation	37	19,58	18	10,47
4. Platform contents	11	5,82	22	12,79
5. Role of teachers	4	2,12	6	3,49
6. Group interaction	41	21,69	-	-
7. Shared knowledge and resources	16	8,47	-	-
8. Individual knowledge	16	8,47	-	-
9. Improvement in users' skills	10	5,29	-	-
10. Innovation	8	4,23	-	-
11. Help and errors	-	-	21	12,21
12. Platform compatibility	-	-	9	5,23
13. Operation norms in platform	-	-	2	1,16
14. Access	-	-	14	8,14
15. Task design	-	-	10	5,81
16. Users' resources	-	-	7	4,07

Note. N reflects the frequency of codes and % their percentages

Students' improvement in learning

Significant differences were found when the grades awarded to the activity were compared between the two consecutive semesters (one during which the platform was used vs. the other during which it wasn't). More specifically, z-tests showed significant differences in the number of A and C+ grades from both semesters. The z-value for A grades was 3.80 and for C+ grades was -2.42, positioning both values outside of the critical range, considering an alpha value

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of 0.05 ($z > 1.96$ or $z < -1.96$). However, z-scores for B and C- grades presented non-significant differences, showing values inside of the critical range ($z=-1.62$, for B qualifications; and $z=-1.09$, for C- qualifications). These findings suggest that the percentage of A grades increased with the use of the CSCL platform whereas the percentage of C+ grades decreased (see Table 4 for the percentages of every grade in both courses).

Table 4. Marks obtained in the activity in the two consecutive semesters studied (percentages)

	Platform	Non-platform
A	51%	12.5%
B	42.6%	60%
C+	6.4%	25%
C-	0%	2.5%
D	0%	0%

Regarding subjects' self-evaluations, results showed that students perceived the usefulness of the CSCL platform in the medium-high range for acquisition of competences and knowledge (mean 3.80 and 3.77 respectively; see table 2 for further details). Figure 3 shows how most of participants were positioned around 4.0 regarding improvement in their knowledge and competencies through use of the platform.

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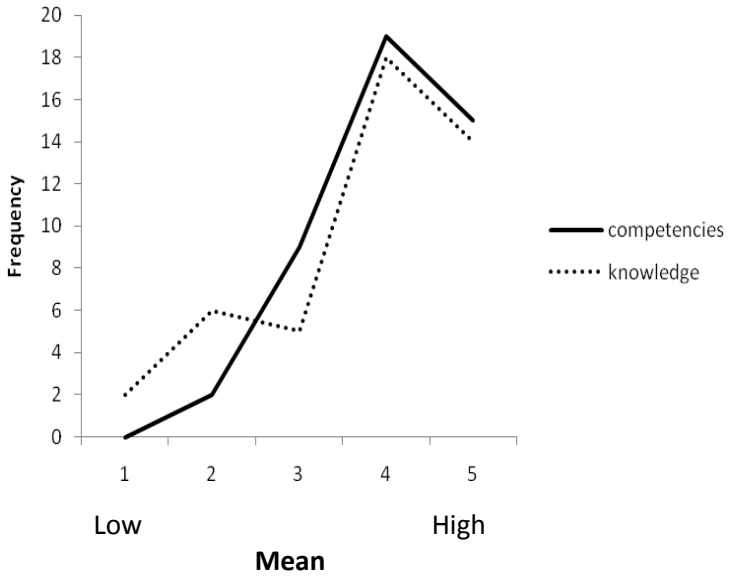
Figure 3. Frequencies of Improvement in Knowledge and Competencies



Discussion

This study aims to develop and assess a computer-supported collaborative learning (CSCL) platform to improve the learning of competences and knowledge through collaborative work among co-students in Psychology.

In accordance with the main aims of this study, a CSCL platform was developed to facilitate the collaborative work and students assessed it positively. Mean scores for the majority of the scales assessed through the online questionnaire were around 4 (in a five-point Likert scale from 1- totally disagree to 5- totally agree). Moreover, qualitative data helps us to better understand the assessments made by the students. With these analyses, the most frequent comments highlighted as strengths were categorized in the codes “Group interaction”, “Platform operation” and “Platform design”. In general terms, and taking into account the opinions

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expressed in these categories, students thought that the platform was easy to use, well designed and organized, and that it gave them the opportunity to interact and share knowledge.

The assessments made by the students also gave us the opportunity to identify important areas that need to be improved in future developments. In sum, the most important areas that need to be improved from the students' point of view are: 1) platform design (students saw good points and points that should be improved concerning design, then further research is needed in this aspect); 2) Tools and functionalities (an increase in the platform's functionalities was suggested by students); 3) Platform contents (a better control of the contents published on the platform was claimed by students); and 4) Help and errors (students considered that the information provided and the error system needed improvement).

Despite these weaknesses, this CSCL platform has shown to be efficient in students' learning process. In this respect, this work is innovative as it not only provides data about the design and feasibility of the platform, but also shows how students can improve their skills and knowledge by using it. Indeed, students improved their marks in this task as compared with the previous course in which the same activity was conducted but without the CSCL platform. From these results, we can conclude that this project contributes to the development of relevant skills and competences for the future psychologist.

Altogether, the results also highlighted the potential of information and communication technologies to facilitate the development of skills and competencies related to the professional role of the psychologist. The use of ICTs is very common nowadays in all of the areas of our life and are also very useful for education purposes. A clear example is our own university, which is completely based on the use of ICTs for lifelong learning.

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Besides the positive results found, we should comment on two limitations of our study. Firstly, the sample size was small, thus affecting the validity of the results. Secondly, the psychometric properties of the questionnaire used to assess feasibility should be tested in a larger sample. Therefore, these results need to be replicated with a larger sample.

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Notes

1. In this article, the terms cooperative and collaborative are used interchangeably, although certain authors provide a different definition for each.

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