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# E-portfolio for Awareness and Reflection in a Blended Learning Environment

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**Abstract.** Kelluwen is a learning community composed of teachers, students and researchers who are devoted to assessing and promoting ICT-mediated learning strategies, focused on improving students' socio-communicative skills. Kelluwen has a Web platform (<http://app.kelluwen.cl>) that supports b-learning activities allowing teachers to create, use and share instructional design leveraging Web 2.0 tools. This paper presents the development of an e-portfolio to be included in the Kelluwen platform, which aims at improving the support for awareness and reflection processes of students and teachers during their didactic experiences. Considering the requirements of the learning community, the e-portfolio is divided into four sections: Works, Evaluations, Statistics and Work's Gallery. The tool developed is evaluated in a pilot experience and we conclude that it enriches the learning processes by facilitating their comprehensive evaluation.

**Keywords:** e-portfolio; web 2.0, awareness and reflection.

## 1 Introduction

Kelluwen is a learning community the purpose of which is to improve the communication skills of elementary and high-school students introducing the use of collaborative web tools and social networks in learning processes, combining online and face-to-face (b-learning) didactic activities [16]. Under this context, the Kelluwen team has worked closely with teachers and education researchers in the development of relevant didactic designs. A didactic design (DD) is a type of instructional design based on social web tools that allows students to work collaboratively, post the outcomes of their learning and get feedback [4]. In addition, the Kelluwen web platform includes several communication and content management tools to support the *didactic experiences* of students and teachers when they run a DD. ([2], [11] and [17]). Kelluwen team proposes a comprehensive evaluation strategy of socio-communicative skills that involves awareness and reflection about the learning process by students and teachers. From the perspective of evaluator agents, the evaluation strategy includes the application of the following types of self-evaluation guidelines: metacognitive, co-

evaluative (joint evaluation) and hetero-evaluative (teacher to students) for the collaborative work. However, before this work, only peer-assessment was supported in the platform, while the rest of the evaluative processes were performed with guidelines available as files or hardcopy.

This work seeks to enrich the web platform, considering the peer-revision module with new features that support the application of different evaluative strategies, including views to facilitate the awareness and reflection of both students and their teachers about the learning process. The new tool being developed is an e-portfolio, which in addition to supporting a comprehensive evaluation process, provides both teachers and students with a space to manage all the products developed in a didactic experience.

The question that guides this research is the following: Can the proposed e-portfolio tool make a contribution to students' and teachers' awareness and reflection processes about their didactic experience?

## **2 Related Work**

### **2.1 Evaluation Typologies**

There are several ways of classifying evaluations. The most common classifications consider aspects such as functionality, timing or who evaluates [5]. This work considers the typology that classifies *evaluation by its agents*, i.e. based on the individuals who evaluate in each case. According to this criterion, the main types of evaluations are self-evaluation, co-evaluation and hetero-evaluation. To complement these types of evaluations, in Kelluwen we have also adopted i) *Product co-evaluation*: an evaluation performed by a group of students of a product generated by a second group of students. This type of evaluation is critical in the didactic activities proposed in Kelluwen [18], ii) *Eco-evaluation*: This evaluation is the one performed by a person of the environment in which the activity or phenomenon to be evaluated took place [10]. In Kelluwen, this is the evaluation of the learning experience by the student.

### **2.2 Best Practices in the Use of E-Portfolios**

The concept of e-portfolio has several directions. While some articles define e-portfolio as a platform for the organization of student-created artifacts [2], others conceive it as an evaluation tool ([8] and [9]). In spite of these differences, several best practices can be recognized in the e-portfolio literature, as presented below.

*Reflection mechanism introduced in the e-portfolio*: A common factor is the use of the e-portfolio to improve learning by reflection. For instance, in [7] students are provided a space in their e-portfolio to write their reflections. Included are reflections on learning objectives, learning outcomes, attitude facing learning, peer performance and their evaluations. In [6], the student must develop a reflection on each artifact posted in his/her e-portfolio. In addition, there is a final evaluation where the student must reflect on the entire process. Several e-portfolios include reflection as an evaluation

object. For instance, in [9] there is a student self-evaluation instance to generate her self-reflection about his/her artifacts and opinions in the support platform forum. The number of reflections about other works and the time students devote to them is also evaluated.

*Register of evaluations as part of the e-portfolio:* A common trend is observed in terms of registering evaluations in the same e-portfolio. In [7] there is a section devoted to evaluations where students sign into “E-portfolio evaluation” which provides online forms to perform self-evaluations and co-evaluations. Similarly, the teacher can perform the hetero-evaluation in the same tool. Additionally, [6] provides tools to evaluate the reflections by students using the “Chinese Word Segmentation System” which classifies the type of reflection made.

*Sharing e-portfolio artifacts:* E-portfolios encourage the sharing of works and provide tools to collect critical feedback from other students. In [13] there is an area for presenting the best projects where students can easily access their classmates’ work. This area is called “Gallery” and it allows students to search works based on a set of criteria, including valuation, date, visits, student, course and semester.

Finally we remark that we use the concept of e-portfolio in the sense of an space to organize the processes and outcomes of learning activities during a limited period of time and not in sense of life-long e-portfolio.

### **2.3 Awareness and Reflection in b-learning Environments**

[14] performs a systematic revision related to awareness and reflection processes in b-learning environments, stressing that most studies focus on the monitoring and visualization –by teachers– of their students’ learning process, with little research focused on supporting students in the awareness and reflection of their learning process, nor on providing teachers with information about their own practice. Within this small set of studies there is [12], which presents an extension of the WebLearn platform, the design of which is focused on providing students with support for their awareness and reflection processes and on providing teachers with information to review their own teaching practice.

## **3 Kelluwen E-Portfolio**

Considering the main best practices in the use of e-portfolios found in the literature and the requirements of the community of teachers who have participated in Kelluwen, four modules were developed in the e-portfolio: Works, Evaluations, Statistics and Work Gallery. A stable version of the platform that includes the Portfolio is found in <http://app.kelluwen.cl/>, accessible through a simple register. Below is a description of the Evaluation and Statistic modules, given their relevance in the awareness and reflection about the learning process of students and teachers.

### **3.1 Evaluations**

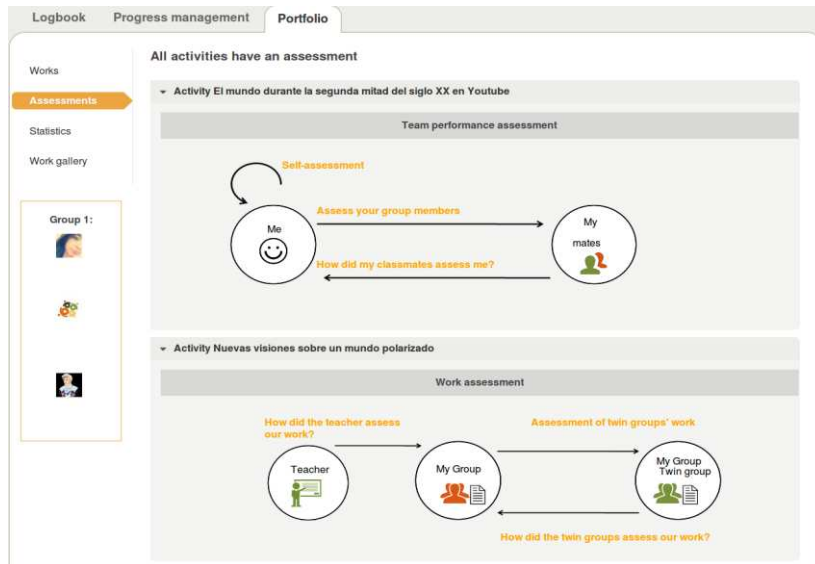
In this section of the e-portfolio, the Student View allows access to the different types of evaluations, depending on the activity that is being performed. Fig. 1 shows the module in which the evaluation displayed are team performance and work assessments. A simple diagram represents the evaluations with arrows between the student and her team mates. Each evaluation has a guideline, for instance, the team performance evaluation includes questions like: “She was responsible in fulfilling tasks”, “She helped his groupmates when they needed” or “She contributed to the group learning process”. In the case of work assessments, the questions are more specific to the subject area: “It is included in the slideshow a reflection about the conflicts experienced during the study period” or “A previous organization is observed in carrying out their slideshow”. In the experience assessment, there are more general questions: “The learning experience managed to satisfy a present need in your schooling” or “You think that criticism of the twin classrooms serve you to guide your learning”. Each guideline includes a space to make comments or explain the achievement levels assigned. The role of this open comment is to promote the students’ reflection process.

### **3.2 Statistics**

This section deals with statistics or analytics of the results of the evaluation processes, considering visualizations that summarize the evaluations that each student or group gets from the different stakeholders involved, using two types of charts: i) histograms that show the frequency of each achievement level considering aggregated criteria of the evaluation guidelines; ii) radial chart that represent the most frequent achievement level for each disaggregated criterion. Additionally, different comparisons are made based on the type of evaluation: when dealing with performance assessments, self and co-evaluations are compared, while in the case of product evaluations, peer evaluations are compared with the evaluation performed by the teacher (see Fig. 2). When evaluating the experience, the evaluation of all students are compared.

## **4 Results of the Pilot Survey**

During 2015, a pilot experience in the use of the Kelluwen Portfolio was conducted in two ninth grade twin classes at the Laico High School (classroom 1) and Martin Luther King High School (classroom 2), both in the city of Valdivia. The DD applied was “Building a Slide Show about the 2<sup>nd</sup> Half of the Twentieth Century” in the subject of History, Geography and Social Sciences. A total of 60 students, 31 from classroom 1 and 29 from classroom 2, arranged in nine groups per classroom, participated in the experience that took place during October 2015.

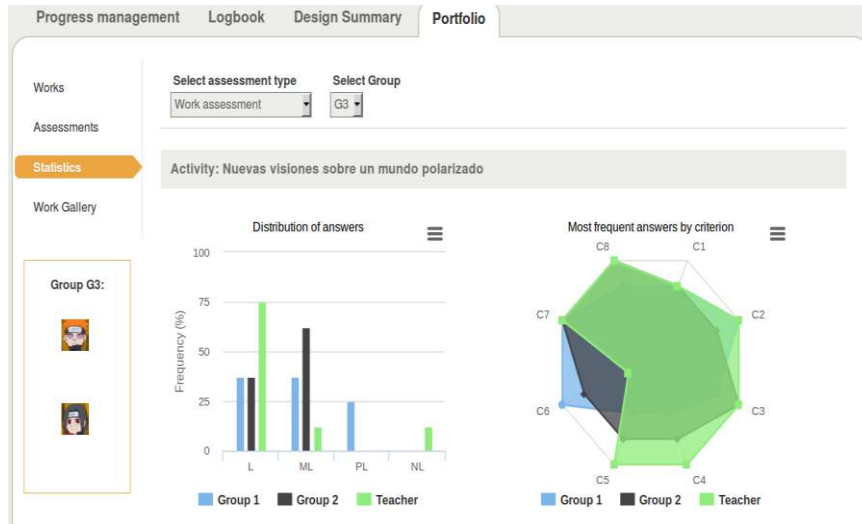


**Fig. 1.** Student View of Evaluation Section with Team Performance and Work Assessments.

Both teachers developed all the activities with their students, including all the proposed evaluation instances. All the groups posted works (68 in classroom 1 and 167 in classroom 2). During the experience, three activities of the Design were related to the evaluation, as follows: i) group co-evaluation, where 21 students in classroom 1 (68%) and 23 in classroom 2 (79%) completed the evaluation of their group mates; product co-evaluation where the 18 groups were assigned to reviewers between classes (twin classes) and completed the evaluation; iii) eco-evaluation, where nine students from classroom 1 (29%) and 25 from classroom 2 (86%) completed the evaluation of the didactic experience.

#### **4.1 Usability Study.**

A survey was applied among the 60 students to capture their perception about Portfolio's usability, adapted from the proposal in [1] designed to obtain a usability index of software applications. For classroom 1, the average obtained is 71.086, while for classroom 2, it is 74.553. Hence, both cases suggest that the Portfolio's usability is within the best acceptability range; i.e., students assess the tool as good according to the interpretation of the index in [1].



**Fig. 2.** Teacher view of Statistical Section which includes a menu of available filters, a results’ graphic display area that identifies the activity, evaluation histogram (1) and radial chart (2).

**4.2 Perception Survey about the Portfolio’s Usefulness.**

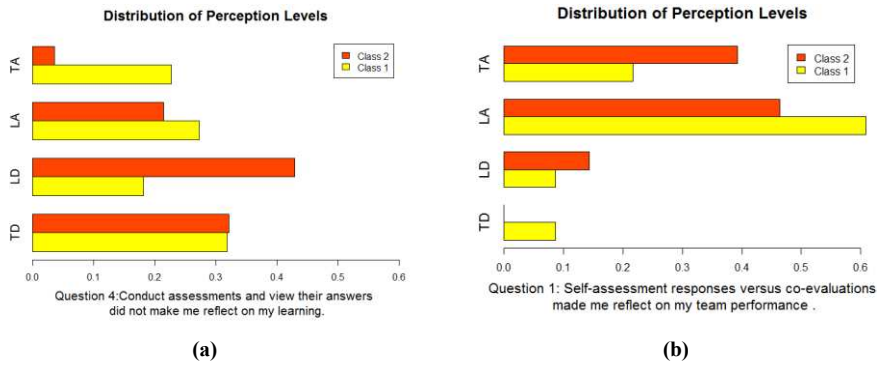
A qualitative analysis of the Portfolio was performed by means of a survey developed by the research team and applied to all the students during the pilot experience. The survey looked into the students’ perception about the implications of the Portfolio on the learning and evaluation processes, and also of the tool’s usefulness. The survey is organized in three parts. The first part focuses on the Works module; the second on the Evaluations module; and the third part contains questions about the Statistics and Gallery modules. The questions are statements that express a positive or negative valuation of the e-portfolio’s functions. There are four levels of responses: strongly disagree (MD), slightly disagree (LD), slightly agree (LA) and strongly agree (MA). The neutral level was discarded to force an expression of positive or negative opinion. The results of the perception survey show that for all the positive statements regarding the usefulness of the Portfolio, most students either strongly or slightly agreed, with percentages above 70% between both options. Regarding the negative statements about the usefulness of the Portfolio, students’ responses were more heterogeneous without a clear trend unlike the case of positive statements. The distribution of this survey’s answers is shown in detail in the Appendix.

Fig. 3 shows the results of the survey questions that more directly address –in the opinion of students– the impacts of the Portfolio on the reflection about their learning process. Fig. 3(a) shows the results of a question that inquiries whether the evaluations performed made them reflect on their own learning process; student responses are somewhat heterogeneous, with an agreement of 50% for students in classroom 1 and 75% in classroom 2. Fig. 3(b) shows the results of a question referred to the val-

orization of the evaluations’ graphic summaries in promoting reflections about teamwork. In this case, 82.5% of classroom 1 students strongly or slightly agreed, while this was true for 85.7% of classroom 2 students.

### 4.3 Discussion Groups

Two discussion focus groups were conducted made up by students from both classrooms in the pilot experience. The purpose of this activity is to understand the meanings attributed by students to their participation in the experience, considering the valorization of the e-portfolio as an environment to support the reflection and motivation of their learning processes. The classroom 1 group was formed by six students. This focus group suggests: i) Broad approval to the e-portfolio:



**Fig. 3.** Both classroom students’ perceptions regarding the question about their reflection process in **(a)** the use of the Evaluations section and **(b)** the use of the Portfolio’s Statistics section.

The main attributes mentioned are: ease of use; interaction with students from other schools; all works are available in the same place; and that it can be used both at school and home. ii) Group co-evaluation was a matter of debate as there was a lack of consensus on its proper use by classmates. Classroom 2 group was made up by five students. The following can be summarized from the conversation: i) All of them stated to like the portfolio, that it was something new and fun to use, ii) Most thought that the evaluations were easy to use and some said that they would like to add comments per criterion in addition to the achievement level. One student mentioned that this way, the teachers could also explain their evaluations.

## 5 Discussion and Conclusions.

The results of the usability study show that students qualified the e-portfolio in the acceptable category, with a usability index of 71.1 in classroom 1 and of 74.6 in classroom 2; both values are within the “good” usability range. This outcome is consistent

with the results collected with other evaluation tools, where students suggest several elements to improve the Portfolio's usability.

The results of the perception survey show that most students positively assess the Portfolio as a tool that supports work posting, comprehensive learning evaluation and the emergence of moments of reflection and awareness in the context of the didactic experience developed.

Discussion groups confirmed the outcomes of the prior surveys and complemented them by specifically arranging the critiques to the tool being proposed. One element worth highlighting is the diversity of perceptions around the co-evaluation process of the team's performance; while it was extremely well assessed by student from classroom 2 as a reflection driver for the development of teamwork, the students from classroom 1 considered it an uncomfortable and unfair process. On this regard, it should be mentioned that the two classrooms involved in the pilot experience are part of two different school situations which could probably explain such diverging opinions.

Based on the outcomes emerged, we can conclude that our e-portfolio meets the role of contributing to the awareness and reflection of students about their learning process, particularly concerning the development of teamwork skills, as well as in feedback processes of works posted in the platform. Another relevant aspect is the role of teachers in the design of didactic experiences, which in this case were directly related to the development of different evaluation guidelines which made it possible for such guidelines to be extremely well contextualized and therefore, to be perceived as easy to be developed by students. On the other hand, the Portfolio can also support teachers when monitoring the work of students, enabling them to compare their own perceptions of the work performed by students regarding the evaluations they get in the peer review.

Most of the findings or confirmations that the e-portfolio is useful to support the process of awareness and reflection of students are transferable to other learning communities and are related to the focus on a comprehensive assessment process, which not only emphasizes the products if not the underlying processes.

Future work is expected to complement the feedback provided to students and teachers with analytics of the activity in the portfolio of the participants of the didactic experience, such as those proposed in [15]. We will test these learning analytics in the Kelluwen platform with didactical designs concerning critical reading and citizenship.

## **A Appendix**

### *Results of the Perception Survey on the Portfolio's Usefulness*

Questions	Frequencies			
	TD	LD	LA	TA
T1. It was hard for me to post works.	11	6	14	19
T2. It was easy to access posted works.	13	9	18	11
T3. It is easy to find the works of my group	14	6	10	11
T4. I was able to identify the work that was going to be evaluated by other groups.	4	10	25	12



Questions	Frequencies			
	TD	LD	LA	TA
T5. It was useful for my group to be able to see the works posted in the Portfolio.	5	16	15	14
E1. Knowing the evaluation guidelines beforehand was useful to better understand my expected learning.	9	1	27	14
E2. Knowing the work evaluation guidelines before was useful to improve my work.	5	11	23	11
E3. The Portfolio shows clearly which activities are to be submitted to evaluations.	8	8	21	14
E4. Performing evaluations and seeing their answers did not make me reflect about my learning.	8	12	17	14
E5. I didn't like performing digital evaluations.	6	14	15	16
E6. Co-evaluations helped our groups to improve their collaborative work.	7	8	22	14
E7. The results of the evaluations helped me learn about which objectives were achieved and which weren't.	10	8	15	17
E8. I was unable to see the works of other groups during the evaluation.	6	10	21	14
E9. It was easy to evaluate other groups.	12	14	14	11
E10. Interacting with other groups during evaluation was useful to improve our work.	7	10	23	10
R1. Self-evaluation answers versus co-evaluation answers made me reflect about my teamwork performance.	6	10	19	15
R2. I was unable to compare how other groups and the teacher evaluated me.	10	7	21	13
R3. I was able to better understand the performance of my work group by looking at the charts in the Portfolio.	8	11	16	16
R4. I think it is a good idea for the Portfolio to include charts to be able to see the answers of the evaluations.	10	9	16	16
R5. I think charts make it difficult for me to understand evaluations.	5	14	18	14
R6. The information in the radial chart was useful for me.	9	7	19	16
R7. Being able to see works of other groups in Portfolio was useful for my learning.	7	13	20	11
R8. Being able to see other works in the Gallery was useful to guide our own work.	3	8	24	16

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