

# Peer Assessment in the Context of Project-Based Learning Online

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**Abstract**—The pedagogy project has been proven as an active learning method, which is used to develop learner's skills and knowledge. The use of technology in the learning world, has filled several gaps in the implementation of teaching methods, and online evaluation of learners. However, the project methodology presents challenges in the assessment of learners online.

Indeed, interoperability between E-learning platforms (LMS) is one of the major challenges of project-based learning assessment.

Firstly, we have reviewed the characteristics of online assessment in the context of project-based teaching. We addressed the constraints encountered during the peer evaluation process.

Our approach is to propose a meta-model, which will describe a language dedicated to the conception of peer assessment scenario in project-based learning. Then we illustrate our proposal by an instantiation of the meta-model through a business process in a scenario of collaborative assessment on line.

**Keywords**—Online project based learning, meta-model, peer assessment process.

## I. INTRODUCTION

THE group work is regarded as an important strategy of learning for all types of course. In so far as it develops skills, without sacrificing the knowledge acquisition.

The cooperative work in a group project improves the acquisition, conservation of information, the enhancement of social skills, communication, and the self confidence [1]. However, the stated objectives of the project must be tested and evaluated by the evaluation criteria.

Our work consists in the conception of a system for online peer assessment in the context of project-based learning.

In this paper, we propose a meta-model of this system, which will provide a language dedicated to the description of

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scenarios for evaluating learning.

In the first section, we will discuss the state of the art of learning by project.

Thereafter in the second section, we will study the online evaluation in this educational context, and modes of assessment.

In the third section, we propose the design of a system for online peer evaluation in the context of the project, which will result in a Meta model.

The instantiation of the meta-model in a scenario of peer assessment is described in a business process in Section 4.

In the conclusion we discuss our proposal and the main prospects.

## II. THE PROJECT-BASED LEARNING

Project-based learning is a learning approach that presents some aspects of sustainable learning skills, such as group work, communication, critical thinking [2]. This method of learning develops transversal and discipline skills.

In our study we will devote to the project carried out within a group.

The group project gives learners the opportunity to work in a group for a period of time, as opposed to individual instruction.

A group project exposes students to other points of view from which they can learn and accomplish their tasks properly.

The group projects provide the opportunity for the development of interpersonal skills and group work such as communication, planning and time management. These skills are prized by graduates in the workplace.

Indeed, a working group is regarded as an effective learning and is a learning tool. In this mode, learners can get an idea about the group dynamics, and develop their interpersonal skills.

## III. THE ASSESSMENT IN A PROJECT-BASED LEARNING ONLINE

If you are The Pedagogy by project is a teaching method in which the project is the key element.

During a project, a learner performs collaborative and individual tasks that involve collaboration and communication.

Students choose a project, perform it, and justify the learning acquired through production, in front of the teacher and peers.

In order to compare the project objectives with learning

outcomes, an assessment of the work done by learner is needed throughout the project.

The learners should be able to evaluate their performance, outcomes, and accept criticism and approval of their colleague.

The evaluation process of learning takes many forms: an assessment inter group, intra group, self-assessment of group members, and assessment by the tutor.

#### *A. Self Assessment*

The assessment allows learners to develop a learning strategy, and to build autonomy. [3]

The self assessment stimulates reflection of the student's own work, his skills, check his progress, and identify weaknesses and strengths during the learning process.

The self-assessment can be done at each stage of the project, either in summative or formative way.

#### *B. Peer Assessment*

The peer assessment is a teaching strategy in which the student evaluates the performance and achievements of their peers, in order to improve learning [4].

The mode of peer assessment consists to encourage students to evaluate each other's contributions during discussions, exposing their critical thinking skills and analysis.

The peer assessment allows students to address problems identified by peers, based on feedback.

The peer assessment is not limited to transmitting and receiving peer feedback by examining the product achieved in a stage of the project.

The viewing of the work of the peers, aims to help students to compare their own work with peers work.

The peer review comments and the suggestions, assist learners to identify knowledge with poor design, and cognitive restructuring processes such as simplification, clarification and reorganization [5].

However, the peer assessment presents drawbacks, such as time spent on the task of assessing the learners, the impact of peer pressure on the accuracy of the evaluation, the inability of students to make a critique judgment of the peers work, as well as the ability of learners to interpret the evaluation criteria and conduct a critical evaluation. [6]

Thus the choice of online peer assessment is an effective way to reduce peer pressure on the accuracy of the assessment. In fact the anonymity is assured to reduce peer pressure.

The problems of time spent on assessment tasks (administrative tasks) by peers are double, from point of view of the instructor and the student both, in traditional instruction.

In a system of peer assessment online, feedback is accessed by learners at the appropriate time, unlike the paper version which required an amount of time to manage the process.

In web based approach, this portion of task is automated, so she is simplified.

These systems automatically manage data, so we did not

need a work manual to maintain the flow of documents, such as the distribution of projects for students, collecting peer feedback, and distribution of the feedbacks to the project authors.

Therefore, the administrative workload is minimal and automated interactions learners are stimulated.

Moreover, understanding the criteria for a particular project, and the analysis of peer work, can lead to a better awareness of their own performance [7].

However, the terms and phrases of assessment criteria may not convey the same meaning for the learner and the instructor.

Besides, learners lack skills of interpretation criteria, which require higher order thinking skills, whence the importance of training for maximum impact of the learning process of the student. [8]

Note that the peer assessment can be made as formative as summative manner.

#### *C. Assessment by Tutor*

The tutor acts as an assistant to advise and guide the learner in his activities when confronted with a problem.

The Learners are observed in their performance, so the reviews are produced and the level of competence is assessed [9]

Furthermore, the tutor evaluates collaborative learning activities, and evaluates the pedagogical level, productions, processes, and assigns a score to the group and project members.

Depending on the level of achievement, we compare the performance with a repository of skills, and the tutor rates a group of learners.

## IV. META-MODEL OF PEER ASSESSMENT IN PROJECT-BASED LEARNING

In this chapter we propose a meta-model (Fig. 1) of peer assessment [10] in project-based learning, with the following concepts: project, tutor, assessed, assessor, test, evaluation form, rating, feedback. Each student plays two roles: assessor, assessed.

- The assessor: the productions will be visualized in step  $n+1$  by colleagues, which provide feedback to their peers through an assessment forms.

- The assessed: each learner in step  $n$  accesses the feedback related to his work, which allows him to make improvements and corrections and submits a revision to its peer assessment.

The assessed may proceed following the feedback for the improvement of collaborative task, which will improve results and may cause other feedback. These tasks can be iterative for having satisfactory results.

At the end of each step, the tutor evaluates the productions of the learners based on the evaluation criteria.

Also, the Feedback from the students assessors are evaluated to determine whether the learners were able to

identify critical problems of the evaluated project, and provide constructive feedback.

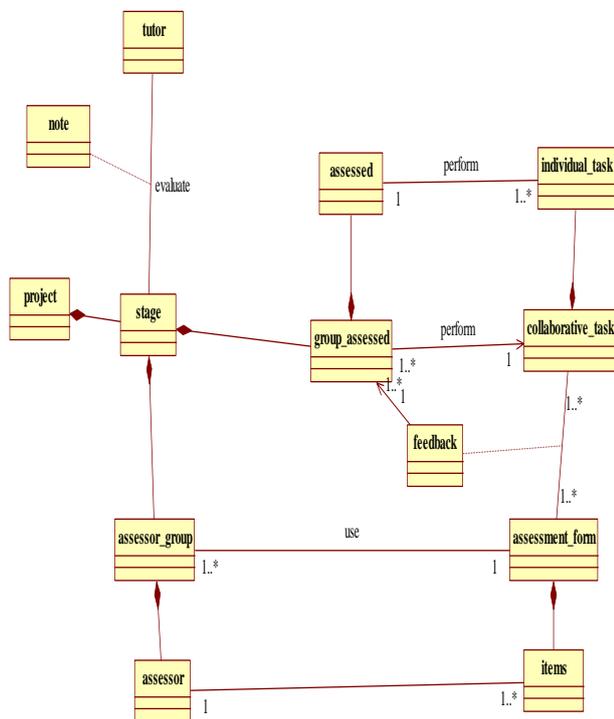


Fig. 1 Peer assessment Meta model in the project based learning

### V. THE PEER REVIEW BUSINESS PROCESS IN THE CONTEXT OF PROJECT-BASED LEARNING

In this chapter we propose a business process (Fig. 2) that will describe the peer review [11], in the context of project-based teaching.

The peer review can take two forms: formative assessment and summative assessment.

The whole project is divided into stages and in each stage is assigned to a group of collaborative tasks.

Each collaborative task performed by a group, will be evaluated by a group of the next stage of the project.

#### A. Formative Assessment

During the learning project, group members in a collaborative task, will be evaluated formatively throughout the stage, by a group assessor who will continue the project at the next stage.

Similarly, the group assessor will be evaluated by the group which continue the project at later stage.

The feedback will then be sent to the group assessed who will review the feedback and make the necessary corrections and improve the outcome.

The review will be done by peers, who will evaluate the work of colleagues in inter group assessment.

In this case, each member will examine the individual work, and will conduct a review of its individual task.

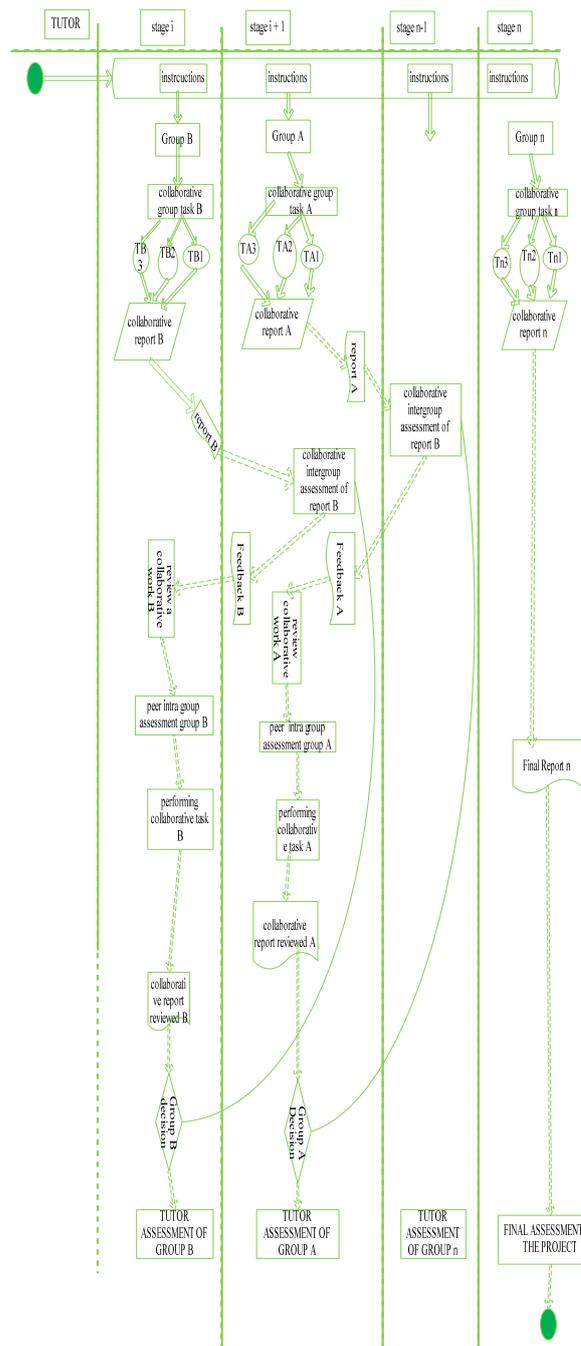


Fig. 2 Peer assessment business process

Then, each member will send his work to the group, and together they will synchronize their work to perform a collaborative task.

The group's work will be sent to members of the group the next stage, for a new assessment and review.

This stage can be repeated as long there will be feedback from the assessor group.

If the assessor group is satisfied, it will assign a score to the assessed group.

At this level, the tutor will evaluate in turn and assign a Note to work.

Therefore, the final score will be a combined score between the tutor score and the group score.

#### *B. Summative Assessment*

During the summative evaluation, the evaluator group, evaluates the product group, and gives a score to the group.

The tutor assigns a final score to the group, by combining his score and the score of the evaluator group.

### VI. CONCLUSION

In this paper we have established a state of the art of project-based learning and assessment process in this context.

Then we have proposed a meta-model for an evaluation system in a group project.

Our meta-model describes the design of an evaluation scenario in a situation of learning project.

In future work, we will focus on the added value in the context of collaborative learning process.

So, we will use this work in the context of use of collaborative writing of a report during a project.

Furthermore, we will assess the contribution of evaluation, on process learning, such as measuring the knowledge acquisition process, and reflecting thinking.

In addition, we will measure the contribution of evaluation to the learning process, such as the process of knowledge acquisition and reflective thinking.

### REFERENCES

- [1] Johnson, D.W., Johnson, R.T., and Smith, K.A. (1998). Active learning: cooperation in the college classroom. Edina, Interaction book Co. Minnesota
- [2] Louise Capra, Lucie Arpin, Québec français, n° 126, 2002, p. 67-71. « La médiation pédagogique de l'enseignant : une composante essentielle dans l'apprentissage par projets ». BOUTINET, Jean-Pierre. Psychologie des conduites de projet. Paris : PUF/Que sais-je ? 1993, 126 p
- [3] Boud, D (1991) Implementing student self-assessment. Second, revised edition. Sydney: HERDSA
- [4] Topping, K. J., Smith, E. F., Swanson, I., & Elliot, A. (2000). Formative peer assessment of academic writing between postgraduate students. *Assessment & Evaluation in Higher Education*, 25(2), 149-169.
- [5] Topping, K. & Ehly, S. (1998), Peer assisted learning, Mahwah, NJ: Lawrence Erlbaum Associates.
- [6] Loddington, Steve (May 2008) Peer assessment of group work: a review of the literature, WebPA [16/12/11]: [http://webpaproject.lboro.ac.uk/files/WebPA\\_Literature%20review%20.pdf](http://webpaproject.lboro.ac.uk/files/WebPA_Literature%20review%20.pdf)
- [7] Freeman, M. (1995). Peer assessment by groups of group work. *Assessment & Evaluation in Higher Education*, 20(3), 289-300.
- [8] Dochy, F., Segers, M., & Sluijsmans, D. (1999). The use of self-, peer and co-assessment in higher education: a review. *Studies in Higher Education*, 24(3), 331-350.
- [9] Project-based learning approach for control system courses. *Sba Controle & Automação* vol.23 no.1Campinas Jan./Feb. 2012. <http://dx.doi.org/10.1590/S0103-7592012000100008>
- [10] Y. Miao, T. Sodhi, F. Brouns, P. B. Sloep, R. Koper, Bridging the Gap between Practitioners and Elearning Standards: A Domain-Specific Modeling Approach. In P. Dillenbourg & M. Specht (Eds.), *times of Convergence. Technologies Across Learning Contexts - Proceedings of the Third European Conference on Technology Enhanced Learning, EC-TEL 2008*. September, 16-19, 2008, Maastricht, The Netherlands, (2008), 284-289.
- [11] Miao, Y. & Koper, R. (2007). An Efficient and Flexible Technical Approach to Develop and Deliver Online Peer Assessment. Clark A.

Chinn, G. Erkens, S. Puntambekar (Ed.) *Mice, Minds, and Society*, Proceedings of the 7th Computer Supported Collaborative Learning (CSCL 2007) conference, p. 502-511, July 16-21, 2007, New Jersey, USA.