

## Reference # 16

### Topic # 1

#### Master students' reactions to peer review

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Peer Review is an advanced activity for students that has been used to improve writing skills, to familiarize students with what constitutes good versus poor work, and to provide them with experiences they cannot get otherwise. In this paper we describe the use of peer review in two ICT Master Courses and students' reaction to it. Surprisingly, most of these master students (Portuguese teachers) were not familiar with peer review and initially had difficulty in accepting it. However, most of them recognized its benefits.

### Peer Review

Peer review is an advanced activity for students to develop reflective processes like critical thinking (Gehring et al., 2005; Denning et al., 2007). It has the potential to provide students with experiences they cannot get otherwise (Gehring et al., 2005), it offers the students a richer learning experience (Raadt et al., 2006), and it fosters learning in a variety of contexts (Kali & Ronen, 2005). Peer review of student writing can deepen conceptual understanding, improve writing skills, and familiarize students with what constitutes good versus poor work (Topping, 1998).

Topping (1998: 249) also points out that peer assessment “is of adequate reliability and validity in a wide variety of applications”. However, as Juwath (2003) stresses, for being “effective, rigorous and appropriate, training must be provided to enable the participants familiarize themselves with the process of devising assessment criteria, developing an assessment rubric, assessing work and giving and receiving feedback” (p. 9).

Topping (1998) presents a table with a typology of peer review (the author prefers to use peer assessment) in higher education that takes into consideration a large diversity of variables.

Variable	Range of variation
Curriculum Area/Subject	All
Objectives	Of staff and/or students? Time saving or cognitive/ affective gains?
Focus	Quantitative/summative or Qualitative/formative or both?
Product/output	Tests/marks/grades or writing or oral presentations or other skilled behaviours?
Relation to staff assessment	Substitutional or supplementary?
Office Weight	Contributing to assess final official grade or not?
Directionality	One-way, reciprocal, mutual?
Privacy	Anonymous/confidential/public?
Contact	Distance or face to face?
Year	Same or cross year of study?
Ability	Same or cross ability?
Constellation assessors	Individuals or pairs or groups?
Constellation assessed	Individuals or pairs or groups?
Place	In/out of class?
Time	Class time/free time/informally?
Requirement	Compulsory or voluntary for assessors/ees?
Reward	Course credit or other incentives or reinforcement for participation?

Table 1 – A typology of peer assessment in higher education (Topping, 1998)

The advantage of using online systems for peer review is that it gives students instant access to the reviews (Cathey, 2007; Denning et al., 2007; Raadt et al., 2006; Wolfe, 2004). In some cases, reviewers rate the assignments and write a comment (Cathey, 2007; Denning et al., 2007) or they may also score the assignment (Wolfe, 2004; Raadt, 2006).

Denning et al. (2007) reported that “the rating process caused them [students] to reconsider the quality of their solution. In the discussion, students confirmed that they reflected on their own answer when rating others” (p. 269). With this strategy, students received more feedback than any one teacher could provide (Wolfe, 2004; Raadt et al., 2006). Moreover, “students exercise and refine their ability to be critical reviewers, often gaining a better understanding of the grading process and making it easier for them to accept criticism” (Wolfe, 2004, p. 34).

Students felt comfortable in the role of critical reviewers (Wolfe, 2004), but some students felt concerned about their work because of the rating process (Denning et al., 2007).

In a study about peer evaluation in a website design, Mirielli (2007) concluded that students tended to be more critical in their evaluations of their peer’s work than the instructor. Kali & Ronen (2005) recognized that discrepancies between student and instructor scores were explained by bias due to non objective evaluation criteria.

Wolfe (2004) realized that students appeared to be working a lot harder to impress their classmates. They felt motivated to produce higher quality work (Gehring et al., 2005). Cathey (2007) also describes that “[i]nterestingly, students reported putting more work into this assignment than they put into assignments read solely by the instructor, even though students’ work was anonymous and grades were uninfluenced by peers’ commentaries” (p. 98).

## **The study**

This study describes an activity of peer review conducted in two Master courses and analyses students’ reaction to it. Most of these students were teachers.

The study objectives were to study master students’ reaction to peer review, particularly:

- To verify peer review acceptance;
- To verify whether master students’ recognize peer review impact in learning;
- To characterize their emotions (inhibition) during peer review.

## **Sample**

The sample integrated 26 Education Master Students’ that were enrolled in ICTE (Information and Communication Technology in Education) and Multimedia Systems courses.

Most students were teachers, 6 males and 20 females, their age ranged from 23 to 45 years old.

## **Methods and techniques**

A survey was carried out in two master courses, and a questionnaire was developed to collect data.

After students had finished the peer review process, data was collected in the e-learning platform Blackboard, used to support the courses.

### Study description

The ICTE students' analyzed websites and the Multimedia Systems students' analyzed educational multimedia software. Both Master classes had access to content and to a grid to focus on particular dimensions. These analyses were done in groups of two or three elements. When the groups posted their work in the LMS (Learning Management System) Blackboard the teacher attributed to each student a group assignment to be reviewed.

In the ICTE course each website group analysis was reviewed by two students and in the Multimedia Systems course each educational multimedia software analysis was reviewed by three students (table 2). All students knew the names of the authors and the name of the reviewers, as this distribution of tasks was available in the e-learning platform Blackboard.

<b>Educational Master Course</b>	<b>Number of Students</b>	<b>Tasks of group assignment</b>	<b>Number of reviewer per group assignment</b>
ICTE (Information and Communication Technology in Education)	6	Analysis of Websites	2
MS (Multimedia Systems)	20	Analysis of educational multimedia software	3

**Table 2 – Tasks in each Master course and number of reviewers per group assignment**

The criteria for conducting the review were the same as the criteria to carry out the group task. The students had to review the group assignment critically, but without rate them.

Students' review was posted in the e-learning platform Blackboard. The teacher evaluated groups' analysis and students' reviews. The teacher commented and rated both, assignments and reviews, which were posted in the Blackboard.

This activity of peer review was implemented to give the opportunity to students to analyse another product (Website or educational software), to develop critical thinking, and to be a critical reviewer.

### Results

The majority of the students (23) were not familiar with the concept and the process of peer review (table 3).

<b>Peer Review</b>	<b>ICTE (n=6)</b>	<b>MS (n=20)</b>	<b>Total (n=26)</b>
Familiar	2	1	3
with the concept	2	1	3
with the process	1	0	1
Unfamiliar	4	19	23

**Table 3 – Familiarity with peer review concept and process**

Only three students were familiar with the concept of peer review, and one of them with the process of peer review that she had used during her undergraduate program. These students

reinforced the idea that it demands knowledge and critical thinking: “Criticizing it not only to identify failures or problems, but also to stress positive aspects” (003). It is important to remember the difference between constructive/professional reviews and useless/insulting reviews, as Wolfe (2004) pointed out.

Another student indicated that in peer review “sometimes a score is required” (015). It allows acquiring more knowledge, as a student wrote: “I understood this activity as an opportunity to learn deeply and to analyze another Website” (003).

### Peer review acceptance

Most students (61%) had a positive reaction to peer review, but 35% did not like it, and one student indicated her indecision about it (Table 4).

Master students	Positive reaction		Indecision		Negative reaction	
	f	%	f	%	f	%
Total (N=26)	16	61	1	4	9	35
ICTE (n=6)	4	-	0	-	2	-
	Reflect about my own work [2] Commitment and responsibility [1] Consolidate websites analysis [2]				I had not enough knowledge to comment others work [2]	
MS (n=20)	12	-	1	-	7	-
	At first, I did not accept very well [7] Analysis of educational multimedia software from different points of view [1] Consolidate the analysis of educational multimedia software [2] Reflect about my own analysis Develop critical thinking [1] Better understanding of the analysis process [1]				I was not expecting to do something like this [4] I had not enough knowledge to comment others work [2] I did not like to evaluate my colleagues [3]	

**Table 4 – Students reaction to the activity of peer review**

Seven students mentioned that their first reaction was negative: “I didn’t accept it very well” “because I have to review (evaluate) colleagues work”, but when they understood the goal of peer review, they accepted it quite well.

The students justified their positive reaction saying that they consolidated their knowledge about websites analysis (in ICTE course) or about educational multimedia software (in MS course). During the process of peer review they realized that they reflected about their own work, they developed critical thinking, they had a better understanding of the analysis process, and one student pointed out that she felt committed and responsible to write a constructive review. All these aspects are reported in the literature review as the benefits of this activity (Topping, 1998; Gehringer et al., 2005; Raadt et al., 2006; Denning et al., 2007).

The nine students that did not like the activity of peer review, they explained that they had not enough knowledge to comment others work, they were not expecting to do something like this, and they did not like to evaluate the colleagues. Indeed, they did not rate them, they only have to criticize group analysis.

Some students, in class, mentioned that they were afraid that their comments could influence the teacher when rating group assignments.



### Peer review impact in learning

Most of the students (80%) recognized that they learned more with this activity and 12% considered they did not learn anything new (Table 5). Two students (8%) did not reply appropriately to the question.

The twenty one students that realized that they learned more with this review stated that they consolidated the analysis of educational multimedia software, they got a better understanding of the dimensions of analysis, they looked at the same type of product from a different perspective that one of a critical reviewer, and it allowed to focus on others details. One student affirmed that during the review she compared it with her own work.

Three students indicated that they did not learn anything else, because it was about the same type of product, but only with a different perspective that of a reviewer, and one student declared that she was not sure about her review.

Master students	I learned more		Nothing new was learned		Inappropriate answer	
	f	%	f	%	f	%
Total (N=26)	21	80	3	12	2	8
ICTE (n=6)	4	-	1	-	-	-
	Focusing on others details [2] Better understanding of the dimensions [2] Reflect about my own work [1]		I was not sure about my work [1]			
MS (n=20)	17	-	-	-	1	-
	Consolidate the analysis of educational multimedia software [8] Better understanding of the dimensions of analysis [5] Look at the same type of product from a different perspective (critical reviewer) [4]		It was about the same type of product [1]  Look at the same type of product from a different perspective (critical reviewer)[1]			

Table 5 – Impact of peer review in learning

Two students did not answer appropriately. Strangely the same justification: “look at the same type of product from a different perspective, that one of a critical reviewer” was used for different students to explain to have learned more or nothing else.

### Inhibition during peer review

This dimension was integrated in the questionnaire because some students commented that they did not feel comfortable with peer review. Their comments about this activity were unexpected.

According to their answers, most of the students (69%) did not feel inhibited during peer reviewing, but 31% did (Table 6).

Master students	I felt inhibited		I didn't feel inhibited	
	f	%	f	%
Total (N=26)	8	31	18	69
ICTE (n=6)	1	-	5	-
	I preferred to say it personally than to write [1]		I tried to give positive feedback only [1] The goal was learning by reviewing [4]	
MS (n=20)	7	-	13	-
	It was my classmates' work [5] I felt uncomfortable [2] Our result depends on rating our colleagues' work [1]		The goal was reviewing to learn [3] Constructive review [7] I did not know the classmates [1] It was not an easy task [1]	

**Table 6 – Inhibition effect due to peer review in learning**

Eight students felt inhibited during the review process, because they had to review their classmates' work. One student indicated that she preferred to comment aloud than to write, and two students mentioned that they felt uncomfortable with this activity.

Eighteen students understood the task (69%) and they mentioned that it was a constructive review, the goal was learning by reviewing or reviewing to learn. One student mentioned that it was not an easy task. Yet another one stated that she only gave positive feedback – this was not the goal of this activity. The goal was to identify positive and negative aspects. Then the group could improve their review. For one student, peer review did not inhibit him because he was not attending face to face classes, only online.

**Peer review in other master courses**

Most of the students (80%) answered positively in doing other peer reviews, and 16% did not want to do it again (Table 7). One student did not answer appropriately to the question.

Twenty one students indicated their agreement in doing peer review in other master courses, because they recognized that it was a rich learning activity, it helped them to reflect on the grading process and on the work done, and it refined the ability to be critical reviewer. One student suggested that she would prefer to have the consent of all students, and others students prefer not to know the names of their classmates and preferably they would like to evaluate the works of students they do not know.

Master students	Yes		No		Inappropriate answer	
	f	%	f	%	f	%
<b>Total (N=26)</b>	<b>21</b>	<b>80</b>	<b>4</b>	<b>16</b>	<b>1</b>	<b>4</b>
ICTE (n=6)	4	-	1	-	-	-
	Rich learning activity [2] It would be better with the consent of all students [1] Evaluate works of other students [1]		Face to face comment only [1]			
MS (n=20)	17	-	-	-	0	-
	Reflect on the grading process [1] Reflect about my own analysis [2] Refine the ability to be critical reviewer [2] Rich learning activity [4] I would prefer without knowing the authors [2] No justification [6]		I do not want to review classmates' works [1] Compromise the relationships among students [1] I intend to use peer review with my students [1]			

**Table 7 – Peer review in other courses**

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Four students do not want to do it again, because it compromises the relationships among classmates and one student stated that she intend to use peer review with her students. This justification is surprising. She does not want to do it again but she wants her students to do it? Finally, one student prefers to express her comments verbally, in face-to-face classes.

### Conclusions

Students got the opportunity to be enrolled in an activity new to them. It was not easy for them, as the majority had difficulty in accepting it. Most of them considered that they were evaluating their colleagues. When they understood the goal, they felt relieved. This activity was important to their professional development: to learn to be critical reviewers.

Most of the master students had a positive attitude towards peer review. They realized that they learned more and they identified their own mistakes in the review process, as it occurred in the study of Denning et al. (2007). However, some of them took some time to accept positively this activity, because they were concerned with their classmates' reaction to their comments. As soon as they understand its purposes, they decided to analyze the group assignments as critical and constructive reviewers.

It is very important to verify if all students did understand what is expected from them in peer review, the criteria used, and that they evaluate but they are evaluated too (Raadt et al. 2006, Mirielli, 2007; Cathey, 2007).

Most of them accept the possibility of doing peer reviews in other master courses. We may conclude that the experience could not be so unpleasant. Was this a reaction to novelty? They are used to evaluate their students, as most of them were teachers.

In regard to my point of view as their teacher, it was interesting to see the level of critical expertise some students had attained. To correct all group works and reviews it took too much time. However, we may conclude that students that committed to this assignment learned a lot, acquired critical thinking, and learned to be constructive reviewers.

Wolfe (2004) and Cathey (2007) realized that students put more work into the assignment to be reviewed by their colleagues than they put into assignments read solely by the instructor. We intend to analyze the effect of peer review in their commitment to assignments. We also need to understand why some students had difficulty in accepting doing peer review. Is this a Portuguese cultural problem? These aspects will need further research.

### References

- Cathey, C. (2007). Power of Peer Review: an online collaborative learning Assignment in Social Psychology. *Teaching of Psychology*, 34 (2), pp.97-99. Retrieved January, 2008, from <http://www.leaonline.com/doi/abs/10.1080/00986280701291325>
- Denning, T., Kelly, M., Lindquist, D., Malani, R., Griswold, W. G. & Simon, B. (2007). Lightweight preliminary peer review: does in-class peer review make sense? *ACM SIGCSE Bulletin*, 39 (1), pp. 266-270. Retrieved January, 2008, from <http://portal.acm.org/citation.cfm?id=1227504.1227406&coll=GUIDE&dl=ACM&CFID=16762406&CFTOKEN=70257775>
- Gehringer, E. F., Chinn, D. D., Pérez-Quiñones, M. A. & Ardis, M. A. (2005). Using peer review in teaching computing. *ACM SIGCSE Bulletin*, 37 (1), pp.321-322. Retrieved January, 2008, from <http://doi.acm.org/10.1145/1047124.1047455>

- Kali, Y & Ronen, M. (2005). Design principles for online peer-evaluation: fostering objectivity. In Proceedings of the 2005 conference on Computer support for collaborative learning: learning 2005: the next 10 years. Computer Support for Collaborative Learning. International Society of the Learning Sciences, 247-251. Retrieved December, 2007, from <http://portal.acm.org/citation.cfm?id=1149293.1149325&coll=GUIDE&dl=GUIDE&CFID=55469245&CFTOKEN=91236114#>
- Juwath, C. (2003). Using Peer Assessment to Develop Skills and Capabilities. *USDLA Journal*, 17 (1), 11 pages. Retrieved January, 2008, from <http://www.usdla.org/html/journal/JAN03/article04.html>
- Mirielli, E. (2007). Using Peer-Evaluation in a Website Design Course. *Journal of Computing Sciences in Colleges*, 22 (4), pp. 14-21. Retrieved January, 2008, from <http://portal.acm.org/citation.cfm?id=1229637.1229639&coll=GUIDE&dl=ACM&CFID=16762406&CFTOKEN=70257775>
- Raadt, M., Dekeyser, S. & Lee, T.Y. (2006). Do students SQLify? Improving learning outcomes with peer review and enhanced computer assisted assessment of querying skills. Proceedings of the 6th Baltic Sea conference on Computing education research: Koli Calling 2006, pp. 101-108. Retrieved January, 2008, from <http://doi.acm.org/10.1145/1315803.1315821>
- Topping, K. (1998). Peer assessment between students in colleges and universities. *Review of Educational Research*, 68 (3), pp. 249-276.
- Trautmann, N. M., Carlsen, W. S., Eick, C. J., Gardner, F. E., Kenyon, L., Moscovici, H., Moore, J. C., Thompson, M., & West, S. (2003). Online peer review: Learning science as it's practiced. *Journal of College Science Teaching*, 32, pp. 443-447.
- Wolfe, W. J. (2004). Online student peer reviews. Proceedings of the 5th conference on Information Technology Education. New York, NY: ACM. Retrieved January, 2008, from <http://portal.acm.org/citation.cfm?id=1029533.1029543&coll=GUIDE&dl=ACM&CFID=16762406&CFTOKEN=70257775>

Research funded by CIED.