FOLLOW-GROUPS: ENHANCING LEARNING POTENTIAL AT PROJECT EXAMS

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ABSTRACT

In a Problem Based, Project Oriented Learning Program of Industrial Design Engineering, students work and are examined/evaluated in groups. The re-introduction of group-based exams in 2014 and a growing focus on raising the quality of study environment provided an opportunity to experiment and compare learning potential by re-introducing more peer to peer learning mechanisms. This opportunity has spawned the question: "Can organising that students observe each others groups based project exams be used as a mean to both raise the learning potential even further and create a more engaging and open study environment by?"
Four aspects were investigated in two rounds through a survey; 1) The perception of the exam as a learning situation in order to establish a baseline for their understanding of the exam in general. 2) Their understanding of their own grade and 3) their understanding of the grade in relation to the learning objective. 4) Finally their understanding of their project evaluation in relation to the other projects in the class. The investigation show that following another group's exam significantly heightens the students' perception of the exam situation being a learning situation and that they do experience additional learning from observing the examination of another group.

Keywords: Exam, Follow-groups, Peer learning.

1   INTRODUCTION

In a Problem Based, Project Oriented Learning Program of Industrial Design Engineering, students work and are examined/evaluated in groups. The re-introduction of group-based exams in 2014 is part of the DNA of the university and the organizations own perception of the exam as an important learning situation. The assumption being that allowing the students in the group to hear and build on questions to and answers from the other group members throughout the entire examination, would significantly raise the learning potential. In parallel with the reintroduction there has been a growing focus on raising the quality of study environment by staging more interaction and collaboration between students of different groups, semesters and a more open study environment.

This combination has spawned the research question of the possibility to utilize the group-based exam as a mean to both raise the learning potential even further and create a more engaging an open study environment? In other words, can the students learn even more and put their own project learning into perspective by seeing other project exams?

As an experiment the study board allowed for a trial period for 1 year testing the idea of re-introducing follow-groups at the project exams. A follow-group means that each group on a semester should attend the entire examination of another group, including presentation, discussion and evaluation.

In this type of program, the learning objectives for the project modules revolve around knowledge, skills and competencies, primarily related to design and engineering processes and methods. The design proposal itself is not directly evaluated, partly due to the perception of design processes being open-ended [1], iterative [2] and the main learning of a design student is about navigating the process, not mastering the design of particular type of products. The emphasis in the Industrial Design program is on the early phases of innovation and development, where framing and conceptualisation are main activities that the students have to demonstrate they can master. Project modules are used to create a learning space where students within relative open briefs need to frame and develop their own projects [3]. Therefore project proposals are usually very different, especially at higher semester students are given a very high degree of freedom to define, scope and execute projects. A direct comparison between the design proposals of the groups are subsequently not necessarily meaningful in it self.

Evaluation of project modules are primarily designed to be learner-centred [4], with an emphasis on promoting learning from the mistakes and successes from the project examined to improve performance in the process in the next project. The group exam promotes discussion and dialogue, eliciting the understanding of the design process carried out, the effects and consequences to the design proposal and the students ability to build new synthesis and reflections during the examination it self.

A key tool for teachers and censors to engage in any discussion and questioning of the process behind the design proposal is the process report. Each group document their process continuously and summarise the work in a report, outlining the main research, requirements, experiments, reflections and the iterations they have been trough [5]. To some extent it is build as a combination of short (pr. activity) and long (phases) learning cycles [6] that will reveal students ability to identify (knowledge) and utilise methods and tools (skills) in a relevant manner and timing in a design process (competencies). So even though it is summative assessment [4] with regards to specific learning objective for one project module, it also serves as a formative assessment in relation to supporting the students overall learning on mastering the design process through the increasing complexity of project modules in the entire curriculum.

It is this broader perspective that was thought to be relevant to fellow students from a follow-group, providing them with an additional example on how a project on the particular level could be executed and the assessors (teachers) questions, comments and evaluation of that process.

Furthermore opening up the processes behind through opening the evaluation for students across the class may help promote an open culture, where students see that can learn from each other's mistakes without affecting them selves in a negative way. Their projects are so different anyway that direct comparison and 'stealing' ideas is not very relevant, but inspiration on using methods and approach to the design process is very relevant.

2   METHOD

The timing of introducing follow-groups across the Industrial Design Engineering program in the fall of 2015 provides the opportunity for conducting a survey on a class having normal 'closed' exams in summer 2015 and subsequently trying a follow-group exam format in winter 2016 to see if they changed their perception. The class was on their 6th BSc in the summer exam 2015 and on 1st MSc in winter exam 2016. This means that they have tried the normal group exam 6 times before the introduction of follow-groups at their exams.

4 aspects were investigated through the survey both times. First question is about the perception of the exam as a learning situation in order to establish a baseline for their understanding of the exam in general and to investigate if it aligns with the organisations own perception.

Second question regards their understanding of the grade to investigate whether there is match between the experienced evaluation during the examination and the grade

The third question is about students understanding of the grade in relation to the official learning objectives, in order to investigate if the exam provides the students with a clear impression of the degree to which they met the learning objectives for the project module.

Fourth question is about the students understanding of their project evaluation in relation to the other projects in the class, to investigate whether their comparison of grades between project groups becomes clearer if they have a chance to observe the evaluation of the other projects. Since it is not the proposals them selves that are evaluated, but the learning from the project it is interesting to see if that becomes more evident with follow-groups.

Second survey also included additional open questions on the learning outcome on following another groups project exam, one question for immediate functional value and second question for additional reflection on own learning from own project.

3   RESULTS

The survey gave 16 respondents in round 1 after the normal group exams in summer 2015 and the second round gave 25 respondents after the group exams with follow groups in winter 2016.

3.1 Exam as a learning situation?

The question "In your experience to what degree is the exam it self perceived as a learning situation?" in the survey show a little polarisation tendency after the introduction of follow-groups. The

percentage of students who "very highly" perceive the exam as a learning situation has increased more than 100% from 13% to 31% or the respondents. At the same time 4 % now state they have a low perception, with n=26 it means that one person does not perceive the exam as a learning situation, but with the number of respondents increasing from 16 to 26, it is not clear whether this person changes his/her mind or it is a new respondent. But overall there is a slight increase in the high/very high group and significant increase in the very high group. Indicated a positive influence.
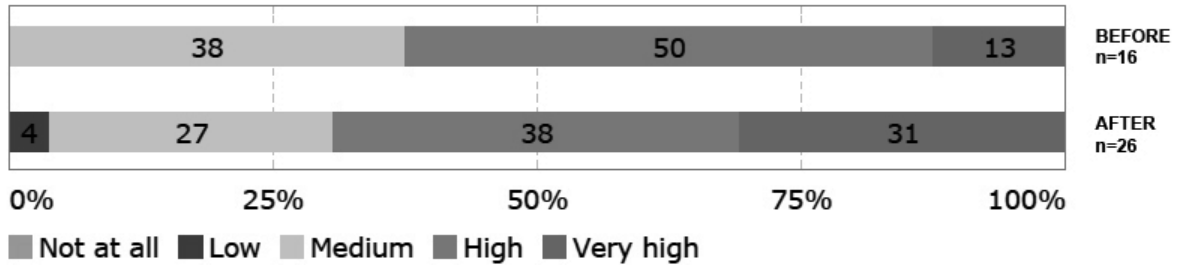

Figure 1. "In your experience to what degree is the exam it self perceived as a learning situation?"

3.2 Understanding the grade?

The question "How well do you understand the reasons for your grade after a project exam?" provides less clear results with a slight tendency for polarization. On one hand there is an increase in students who understand the grading "very well" from 0% to 19%, but at the same time the "well" response has decreased from 75% to 46% lowering the total response on "well/very well", but increasing he "fair" share from 13% to 31%. The number of students with "low" understanding has decreased from 13% to 4%. So in total the percentage of students with a fair understanding and above has increased, but the increase is distributed over more steps with a significant increase in understanding the grade very well.
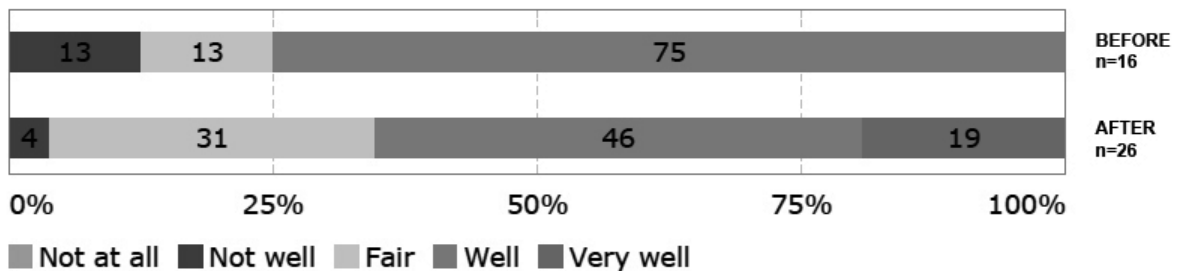

Figure 2. "How well do you understand the reasons for your grade after a project exam?"

3.3 Understanding the evaluation compared to learning objectives

The results of the question: "How well do you usually understand the evaluation of the project in relation to the learning objectives after a project exam?" shows no change can be detected between the *before* and *after* a follow-group exam experience.
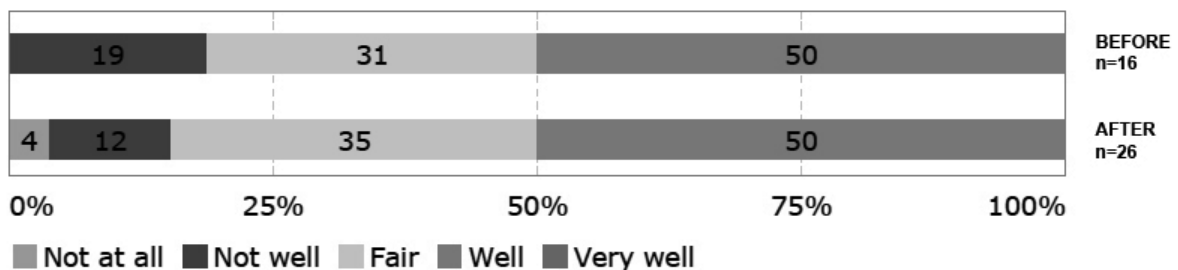

Figure 3. "How well do you usually understand the evaluation of the project in relation to the learning objectives after a project exam?"

3.4 Understanding the evaluation compared to other projects in the class?

The comparative question "How well do you understand the evaluation of your project in relation to other projects in your class?" shows only a very slight increase in the understanding. The overall rating shows that about a third of the students do not understand the grading between different project, and the observation of other exams has not significantly changed their perception.
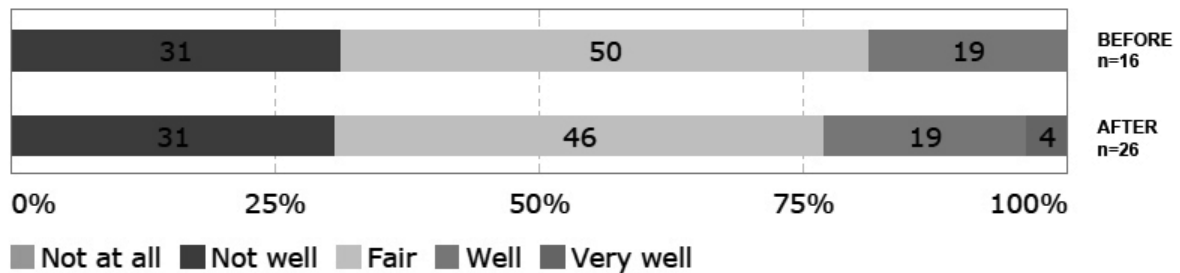

Figure 4. After (top) and before (bottom) a Follow Group experience

3.5 Learning outcome of observing a group exam?

A significant majority of 85% of the students responded positively on the question: "Did you learn something you could use for your own? If yes, what? - Yes I learned:" And they had many comments on what they learned.
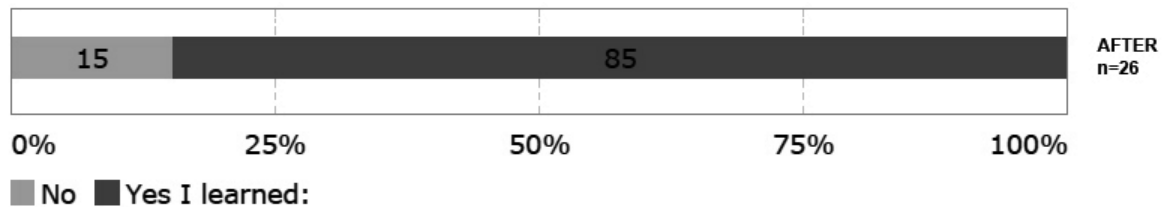

Figure 5. "Did you learn something from a Follow Group experience?"

3.5.1 Presentation

12 commented on presentation and presentation skills as learning outcome: "The presentation method", "How to present yourself", "Reflecting on others presentation", "That I should be better at selling my project, and that the presentation should be more fluent", "General presentation feedback and subjects discussed afterwards", "The importance of a red line during the presentation, not just give points, but sum up during the presentation so it is clear why this is presented", "I learn how important it is to have faith in the product while presenting", "How to improve the way of presenting" and "Tips for presentation".

3.5.2 Seeing a project from outside

Other comments touch on the need for transparency in process reports: "Seeing how transparency pays off, as the gaps in the projects are easily identified by third parties anyway." Which indicates that they now can see a project from outside.

That is also supported by comments on the experience of being at an exam: "That the exam is not as intimidating as what you perceive when you are in the "hot seat" yourself" and "I could se myself in the way we change the questions when we do not understand what the supervisor ask a question".

3.5.3 Peer-to-peer aspect

Furthermore some comments are directly related to the peer-to-peer aspect: "It was nice to have an impartial opinion on the questions asked by the examiners". Also to "have an evaluation on your own performance that was not given by a professor was a nice experience." And that "Getting feedback from peers, helped clarify even further, and get a view from an additional perspective".

3.6 Additional reflection on own project?

An additional question to prompt students for learning outcome was "Did it make you reflect on the learning outcome of your own project? If yes, what? - Yes, I thought that:" Only about 50% of the

respondents, indicated that it was basis for additional reflection on their own project and learning outcome from that.

| 46 | 54 | AFTER n=26 |

0%   25%   50%   75%   100%
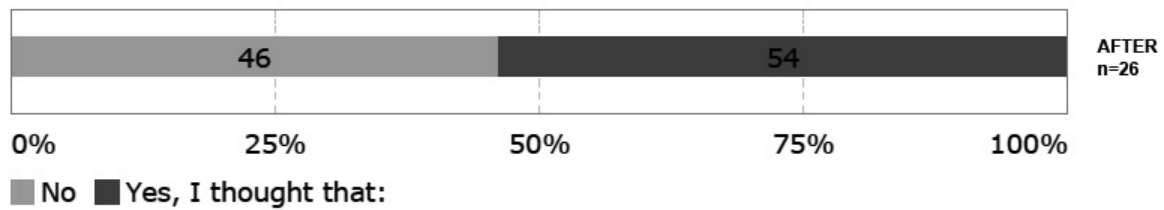
■ No ■ Yes, I thought that:

Figure 6. Reflection on own project after a Follow Group experience

Comment demonstrating the understanding of an exam being oral and based on performance demonstrating learning: "It did and it showed that the grade isn't representative of a entire project however only the day shape of the participants."
And finally that design processes are open-ended; "There's no one right answer" and " It was interesting to see how different a task can be solved".

4   DISCUSSION

Overall the survey indicates an increase in learning and understanding when looking at the answers before and after. But it is important to note that this survey has not measured the actual learning, only students' own perception of learning something more. It may be very difficult to measure exactly what they learn as it is nearly impossible to compare two groups in the same class or sequentially two semesters in a row due to the variance in students and project and the progressive learning over time.

4.1 Increased perception of learning

But the increased perception of learning is however significant, not as much in relation to grading, but in relation to the exam being a learning situation. This is in line with the mission of the University and the teachers own perception of the role of the exam being to create a learner-centered assessment [4] environment.

One should also note that the number of respondents was much higher in the second round, which may have lead to some significant changes in the numbers due to many new respondents. However, since there was no very significant change to be detected in their perception of the grading in relation to the learning objective and compared to other projects in the class is believed that this is not the case in general.

In relation to the comparison between projects, comments indicate that some students realised that projects are not as much alike as they thought and that it is not even fruitful to compare project, since "it is the performance of the students on the day" that is the basis for grading. Again this indicates a slight increase in the awareness of the exams being learned-centered, and not scoring points for a proposal. This is further supported by the comments on the benefit of having feedback and additional perspectives from other than the teachers, thus embracing the notion on learning from each other.

Especially the aspect of presentation and communication of a design process based proposal was mentioned as a key learning aspect. Seeing other groups present their projects and hearing the comments on presentation and the project reports seem to raise awareness of how to present, structure of presentation and the importance of keeping reports transparent. As one noted, teachers and censors are able to see the critical points anyway, so no need to try to hide them. Again indication of increased awareness on the evaluation focus being on learning process and methods, not producing a 'great design' proposal.

4.2 Study environment

None of the respondents mentioned any hesitation, un-comfortability, insecurity or unwillingness to have an audience listening to both their presentation and the discussion sessions at their exams. It strongly indicates that the experience of having follow-groups had no negative impact on the study environment and comparing it with the positive comments on the learning on observing other groups in almost indicate positive impact on their study environment in the class.

5   CONCLUSION

The research questions behind this survey were "is it possible to utilize the group-based exam as a mean to both raise the learning potential even further and create a more engaging an open study environment?" And can the students learn even more and put their own project learning into perspective by seeing other project exams?

Based on the answers from students themselves 84% state that they did something from observing an other groups' exam and 50% claim that it gave additional reflection on the learning from their own project. So the short version is yes it is possible to increased the perceived learning and even it is not directly traceable the study environment, seen as openness and willingness to learn from each other, does benefit from the follow-group setup.

Is it recommendable to introduce follow-groups for project exams? Yes. In a study program with so much emphasis on the process behind it can help highlight the very nature design process based projects by inviting peers to observe and follow an in-depth evaluation of a parallel project.

It has the absolute benefit of being almost 'free' of costs for the organisers, the only effort required is organising the combination of groups for being observer or observed.

REFERENCES

[1]   Buchanan R. Wicked Problems in Design Thinking. *Design Issues*, 1992, Vol. 8, No. 2, p. 5-21.
[2]   Lawson B., *How Designers Think - the design process demystified*, 1980 (Architectural Press: London, UK)
[3]   Tollestrup C. Project Time-boxing and Milestones as Drivers for Open Design Projects. In *International Conference on Engineering and Product Design Education, EPDE15*, Loughborough, September 2015, paper 221. (Design Research Society, London)
[4]   Crawley E. F. et al. *Rethinking Engineering Education*, 2014 (Springer International Publishing, Switzerland)
[5]   Tollestrup C. Semi Scientific Attitudes Through Process Reporting On Knowledge Production. In *International Conference on Engineering and Product Design Education, EPDE10*, Trondheim, September 2010, paper 225. (Design Research Society, London)
[6]   Kolb D.A,. *Experiential Learning – Experience as the Source of Learning and Development*. 1984 (Prentice Hall, New Jersey)