FROM GUT FEELING TO A STRUCTURED, SUMMATIVE ASSESSMENT OF DESIGN COMPETENCIES

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ABSTRACT

In the current work, we introduce a summative method for assessing the whole set of students' design competencies demonstrated in their final design project when graduating an interactive media design course, and reflect on the use of this assessment method. Both qualitative and quantitative analysis methods are used; the deployment of the instruments is analyzed in a qualitative manner, and the scores underlying the final grade are analyzed in a quantitative manner using a custom-made visualization tool. Evaluations show that during the deliberation phase, the supervisory team concentrated on the discussion and assessment of the competencies rather than agreeing on a final grade. The visualizations of the scores enabled us to discern major patterns in the grading of our assessment, which in turn fed into adjustments of the assessment procedures as well as the curriculum in general.

Keywords: Design education, assessment, instruments, design competencies

1   INTRODUCTION

A final design project is often used to give students the opportunity to demonstrate whether they have obtained the right level of expertise to graduate. The level of expertise that should be acquired by the student is often formulated as a competency, a combination of specific professional capacities: attitudes, skills, and knowledge [1]. Consequently, the assessment of final graduation projects should be able to assess whether the students' work constitutes, —as Horváth defines it— a complex whole by forming a complementing combination of professional capacities [2]. Although, these competencies to be met are usually set forth in the course competency profile, a holistic assessment of students' competencies and professional capacities is not a straightforward exercise.

In competence-based education not only the product is being evaluated, but also the process and the students' reflection on their development is part of the assessment [3]. In our own observations, however, we have seen many assessors struggling with lists of ambiguous criteria used to assess the students' competencies; it seemed that experienced assessors often rely on their intuition or 'gut feeling' to grade the students, and are not stimulated to make their choices explicit. At the same time, recent developments in the accreditation of higher education in The Netherlands demand a more transparent assessment and grading system. This all makes grading of final graduation projects a delicate issue which requires a transparent summative assessment qualifying a student as a competent professional.

The aim of the current study is to gain insight in structured, summative assessments in order to contribute to the political and educational debate on objective and accurate grading systems. We developed a summative assessment instrument, and applied this in the context of grading final design projects of an interactive media design course.

1.1 Course Context

The context of the assessment is the graduation project of the bachelor course Communication & Multimedia Design (CMD) of Rotterdam University of Applied Sciences. The CMD bachelor course

is a four-year course, which educates students to become designers of interactive media. CMD students conceive, design and develop: websites, mobile applications, interactive environments and many other interactive artifacts. During the last semester of the course, CMD students work individually on their final project, at a design company. The final projects should enable students to demonstrate their competencies; that they have acquired sufficient skills, knowledge, and a professional (design) attitude that qualifies them to start as a junior practitioner.

1.2 Final Design Project

The final design project consists of two elements: the thesis (which investigates state of the art theory and knowledge) and a design project (a real life situation in which students have to demonstrate their competencies). The thesis and design project are closely related as the thesis forms the foundation and rationale for the design project. The decisions students made, should on one hand be grounded in desk and field research, and evaluated by their prototypes, and on the other hand, these all need to be reported and reflected upon in the thesis. The duration of a final project is five months and holds several 'checkpoints', like a poster presentation (presenting the scope and aims of the project), a 'green light' presentation (a formative assessment to determine if the student is 'on track'), and finally a summative assessment presentation in which a student presents the outcomes of their research, and their design project.

Students are assessed on a set of criteria, which are based on competencies. These competencies are based on a national profile of CMD courses [4] and adapted to the course profile with the input of practitioners from the interactive media industry.

1.3 Final grading protocol

The final assessment is a one hour session that consists of four specific stages: presentation, interview, deliberation, and feedback. Students present the outcomes of their research and their design project, after which the course- and company supervisors, together with an external representative of the design industry, conduct a criteria oriented interview [5] with the student. Once the student has answered a number of questions (depending on time available) to the satisfaction of the committee, the student is asked to leave the room, after which the committee deliberates on the grading of the criteria set forth in the assessment form. Once the committee has arrived at consensus regarding the students' performance, he/she is asked to reappear before the committee to receive the result, grade and final feedback regarding the graduation project.

As previously mentioned, having a holistic assessment of the students' competencies and professional capacity means that students are graded on eleven criteria on which they can score at four levels (unsatisfactory, satisfactory, good and excellent). The latter three of these levels lead to a passing result, however due to the multidisciplinary nature of the interactive media design field, students tend to develop some disciplines to a higher level than other disciplines. For instance, one student focuses on the discipline of interaction design, whereas another student focuses on the development of his/her visual design skills. Both of these disciplines form an equal part of the interactive media design field. We feel that this individual development is key to becoming a proficient (interactive media) designer, however as assessors we should not emphasize one area of development over any of the eleven other criteria. The final grade is a single digit grade on a scale of 1 to 10, where a 6 or higher qualifies as a passing grade.

The aim of this paper is to evaluate the instruments and to gain insight in the use of structured assessment instruments, by applying these in the context of the assessment of final graduation projects of an interactive media design course. The deployment of the instruments is analyzed in a qualitative manner, and the scores that resulted in the final grade are analyzed in a quantitative manner.

2 METHOD

2.1 Instrument

The assessment tool consists of four instruments: a manual, a question list, an assessment form, and a calculation aid that supports the transformation from the assessed competencies into a final grade on a scale of 1 to 10. The objective was to make the assessment procedure more transparent by supporting the grading with solid argumentation how the committee arrived at their final grade. This set of four

instruments forms an interconnected whole that guides procedures and the assessment of the final project.

The manual is a formal description of the procedures that take place when the assessment of the final project is done. It outlines the specific parts of the assessment and describes the roles of the members of the final project review committee. The assessment reviews three specific parts of the final project: thesis, project and final presentation. These three parts are evaluated using eleven distinct criteria.

The assessment form describes the eleven criteria that a final project is graded on, on which the student can score on four levels (unsatisfactory, satisfactory, good and excellent). Three of these levels lead to a passing result. An unsatisfactory result for any of the criteria, results in a failure of the final project. The assessment form collects feedback on the same set of specified criteria, and the (resulting) final grade. All members of the committee sign off upon this form.

In order to support the assessment of the design competencies we developed a supporting list of questions (see also [6]) that can be used to determine whether the student meets the criteria set forth in the assessment form. The thesis has been read beforehand by all the members of the committee and a general impression is formed by the presentation of the student, after which, during the question round, the interview questions are used to validate the impression. Next to that, we assess the reflective capabilities of the students and any other concerns that arose from the thesis, the project, or the presentation.

The calculation aid is a form that enables the committee to calculate a final grade that is based on these scores circled on the assessment form (see Figure 1). The three parts of the final project (thesis, project and presentation) are weighted into the final result, i.e., 40% for the thesis, 40% for the project, 20% for the presentation.

Figure 1. Example of the assessment form and calculation aid

In a pilot, we first validated whether the use of the structured assessment method did lead to a final grade that corresponds with previous assessments. Hereto, we reassessed several graduation projects from the previous year. We randomly selected five projects. These projects were anonymized and all members of the curriculum committee completed the assessment forms. The comparison of the scores

using the structured assessment method and the earlier assessments showed that the new assessment method stimulated a stricter, more precise scoring.

2.2 Setup

A team of assessors was formed for each graduation student: two graduation supervisors from the course, one graduation supervisor from the company where a student worked on his final project and an external representative from design industry. In total, 17 graduation supervisors from the school, 50 assessors from the companies, and 20 external representatives were involved in the assessment of 58 final projects.

At the start of the current study in February 2011, 75 students were registered to start their graduation project. After three months 64 students of this group did their 'green light' presentation and 58 students of this group eventually participated in the final assessment in either June and/or August 2010, one student failed. The scores of these 58 students have been analyzed.

2.3 Data collection

During the assessments of the final projects we observed assessor teams when they deliberated on the assessment of competencies and discussed the resulting final grade. After the assessment, the use of instruments was evaluated with assessors from the teaching staff. They were asked to give feedback on how the instruments supported them in grading the graduation work and what their experiences were using this tool.

3   RESULTS

In this section, we report on the results from the evaluation with the assessors and the observations during the assessment. First, we present the usage of the tool, and then we look into the outcome of the grading of the assessments.

3.1 Use of structured assessment instruments during the final assessment

Observations during the deliberation phase of the final assessment showed that assessors were less likely to rely on their general impression of the work and the presentation. Instead, they were actively discussing the students' results on the criteria set forth in the assessment form. Discussions between course supervisors, company supervisor, and external advisor stayed focused on discussing the competencies. This might be due to the fact that the calculation of the final grade is deferred to the calculation aid. As a result of this, it appeared easier for the committee to collect feedback around the specific criteria, since each member of the committee already had to argument his/her assessment for that specific competency. When the assessors finished their discussion and asked the student to reappear before the committee to receive the final result, the committee was better prepared to link their feedback to the criteria set forth in the assessment and seemed to be more confident motivating the resulting final grade.

Experienced assessors did not rely on the question list while examining, however, less experienced assessors based their interview questions closely on the questions set forth in the question list.

3.2 Outcome of the evaluation of the instruments with the graduation supervisors:

In general, the assessors mentioned that the discussion during the grading was about the criteria set forth in the assessment form and not about the final grade. Although the assessment instrument was helpful in assessing the design competencies, some assessors indicated that the final grade did not match with their 'gut feeling'.

3.3 Outcome of quantitative analysis of the assessments

A small piece of visualization software was written to visualize the scores of the assessments for each student. This visualization was created for each of the 58 students. Figure 2 shows the resulting visualization for two average students. Figure 3 shows the resulting visualizations for two excellent students. Both figures show a variety of scores regarding the criteria, but leading to a similar final grade. In other words, assessors seem to be able to discern the individual qualities of the students' work and assess the individual merits of the work in relation to the entire body of graduating students.
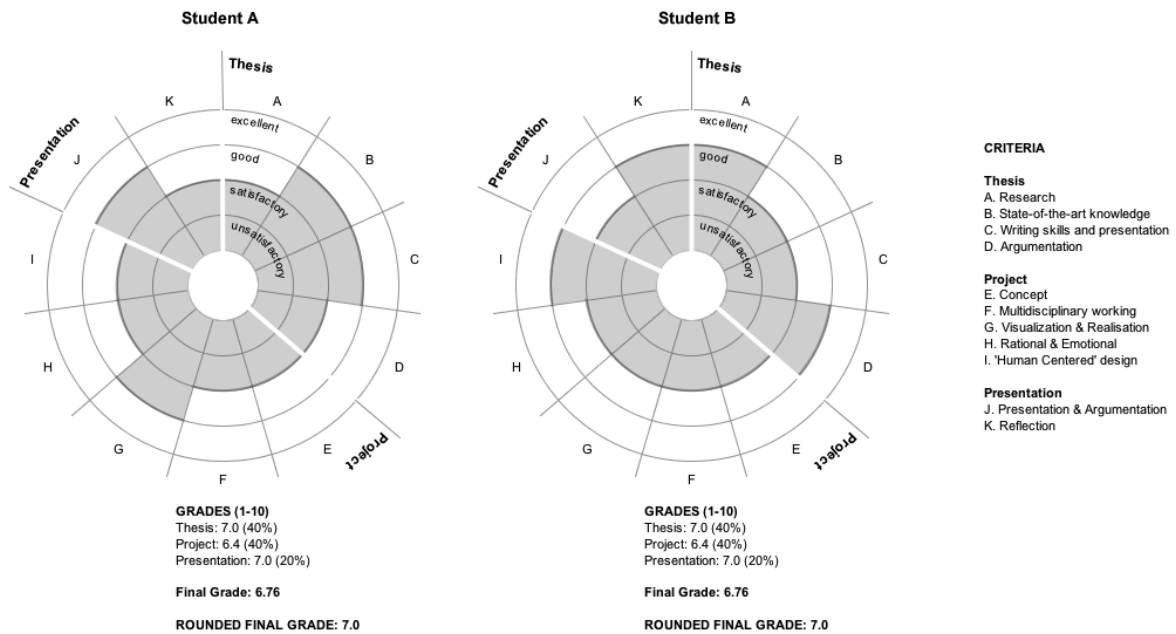
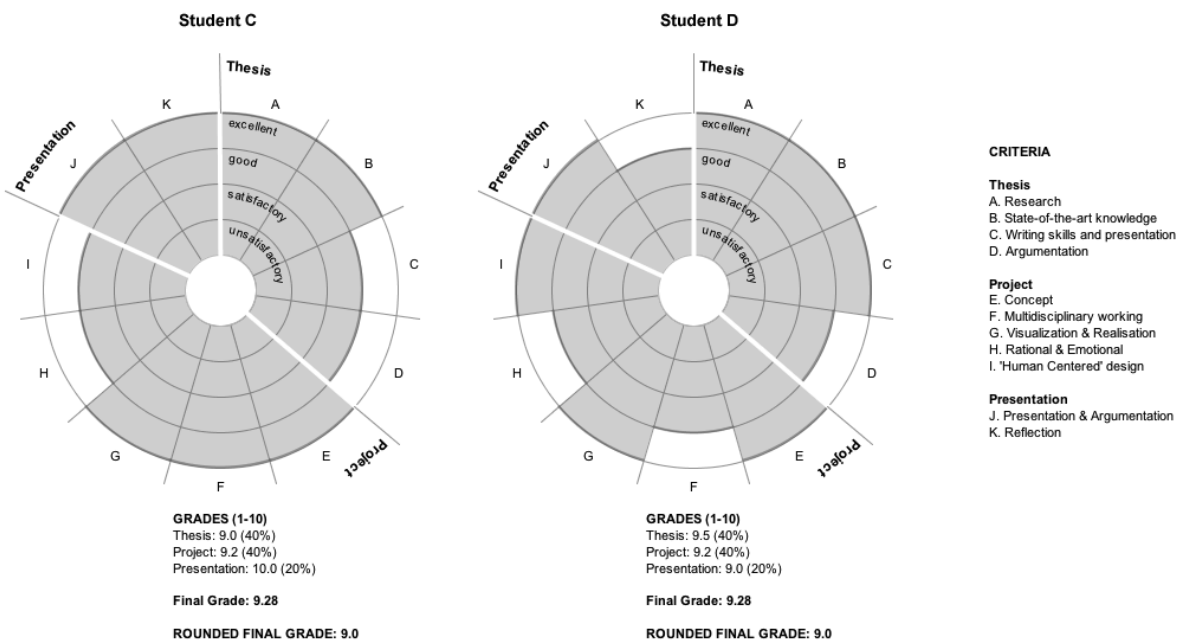*Figure 2. Different scores lead to similar final grades, in this case two average students (1-10 scale)*

Figure 3. Different scores lead to similar final grades, in this case two excellent students (1-10 scale)

4 DISCUSSION AND CONCLUSIONS

The usage of a structured calculation aid did not only lead to better discussions and a more structured assessment; it also enabled us to visualize the assessments. These visualizations in turn provide a fertile ground for continuing discussion on assessment procedures, for individual students as well as for the curriculum in general.

Being able to visually compare the outcomes of various assessments allows us to gain insight into the different assessments and to find patterns as well as points of interest, which inform further course development. Based on the current sample we were able to discern two major patterns in the grading of our graduation projects. On one hand, in keeping with the main goal of a university of applied

sciences, we found that the majority of our students demonstrate that they are able to apply their work in the real life practice. On the other hand, the visualizations showed, that students who demonstrated a better holistic understanding of the design practice, also outperformed on translating state-of-the-art knowledge into real-life context. The visualization, in combination with the final grade appeared to be a reliable benchmark of the quality of the students' work in relation to his/her peers.

The current study demonstrated that structured assessment instruments have dual purposes; primarily holistically assessing the quality of the work of the students, and secondarily, improving the discussion amongst the members of the supervisory team during the deliberation on the final grade.

As mentioned before, some assessors felt confronted with their own subjectivity when valuing specific competencies in relation to the whole assessment. Our observations stressed the need to distinguish between 'gut feeling' and intuition. Experienced assessors who were used to grade students based on their intuition were positive about the instrument and did not see major differences between grading in the previous situation and the current one, however they appreciated the support in explicitly motivating the nuances of the specific design competencies. A side effect of revealing the tacit expertise of experienced assessors was that the junior assessors felt they improved their understanding of the competencies and associated criteria and proficiency level. This seems to be beneficial for the students as well. Usually students complained about perceived subjectivity of the final results; interestingly, the current cohort hardly discussed their final grades.

Some assessors, who were initially unhappy with the usage of a calculation aid to establish the final grade, found that the calculation aid was helpful in their assessment and made them aware of their own subjectivity when it comes to the proficiency of specific competencies. Furthermore, it allowed them to gain better understanding how specific competencies were weighted in relation to the whole assessment. As a consequence using a holistic assessment tool, every project is assessed on the same eleven criteria, with the same weighting factors, while also taking into account the fact that final projects vary greatly in subject matter (for example, visualization techniques for social networks or persuasive design for elderly). All in all, it can be concluded that structured assessment instruments, when properly designed, help assessors to distinguish between a 'gut feeling' and their intuition, as well show the relative merit of a specific competency and matching proficiency level.

REFERENCES

[1] Bakerman, A. Attitude, Skill and Knowledge (ASK): a New Model for Design Education, 2005, *(King Saud University, Riyadh, Saudi Arabia)*.

[2] Horváth, I. Design competence development in an academic virtual enterprise, *Proceedings of IDETC/CIE,* 2006, Philadelphia, Pennsylvania, USA, pp. 1-10.

[3] Baartman, L.K.J. Bastiaens, T.J. Kirschner, P.A., van der Vleuten, C.P.M. Evaluating assessment quality in competence based education: A qualitative comparison of two frameworks. *Educational Research Review 2*, 2007, p.p. 114–129.

[4] Serière, J., Leurs, B., Peeters, J., van Turnhout, K., Holwerda, R. (2011) Beroeps- en Competentieprofiel Communication & Multimedia Design, Maastricht, The Netherlands, March 2011 (INCMD).

[5] Dochy, P. Nickmans, G. Competentiegericht opleiden en toetsen. Theorie en praktijk van flexible leren [*Competence-based education and assessment. Theory and practice of flexible learning*]. Utrecht, Lemma (2005).

[6] Leurs, B., Mulder, I. and van Waart, P., Developing A Human-Centered Attitude through experiential learning. In *The 4th IASDR World Conference on Design Research, IASDR 2011*, Delft, 2011.