Teaching Systematic Reflection To Novice Educational Designers

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Summary

How to help students in the field of instructional design and educational technology to develop their professional expertise through systematic reflection? This question is answered by describing the intended, implemented and attained curriculum of a third year university bachelor course on systematic reflection for design students. In this course, students learn four modes of reflection that originate in the work of the philosopher Kant. This approach is perceived as a different, yet productive addition to existing reflection approaches.

Introduction

Reflection is an important competency for designers in general (e.g. Schön, 1983) and for instructional or educational designers in particular (e.g. Rowland, 1993). Moreover, in the process towards formulating instructional design competencies, expert designers viewed reflection as an "essential element of successful design for all designers, novice and expert" (Richey, Fields, & Foxon, 2000, p.72). Since it is such an important competency, reflection should be a clear component in the education of designers (e.g. Rowland, Fixl & Young, 1992; Shambaugh & Magliaro, 2001).

Reflection can be regarded as an element of academic competence. Therefore, in higher and university education, teachers regularly ask students to reflect on their work (e.g. Boud & Walker, 1998; Boud, Keogh & Walker, 1985; Korthagen & Vasalos, 2002). In a number of cases, teachers provide guiding questions to steer the students' reflection. These guiding questions frequently are based on a logic of improvement: What was wrong in your project, what are the causes of it, how can you learn to do it better a next time? In line with these questions, however, more than occasionally the student papers turn out to be rather an expression of a negative self-evaluation, than of real reflection. Not only can this approach be demotivating since students need to start with the idea 'I did not do my work well', but it also leads to superficial professional and academic growth, resulting in a mastery of explaining their failures in terms of external circumstances, and at best to only technical clues for how to improve their work. Some teachers might approve this as good reflective work, others will not. It thus shows that the concept of reflection is vague, meaning different things for different persons, and that students have difficulty in doing it.

This observation has resulted in a collaborative endeavor of a philosopher and an ID expert , being the authors of this paper, to develop a distinct course on systematic reflection for students in the field of instructional design and educational technology at the University of Twente. In this course, students, who are in the third year of their study, learn four modes of reflection that originate in the work of the philosopher Kant. The course has been taught to 7 groups of students since 2002-2003. The student study load for this course is 5 European Credits, equaling 140 hours.

The basic question underlying course design and delivery has been: *How to help students in the field of instructional design and educational technology to develop their professional expertise through systematic reflection?*

The purpose of this paper is to provide an answer to this question by describing the intended, implemented and attained curriculum (Goodlad, 1984; van den Akker, 2003). The first section of this paper is therefore devoted to our views on the nature of reflection and how to teach it (the intended curriculum), a description of the course as it is implemented (the implemented curriculum), and an overview of student perceptions and results (attained curriculum).

From the beginning we took a design research perspective (Nieveen, McKenney & van den Akker, 2006) in the sense that we:

- expressed and described a conceptual framework, based on literature review that portrays our perspectives on reflection and on teaching reflection;
- conducted an iterative course planning, in the sense that evaluation results of a course in one period led to revisions of the course in the next period;
- systematically documented and reflected upon the process and its outcomes, in order to support retrospective analysis. As such, for each course we rely on the following documents: course syllabus, author(s)' articles, electronic learning system, teacher planning sheets and log files, e-mails between teachers and between teachers and students, course evaluations –both smile sheets and in-depth evaluations- by students, student papers,

written feedback on student papers by teachers and students, student grades, and external audit statements on the quality of the course.

In the second part of this paper, we will describe these sources and explain how the design research perspective supports our work. An explanation of the methodology and evolvement of the course are followed by a discussion of the findings and future implications of our work.

Part 1: The Curricular Representations Of The Systematic Reflection Course

The systematic reflection course will be described at different curricular levels. First, the basic assumptions and views underlying the course will be formulated as the intended curriculum. Second, the section on the implemented curriculum will describe how the course is being organized and implemented. Third, in the section on the attained curriculum, we describe students perceptions of the course, and describe their development in the reflective competence.

The Intended Curriculum

The Nature Of Reflection

According to John Dewey (1916, 1933), by many authors perceived as the founding father of reflection in education, reflection starts with experience, not with theory. "An ounce of experience is better than a ton of theory, simply because it is only in experience that any theory has viral and verifiable significance" (Dewey, 1916, p. 44). Dewey distinguishes between two types of experience. The first is trial and error, leading to rules of thumb without insights into acting and outcomes. The other is reflective experience, meant to get insights into relations between causes and effects both in theory and in acting. Dewey's model for reflective experience can be viewed as a circle, consisting of the steps: sense of a problem, the observation of conditions, the formation and rational elaboration of a suggested hypothesis, and the active experimental testing. This approach to reflection can be characterized as a process in which the student acts as a problem solver (or in a metaphor: as an engineer) and grows through learning from his or her own mistakes.

One key characteristic of Dewey's model, and a lot of models stemming from this tradition, is that it is aimed at improvement. Although the wish to improve one's performance is instrumental to professional growth, this approach has, as already said, a serious drawback: the learner must take a negative view towards his or her previous experiences. As such, reflection has the nature of a (negative) self evaluation ('I did not do well'), often resulting in excuses and good intentions ('I will do better next time'). Also, students often stick to giving explanations of why something did not go well. This way, they do hardly get any new and deeper insights.

As described in previous publications (Procee, 2006a; Procee, 2006b) an in-depth study of the work of the philosopher Kant (1787, 1956) results in another, more fruitful view on reflection. Rather than a focus on improvement, it emphasizes the making of discoveries. Kant distinguishes between understanding ('Verstand'), judgment ('Urteilskraft'), and experience. On the one hand, there is the experience, something the individual has done or encountered. On the other hand, there is understanding, which is related to the ability to grasp logical, theoretical, and conceptual rules; in-between, there is judgment, which is related to the ability to connect experiences with rules. Folllowing Kant, there can be posed two assertions:

- Learning formal knowledge should be characterized in terms of understanding.
- Exercising reflection has to be characterized primarily in terms of Kant's notion of judgment.

Following these assertions, the character of reflection radically differs from the character of learning formal knowledge. Because judgment (as the capacity to combine heterogeneous elements) is situated between experiences and understanding (concepts), reflection activities depend on the breadth of the experiences, as well as on the feasibility and productivity of the concepts introduced for inquiry into those experiences. This mirrors Kant's famous dictum: 'Concepts without experience are empty, experiences without concepts are blind'. In the process of reflection, concepts have a double function; they function as a source of inspiration to analyze the experience and as an outcome in which they are better understood than before (Procee, 2006a). According to this approach reflection is not submitted to the logic of improvement, but to an emotionally more neutral logic: the logic of making discoveries.

As argued by Procee (2002) Kant's table of moments of thought, as developed in his Critique of Pure Reason, can be usefully adapted and developed for a systematic approach to reflection. Kant's four moments are:

- Quantity: this moment creates a reflective space that stimulates learning discoveries. It generates new and unexpected views on experience.
- Quality: refers to points of view that may be helpful to estimate (elements of) experiences and choices made.
- Relation: this moment brings about dynamic elements by introducing points of view that are related to different visions from a professional as well as a social context.
- Modality: this refers to the status of the judgment, in our view, it reflects on the reflection process itself and on aspects of (professional) identity.

In order to make these modes of reflection communicable, we introduced geometrical names; point reflection (quantity); line reflection (quality), triangle reflection (relation); circle reflection (modality) (see Procee & Visscher-Voerman, 2004; see table 1).

In the following sections, the general structure and aspects of the four reflection modes are described. Step-to-step approaches of each mode will be described in a later section, where the content of the course events are being described.

Table 1: Reflection modes after Kants moments of thought

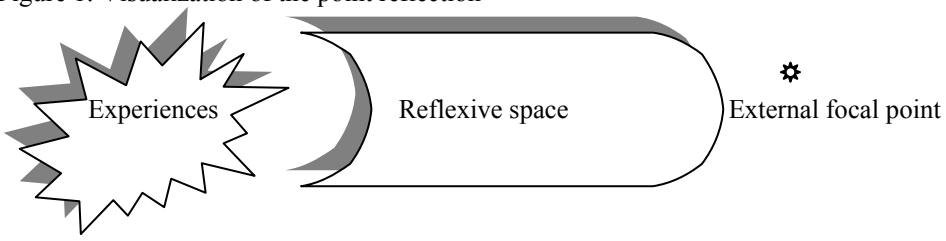
Kant's moments of thought	Type of reflection	Geometrical figure
Quantity	Point	•
Quality	Line	——
Relation	Triangle	△
Modality	Circle	❍

Point Reflection

Underlying this mode of reflection is the acceptance that an experience should not be seen as an unequivocal fact, but that it may be described in many different ways. By the 'free play of imagination' it is possible to highlight unique features. Therefore, it is important to take the experiences to a new reflexive space outside the own experience, in which new thinking activities can take place. In the reflexive space all kinds of discoveries can be made, for example with respect to the use of materials ('what is the function of different materials'), personal feelings (what in the project made me happy, what made other people happy), or a color (green: 'where did I appear to be a greenhorn?' 'What was fresh and new in our approach?'). The point reflection is visualized in figure 1. The choice for the external reference point depends on the pragmatic question: do I expect to learn from this? But one should be careful: each question will highlight different aspects in the experience, and some questions are more meaningful than others. Choosing a topic close to the experience will not add to deep reflection. For example the question 'how was the communication with the client?' will lead to a chronological description of what has been done, with little room for new viewing points. On the other hand, viewing points far from the experience may raise so many new questions, that it results in chaos. For example, the topic 'design vision' may lead to reflections on this vision itself, on parts of the vision, on other design visions, on how the vision permeates the product, etc. There are than too many questions, so that the link to the direct experience disappears.

Apart from the viewing point chosen, the quality of the reflection also depends on the type of questions that are being raised. 'Why' questions can better be avoided, since they provoke a justification for actions, as if the experience itself was wrong, which may strengthen the negative feelings of the student about the performing of his or her task. Questions such as 'how' and 'what' are better, because they put less pressure on the reflecting person.

Figure 1: Visualization of the point reflection



In this stage the role of the reflection partner is precarious. Such a partner has to be involved in the learning process of the student, and less in the aims of the design project itself. Reflecting with colleagues who have been working on the same project has some disadvantages, because they share the similar experience. Reflecting with one

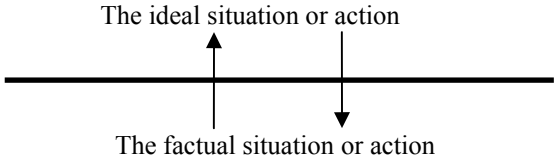
self, although being a real human capacity, is even more difficult. To create a model of the reflection partner (and also of the teachers involved in these reflection processes) a novel of the Swiss author Max Frisch is very helpful. In the novel *Mein Name sei Gantenbein*, Frisch (1964) describes a man who is thinking about living as a blind person. He is curious to know what could be his most adequate vocation. In a great passage he concludes that the role of tour guide would be most appropriate. Suppose, you are seated at the foot of the Acropolis and your group of tourists have to explain you what they have witnessed. In that case they will observe many times better than in situations in which the tour guide is a seeing person. This image – the blind tour guide – is the bench-mark of the reflection partner. It is a person who does not tell his or her own interpretations and narratives, but who inspires other persons to tell their experiences in depth.

Line Reflection

Line reflection is about quality. It borrows its name, and partly its structure, from the philosopher Plato. Plato discriminates between the factual reality and our usual experiences on the one hand, and eternal criteria in the world of Truth, Goodness, and Beauty on the other hand.

Thus, people have different views of quality; they can qualify a situation or action as 'good' or 'bad', and are able to indicate why they do or do not appreciate it. In their minds, they have a view of the ideal or perfect situation or action, against which they mirror the situation or reflection at hand. These views may change over years, based on new experiences and new insights. Also, one vision or norm could be more fruitful than others. In this type of reflection, experiences are judged against own norms and criteria (see figure 2). But, proposed criteria, norms, and ideals also have to be examined on their appropriateness. For that reason, this kind of reflection differs in some important aspects from evaluation. It does not accept criteria as given from the outside. It starts, instead, with a procedure in which one defines and scrutinizes his personal criteria in view of his learning process. Also, based on the reflection, personal norms and criteria may be adapted.

Figure 2: Visualization of the line reflection



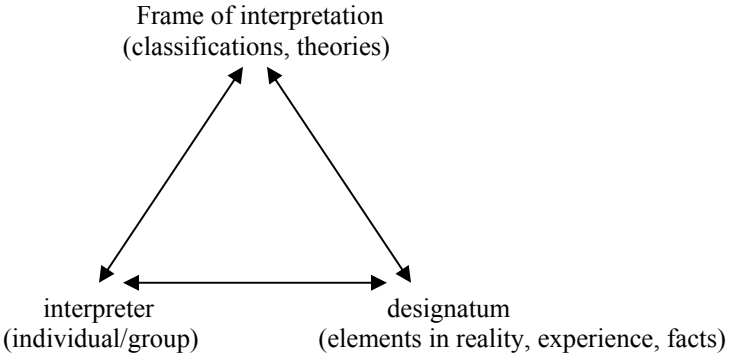
Triangle Reflection

Triangle reflection is the most dynamic form of reflection. It is based on the theory of semiotics put forward by Charles Morris (1938). In the triangle reflection, relations and connections are put central. People interpret facts or events in a certain way (for example against the norms as described in the line reflection), depending on their experiences and knowledge. For example, in traffic a red light is a sign to stop, a green light is a sign to drive. In such daily structures, there are three elements connected: the experience or fact (sign or designatum), the person(s) who give(s) meaning to the sign (interpreter), and the frame of interpretation (classifications, theories) from which meaning is derived. This can be visualized in a triangle (see figure 3).

Different interpreters may interpret the designatum in different ways, depending on their own frame of reference, and based on that, they may come to different actions. An interpreter can be an individual, but also a social group (cultural group, professional group, religious groups, scientific groups, etc). Such groups have their own frame of reference according to which they describe and explain reality.

Characteristic for this model is its dynamic structure. A change at one angle does have repercussions for the other angles. A change in the frame of interpretation (for example: the alteration from 'smoking is fine' to 'smoking is bad') does change situations in reality (special smoking places) and also creates a different image of persons (a smoker nowadays is an irresponsible creature). In a similar way, a change in reality, especially technical artifacts such as mobile telephones, redefines the social community (users and non-users), as well as the frame of interpretation about 'normal' communication.

Figure 3: Visualization of the triangle reflection



Circle Reflection

According to Kant the moment of 'modality' has a weaker position than the other moments, because it is about the way of thinking itself. In his words: 'The modality of judgments is a quite peculiar function. Its distinguishing characteristic is that it contributes nothing to the content of the judgment (for, besides quantity, quality, and relation, there is nothing that constitutes the content of a judgment).' (Kant, CPR, B99, 100). For that reason, we interpret this moment as the cyclical character of reflection itself. Reflection starts with experience, detaches itself from it, examines a variety of quality aspects in it, scrutinizes different types of relations, and eventuates in a growing capacity to handle new experiences. This is a never-ending cyclical process which can be put forward on the three other reflection techniques. Circle reflection can be performed on different levels:

- the design project or the design experience (what reflection method did I use to study the design experience? What new and unanswered questions with respect to design issues do I need to investigate further?)
- the professional identity (how does my professional identity fit to my personality? What is in my professional toolbox and what is lacking? What types of design problems do fit my professional identity?)
- the reflection itself (what types of reflection did help me to gain new insights? What reflection methods do I need to study more?)

How To Teach Reflection

Also from Kant, we derived three basic assumptions about the pedagogical role of the teacher, which are central in our approach. Firstly, in judgment-oriented educational settings, such as in case of reflection, the individual student and his/her learning goals is central. It asks that students take on an autonomous attitude and teachers a coaching attitude. In an environment where students are used to teachers taking the lead, this means a radical change. It asks for an explicitly active rather than passive role of the student. It is the task of the coaching teacher to improve the emotional trust and self-confidence of students to take the lead.

Secondly, judgment is related to the individual. Thus, reflection is an individual activity, in which the one who reflects takes the lead. Teachers facilitate reflection, but should not judge the experience of the learner, since that provides the materials to reflect upon. The student judges his or her own learning experiences in reflection activities, but they also judge their personal and professional growth through the reflective activities themselves. In the course, this shows in students making a justified suggestion for their own grades.

Thirdly, teachers do not instruct specific content, but put instead the reflection competence central. Students choose themes or topics from their design experience that may result in further personal and professional development. Teachers provide new viewing points or help students find these, to steer their reflective actions.

The Implemented Curriculum

In the course Systematic Reflection, we have incorporated the above mentioned principles. Students learn how to reflect, deeper than just common sense thinking, aimed at their own professional development. In this process, we follow a Kantian approach. As teachers we act as coaches. We facilitate the reflection process, while leaving the judgment of the experience to the students. As content for the course, students take their own design experience from a design project that they recently finished. In this project, atelier 5 (see also Visscher-Voerman,

Kuiper & Verhagen, paper, this AECT), students work in groups of three or four students for an external client, e.g. a school principal or school teacher, a museum, a manager in a company, a teacher trainer, etc.

Below, we will describe the course, addressing the elements from the curricular spiderweb (van den Akker, 2003), and provide step-by-step approaches for each of the reflection modes in the subsection content.

Goals

The following goals have been formulated for the course. The student demonstrates that:

- He/she has made an intellectual growth in reflection throughout the course;
- He/she is able to apply the modes of reflection correctly;
- He/she is able to apply reflection tools, partly with using literature, with the function of gaining new insights regarding his/her own functioning as a professional
- He/she is able to support peers in their reflection processes by providing concrete and supporting feedback.

Course Outline

Course moments have been centered around the four reflection modes. Each reflection mode follows the same structure:

- Two-hour tutorial in which the reflection mode is introduced and a systematic step-by-step approach is being provided; instruction of the steps is alternated with small exercises, or teacher role play.
- Students write a reflection paper according to this specific mode, starting from an individual relevant viewing-point, and relating it to their own specific design experience.
- Both teachers and two peer students provide individual written feedback, sent to the students by mail, in advance to the feedback session.
- Two-hour feedback session, in which teachers provide overall feedback on the reflections, for example, by addressing topics that students chose to reflect on; by identifying pitfalls for reflection in the specific mode; by making suggestions for how to make the reflections in the specific mode more powerful, etc.
- Students use the peer and teacher feedback to improve their papers into the final paper which is being assessed and discussed in an individual oral conversation with the teachers. This oral conversation replaces the last feedback session related to the circle reflection.
- One element in this conversation is a student's proposal for grading his or her own work.

Course Content

The Tutorial On Point Reflection

This meeting addresses the questions:

- What is reflection, and why is it important?
- What are characteristics of good questions?
- What is the structure of the point reflection?
- How do you choose external points of view to start the reflection from?
- How can you help others to reflect as a reflection partner?

The step-by-step approach of the point reflection is:

1. Reflection can be initiated by using many different viewing points, for example, theoretical concepts, contradictions, proverbs and sayings, colors, emotions, tools, sports/games, 'faith, hope, and love', title of a roman, etc. Picking such a viewing point rather than project related words (such a goal, communication, instructional strategies) helps to come loose from one's usual patterns.
2. Open up your creativity by generating questions related to different viewing-points chosen from the list above.
3. Choose a viewing point, that highlights your experiences in new ways, and that seems a powerful vehicle for learning;
4. Reflect, not on a viewing point in the experience, but from a viewing point. Avoid raising 'why-questions, but concentrate on 'how' and 'what' questions.
5. Summarize what you learned.

In the tutorial teachers make an inventory of student former reflection experiences; students conduct a reflective conversation in pairs; we read aloud a Fairy tale *Spirit in the bottle* to illustrate what reflection is

(http://www.pitt.edu/~dash/grimm099.html); We practice the first two steps of the step-by-step approach. Also, the theory of reflection, according to Kant is instructed. As home work students are asked to generate at least 5 questions from 3 viewing points and typify project situations.

The Tutorial On Line Reflection

The guiding questions for the tutorial on line reflection are:

- What is the structure of line reflection?
- What are the similarities and differences between line reflection and evaluation?
- After the tutorial, students are expected to be able to write a line reflection.

The step-by-step approach for the line reflection has three different phases. In the first phase, as preparation, norms and quality criteria are being formulated. The second phase consists of the reflection itself. In the third phase, the student discussed the consequences, either being related to planned adjustment of acting and performance, or adjustments of the norms themselves.

1. Choose a professional role (for example, teacher, designer, researcher, or advisor).
2. Distinguish between actor, process and product (for example: designer, design process and designed product)
3. Formulate for each of them norms or quality criteria, starting from questions such as: 'What are characteristics of a good designer?' 'What are criteria for a good design process'? 'When are you satisfied about the product?'. List these norms in a scheme (see an example below).
4. Choose one of the norms, guided by your intention to get important learning experiences.
5. Develop this norm further into norms of quality, first based on your own ideas, expectations, and experiences; and then by making use of literature.
6. Relate these norms to your own experience.
7. Summarize what you learned, both with respect to schemes for changing performance and acting and to adjustments of norms.

A good designer …	A good design process …	A good product …
Is a good listener	Is based on scientific knowledge	Meets the specifications
Is creative	Relies on users	Is accepted by the client
Applies design models	Makes use of formative evaluation	Is accepted by users
Knows the context	Has an implementation perspective	Yields learning effects
Can motivate people	…..	Helps to solve the original problem
Is a good project manager		…..
Is analytical		
…..		

During a first brainstorm there will not be a direct horizontal link between the columns. This might be reached in a further refinement of the scheme.

The process of line reflection resembles the process of evaluation, but is basically different on several aspects. Firstly, because the student himself determines what norms to study, secondly because its goal is to learn and not to judge. Thirdly, the norms are not viewed as a given, but are investigated on their quality. Also, not only the quality of the final product is put central, as is usually the case in evaluation, but also that of the design process, and especially the actor himself.

After a short introduction to the line reflection, we practice with the group steps 1 to 4, by focusing on the role of researcher; In pairs, students practice step 5; Students exercise difference between line reflection and evaluation, by generating 5 questions stemming from that norm that have a reflective nature, and 5 questions with an evaluative nature. As home work, students are asked to write a line reflection paper, starting from a norm that is interesting from their individual point of view, from 6-8 pages. They are expected to use literature to specify their norms and/or to support their summary of what they have learned.

The Tutorial On Triangle Reflection

The goal of this session is to make students familiar with two types of triangle reflection, related to stakeholder analysis, and to scientific approaches. The step-by-step approach related to stakeholder analysis is:

1. Choose a theme, fact, or situation for the reflection (designatum)

2. List all (groups of) 'interpreters' related to your design project in general;
3. Delete all interpreters from your list, that are not worthy for your chosen theme. You end up with a list of stakeholders.
4. Formulate hypotheses about the frames of reference for each (group of) interpreter(s);
5. Test your hypotheses (not always possible)
6. Interpret design experiences in relation to these differences
7. Analyze how to deal with differences in frames of reference (what strategies are possible, do fit your experiences and person, what tools do you need for that)
8. Summarize what you have learned.

The step-by-step approach related to scientific approaches is:

1. Choose a theme, fact, or situation for the reflection (designatum)
2. choose one or more different theories about that theme, for example, design theories, instructional theories, communication theories, etc)
3. Formulate hypotheses: describe from the point of view of each theory how the chosen theme was present in your project, or should have been present;
4. Interpret your design experiences in relation to these hypotheses and theories;
5. Analyze how to deal with the differences between the theoretical frames of reference (what strategies are possible, which ones do fit your experiences and person, what tools do you need for that);
6. Summarize what you have learned.

In the tutorial, first both step-by-step approach is explained. Then, we practice the stakeholder approach steps 2-4 related to the theme of quality of the product. Then, with the whole group, we practice the approach related to scientific approaches, starting from instrumental, communicative, pragmatic design approach (Visscher-Voerman & Gustafson, 2004). As homework, students are asked to write a triangle reflection for one of both options, 6-8 pages, use of theory.

The Tutorial On Circle Reflection

As a preparation for the course, each student reviews his work as done in the course thus far and makes a (small) list of topic(s) he/she wants to study during the circle reflection. For the circle reflection we do not present a clear step-by-step approach. Instead, we discuss the table as presented in table 3. The scheme is an instrument to visualize how one can reflect on different levels, ranging from the evaluative level to a more philosophical level (depth of reflection); it also shows how reflection topics can be related to the profession, the individual professional, or the wider environment (breadth of reflection). During the tutorial we first formulate questions related to the theme of communication. Then, we help students to formulate questions related to their theme of the circle reflection on a higher level.

Table 3: Breadth and with of reflection

Breadth of reflection Depth of reflection	Profession or problem	Self	Wider environment
3. epistemic/critical (*philosophical/ contemplative*)			
2. interpretative			
1 technical/pragmatic level (*problem solving*)			
0. evaluative level (*measuring effects*)			

Feedback Sessions

In the first session, related to the point reflection, a communication specialist comes in to instruct students on how to provide feedback. The other feedback sessions are used by the teachers to provide general feedback related to the individual reflection papers. Individual feedback has already been e-mailed to the students by then.

Feedback relates to readdressing the specific function and steps of the reflection mode; the role of theory, choosing the theme, the level of reflection.

Course Materials

Specifically for the course, a short syllabus has been written, that provides background information about reflection as summarized at the start of this paper, and that mainly describes and elaborates the different reflection modes, with their underlying philosophies. Also a reading guide for the book Procee (1997) is provided. As options for students to steer their reflections, some basic literature is suggested, that students could choose to use for their reflections (e.g. Curren, 2007; Procee, 1997; Schön, 1983; Simon, 1967; Wouters, 1999). But, what students ultimately choose to use, depends on their experience and chosen focus for the reflection. Therefore, in addition, students search for scientific or professional literature that connects to their reflection questions.

Teacher Roles

In the first part of the paper we have already described our teaching philosophy. In addition it could be added that throughout the years, we have developed clear and distinct roles. The role of the philosopher is to instruct the reflective theory, to provide new viewing points, to inspire students. The role of the ID teacher is to keep track of course planning and to manage the time, to provide design knowledge, and to communicate with students. Both teachers alternate the introduction, leading, and discussion of the hands-on experiences during the tutorials, and both teachers provide feedback on papers.

Assessment

In an oral meeting with each individual student, we discuss his or her work. As input for this meeting is the student's paper, consisting of four different reflection papers that has evolved through the course and has been improved based on feedback from peers and teachers. An important input for the assessment is the student's own argumentation for his grading. In the student's argumentation towards the grading we expect –again- a reflective approach. The student's subjective judgment indicating the own learning curve, is compared to the teachers' more external and comparative grading. In most of the cases, both gradings match, indicating that students are very well able to judge their own qualities as a professional. Because of that aspect we have chosen for this kind of assessment. In more formal education situations we use a different approach, according to the standards of the academic forum.

Changes In The Course Over Years

This general outline of the course has been rather stable over years, although there were some minor changes, based on experiences and student evaluations. Most changes were implemented in 2004-2005 as a reaction to two years of evaluation and experiences. Some of these changes were undone or adapted later. Major changes relate to:

- Final oral meeting: in the course 2004-2005 we decided to skip the oral final meeting, in order to save teacher time. Although the general appreciation of the course did not change and student results were not different from other years, several students indicated that they really missed this meeting, based on what they had heard of it from previous years. Therefore, we decided to bring this element back, to bring the course for each individual student to an individual end.
- Peer feedback: In 2003-2004 we were dealing with a very large group (56). Since we had experienced that providing feedback on all papers ware very intensive, we looked at possibilities to bring in peer feedback. We soon learned that this can be very motivating, and that it can have a positive effect on student attitude and achievement (Topping, 1998; see also Van den Berg, Pilot & Admiraal, 2005), although we have not deliberately measured this effect ourselves). The peer feedback has become an essential part of the course, and is included in the formulation of the course goals. Different from the first time, in the course 2006-2007, students were now explicitly instructed on providing good feedback by a communication teacher.
- The amount of teacher feedback: in 2005-2006, a year after peer feedback had been introduced, the teachers only provided general feedback in the feedback tutorial an no individual feedback. This was evaluated as a weak point during that course. Students indicated to miss this external reference, and also indicated that not every student was as good in giving feedback as others. The following year, teacher feedback was included again.

- Point reflection: the first two years, the concept of point reflection remained rather vague, as also showed in the student evaluations. Students found it difficult to step outside their own project and the teachers had no good clues of how to inspire them. We mainly used this meeting to ask students to come up with a reflection agenda. Two years ago, we experimented with the use of sayings, proverbs, sports, colors, emotions, etc. to ask students to generate inspiring and unique questions. The use of these unusual viewing points opens up students' creativity and helps them to step outside the experience.
- Order of the reflection modes: the order of line reflection and triangle reflection is rather arbitrary. Some students have a natural inclination to the first mode (especially the more evaluative types among them), others (who are inclined to discovering differences) prefer the last mode. During some years we started with line reflection, in other years we started with triangle reflection. The order made no differences in the end.
- Place of reflection in the curriculum: In their evaluations students indicated several times that they would have wanted to be familiar with the reflection techniques in order to steer their design activities. Therefore, in 2004-2005 we decided to offer the triangle reflection mode at the start of a design course, as part of stakeholder analysis. At the end of the course, it turned out that none of the design groups had made explicit use of this technique during their project. Students indicated they were not yet ready for those techniques, since the project had so many new aspects they needed every attention to control the design process (design in real context, for real client, real communication). Stepping outside the process to reflect was not yet an option for them.
- The roster: in the first two years, the tutorials and feedback sessions were planned at the same day (4 hours). Students indicated that that session was too long to stay motivated and attentive. They also indicated that the time to write a paper was very short. Therefore, in 2004-2005, we split up both sessions. Students could hand in their paper during the next tutorial. Drawback: they could already start writing before they had their general feedback.
- Step by step approaches: In the beginning years, we divided each reflection mode in three steps (preparation, reflection, and summary of learning). Students indicated to find it still difficult to reflect and that reflection remained rather vague, and that they needed more guidance and structure. Therefore, we have extended the step-by-step approaches for each of the reflection modes, by distinguishing more clearly the different steps. Although we were rather hesitating to do so, since they might see it as a simple checklist and thus might hinder them to think for themselves, students appeared to get support from this, and do not report about vagueness any more.

The Attained Curriculum

Student Perception Of The Course

Students are very positive about the course. On a scale from 0 to 10 students the mean student approval each year has been 7.9 or 8.0. No student ever gave an unsatisfactory mark (e.g. 5 or lower).

Students especially highly value the content of the course and the pedagogical approach underlying it. Students identify this course as extremely supportive for their own professional development. They like the different teaching pedagogy, although this, at the same time is difficult for several students.

Student Growth In Reflection

All students increase their reflective competence during the course, where some make impressive progress. Overall, over the years, student results have not improved, it even seems that grades are a little lower. This can be due to two causes: the changes in the courses have not resulted in improved pedagogy and thus improved results/learning; or, the teachers have become more strict in their grading.

The feedback chain is reported to provide great impulse for personal and professional growth, and it increases the quality of the reflection papers (more depth, more content).

Students usually indicate to have clear preferences for specific modes of reflection, which also always shows in the quality of their papers following that specific mode. Generally, they show least affinity with the point reflection.

Part II: Design Research Activity

This section is used to show how the systematic way of working and investigating the context has helped to shape the course, and it will provide data about the quality of the course. First, some general information is presented, regarding the number of students attending the courses over years. Next, all resources and types of data gathered are described briefly. Finally, in more length, the results of the in-depth evaluation are summarized.

General Information

Table 4 shows the number of students that enrolled class and how many of them passed or dropped out. Overall, only in a very few cases were students judged an unsatisfactory mark and obliged to attend the course next year. In each year, there was a small number of students who dropped out. They could not cope with the deadlines for the sub-papers and indicated to have too little time to do it right. They enrolled in the next year.

Table 4: # of students attending and passing the course over years (source: teacher notes)

course cycle	Cohort	# enrolled students	# of total passes	# of dropouts	# of failure	grades			
						6	7	8	9
1	2002-2003 (group 1)	10	10	0	0	2	3	3	2
2	2002-2003 (group 2)	22	20	1	0	5	9	6	1
3-4	2003-2004	56	47	9	0	5	23	16	3
5	2004-2005	26	23	3	0	4	11	8	0
6	2005-2006	22	19	2	1	4	9	6	0
7	2006-2007	22	19	3	0	4	8	6	1

Notes:

- In 2002-2003 the course was delivered twice in the same period to two different groups, because of planning problems for students. In group 1, we focused on the role of researcher, in group 2 on the role of designer. The reflection approach was the same.
- In 2003-2004 the course was delivered twice a year, due to curriculum changes. The content of both courses was the same. Therefore, in this table, the students are treated as one group;
- The evaluation results from course 2006-2007 have not been analyzed yet.

Resources

Over years, we have systematically documented and reflected upon the process and its outcomes, in order to support retrospective analysis (see table 5). As such, for each course we rely on the following documents: course syllabi, author(s)' articles, electronic learning system, teacher planning sheets and log files, e-mails between teachers and between teachers and students, course evaluations by students, student papers, written feedback on student papers by teachers and students, student grades, and external audit statements on the quality of the course. These sources reflect four aspects:

- Our theoretical assumptions about reflection
- Our theoretical assumptions about teaching reflection
- Description of the process and implementation
- Description of evaluation activities regarding the quality of the course, their outcomes and the actions taken according to them.

Course Evaluations By Students

The University makes use of an evaluation 'smile sheet'. Usually, the response on this evaluation is low (in the range between 25-50%). Also, the questions are very general, and do not provide the information we need for this particular course. Therefore, we have formulated an extra in-depth evaluation and hand it over during the last oral session. During this meeting, the student commits himself to filling in the form in return to getting the written proof of the grading. The response rate is between 90-100%. The results to the most important questions are presented below.

Table 5: Overview of resources

	Syllabus	Articles	ELO	Planning sheet	Teach. log files	E-mails	'smile sheets'	In-depth eval.	Student fb	Teacher fb	Student papers	Grades	External audit
Assumptions about reflection	X	X											
Assumptions about pedagogical approach		X	X	X	X	X							
Process of implementation					X	X			X	X	X		
Evaluation outcomes and actions							X	X				X	X

What reflection approach does fit you the best and what the worst?
Generally, the line and triangle reflection are valued more than the point reflection or the circle reflection. Preferences for the line reflection relate to: structured technique; discussion of ones own norms was supposed to be very useful. Preference for the triangle reflection relates to the fact that more than one frame of reference needs to be used. This enlarges ones thinking. Overall, it is remarkable that students show an inclination for those approaches that were taught in the most structured way (in their eyes). Also, a positive learning experience on an approach connects to appreciation of that approach.

Reflection needs to impact you as an Educational Designer. To what extent has this goal been reached?
Overall, almost all students (>90% each year) indicated that the course has contributed to them, for a range of reasons, such as 'I now know how to develop myself as a designer', 'I realized that different points of view is not necessarily negative, but that it can also serve as an inspiration for my creativity'. 'The course has changed my negative attitude towards reflection into a positive one'. I now know how useful it is to reflect. 'It was useful to get to know my strengths and my frame of reference.
The few students who were indecisive indicated that they are not sure whether they will make use of such techniques often, since they found it difficult.

The pedagogical chain in the course was: introduction to reflection, practicing reflection through exercises, write a paper independently – personal and general feedback. How have you experienced this pedagogical chain?
Each year, up to 90 % of the students found the pedagogical chain effective. Most negative were the students from the 2004-2005 (25%), because of absence of teacher feedback. In previous and latter courses, the presence of teacher feedback was valued very positively. From 2005, students indicated to value the student feedback as well.
The students were very eager to indicate potential improvements/changes. These relate to assignments to be formulated more clearly, the need of better step-by-step approaches of the reflection modes, strengthening the teacher feedback, and instruction to students on providing feedback. These suggestions have actually been effectuated.

What are your experiences with working with sub-papers, building up to a final paper?
Overall, students are positive about working with sub-papers, which culminate in the final paper. As reasons, they mention that it provides structure; it involves you in a process in which you get time to adjust your views, based on feedback; it is a good way to stay involved in the content throughout the process; it reduces the pressure at the end to deliver a large final paper that should be ok in one time.

As difficult aspects, students refer to time pressure around deadlines for sub-papers. Some of them think adapting the sub-papers was not useful, producing a sub-paper was informative enough.

What are your experiences with giving and receiving feedback from peer students?
Overall, students find peer feedback very useful, also in 2004-2005 when it was introduced for the first time. As a negative aspect students indicated that not every student did well on providing feedback, so that a) it should become part of the course goals and thus rewarded or sanctioned; b) students should be instructed better on how to provide feedback. This change was implemented from 2005-2006 onwards. In 2005-2006, the evaluation showed that students liked the combination of peer feedback, individual teacher feedback and the general feedback sessions.

What is your opinion about the usefulness of the final oral meeting?
For more than 90% the final oral meeting was useful. Most reported reasons are: it provided yet another step towards my professional growth; if have again yielded new insights; it was a nice and personal way to end a course; it is a good way to be able to justify to teachers the choices you have made.

Discussion

In this paper, we have described a way to teach reflection that differs from a lot of other approaches used in education (e.g. Boud & Walker, 1998; Boud, Keogh & Walker, 1985; Korthagen & Vasalos, 2002). The design and implementation of the course was guided by the question of 'How to help students in the field of instructional design and educational technology to develop their professional expertise through systematic reflection?'

Firstly, Course evaluations of students show that they think the course is very relevant for their education and that they highly value the course. The analyses as well as our experiences provide several points for discussion that are related to the concept and process of reflection, as well as to the pedagogical approach.

First, being able to ask the right questions is a crucial condition for a good reflection. This is, however, not easy. Students can easily stay 'stuck' in their own thinking. It requires that students can be loosened from their own thinking and their own project. Asking a second –trusted- person to ask questions from a different perspective can, therefore, be fruitful. It is very helpful to realize that it is important to take a point of view outside the experience, instead of a point of view in the experience. The former yields more information and asks for a different look at your project. It is very important, therefore, to choose the 'right' person as a reflection partner. Someone who knows the project well, may be inclined to ask questions from inside the project. The same holds if you act as your own reflection partner. Reflecting with someone who does not know the ins and outs of the project may lead to more surprising discoveries. In this respect, the use of 'how' and 'what'-questions is more fruitful than 'why'-questions. The choice out of many perspectives can make students insecure. Here is also a task for the reflection partner: to make people emotionally more secure.

Secondly, reflection according to the logic of discovery is most fruitful. In this paper we described reflection approaches according to the logic of discovery rather than of improvement. Several students who had former experience with reflection approaches according to the logic of improvement started the course with a rather reluctant attitude. During the course, they changed their reluctance into an eagerness to learn more, and several of them described in their evaluation that this way of reflection was very stimulating. Such and other reactions strengthen our believe that the logic of discovery in this reflection approach is more productive than approaches according to the logic of improvement. It would be interesting to find out how teachers who are used to teach according to the logic of improvement, would value this way of reflection. Can their criteria be applied to this way of reflection, or are they two fundamentally different ways of reflecting, with own criteria and own levels of quality?

As a third point for discussion, we argue that this reflection approach can be broadened to all professions. Reflection without experience is empty, experience without reflection is blind. The approaches in this paper help students to look at their experiences in new, different ways. By looking from new perspectives, asking the right questions, students can make new discoveries with respect to their profession and their own performance. The approaches as such are heuristics for reflection, and therefore, they are not bound to educational designers. In fact, we are convinced that each professional could benefit from this approach. In the education of educational designers,

Fourthly, the depth of reflection seems to depend on the intellectuality of that person. Connecting reflection to Kant's concept of judgment, means that it is related to a (personal) power to determine which concepts and theories are and are not appropriate for 'concrete' situations. Judgment, thus, is not performing homogeneous (logical) operations but connecting heterogeneous (logical, theoretical, personal, empirical, and practical) elements (Procee, 2006a). This line of reasoning means that the depth of reflection, thus, seems to depend partly on the intellectuality of the person. Judgment, then, is a peculiar talent which can be practiced only, and cannot be taught from a zero-level. Anyway, we have experienced a major growth with some students and less growth with other

students. Some remain having difficulty with the reflective approach. Although it is not more than a speculation, we got the impression that it is primarily the case with students who achieve, overall, in the whole curriculum, less than other students (e.g. they need more chances to pass exams, and/or they get lower grades). It would be interesting to see to what extent this speculation holds. First of all it needs to be determined whether those courses call upon judgment or understanding, and how the students score. Then it could be investigated whether there is a link between the results of students on those courses and on the reflection course.

As a fifth point, we argue that the pedagogical approach should be broadened to other courses in the curriculum. In line with the previous remark, we would argue that the basic pedagogical approach as we apply in our course, should be extended to other courses in the curriculum, at least to those where is called upon judgment of the students. This, because this approach motivates and supports students to develop as independent professionals, being responsible for their own development. Further elaborating on this line, we should mention that –even for us who really believed in the concept- it is really difficult to take on the role of a coach, rather than of a traditional teacher. It may not merely be expected that all teachers are ready to take on this role.

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