

## Authentic assessment For autonomous learning

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# Authentic Assessment For Autonomous Learning

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## ABSTRACT

Industrial Design at Eindhoven University of Technology focuses on designing intelligent systems, products and related services for societal transformation. Our holistic and integrative approach to learning clearly shows in the end-of-term assessments. Students are not assessed at the level of curricular learning activities. Instead, the assessment focuses on students' overall development, which can range from 'blank' to 'visionary'. Key elements of the assessment are the end-of-term exhibition, a review of students' showcase, and a meeting between student and assessor. In their interactive and integrative showcase (portfolio) students demonstrate their development as a designer, fitted in with their past and envisioned future development. In the paper we explain the rationale behind the assessment and illustrate how the assessment works in practice. At the conference we will review our most recent initiative: the first version of our augmented frame of reference.

## INTRODUCTION

Rapid developments in technology, science and society, and the ever increasing body of information have turned the 21<sup>st</sup> century into a knowledge and information era, which is reflected in the professional workplace. This puts new demands on graduates: they need to become "knowledge-managers" rather than "knowledge-owners" (Dochy and Nickmans 2005: 9). In order to perform a task or role in varying and often complex settings they need to be able to self-regulate and reflect on their learning, take responsibility, adjust to changes, learn from their experiences, and assess themselves. In short, they need to become autonomous and lifelong learners. Preparing students for the new demands that present-day society place on them requires a student-centred approach. Educational goals need to shift from teaching a specific body of knowledge to facilitating students' ability to learn and to develop continuously. Educational objectives, learning environment and assessment need to be congruent with each other. If the educational goals change, the learning environment and assessment need to be aligned with these new goals (Biggs: 1996): it requires a shift in educational paradigm.

Learning theories are an attempt at unravelling the phenomenon of learning. They evolve in a social context and, as a result, reflect the changes in that society. In the current knowledge era, a learning theory such as the constructivist paradigm is gaining interest. This paradigm includes learning theories that focus on learner-world relations. The individual or cognitive theories assume the locus of knowledge construction to be in the individual learner; the social or situative theories assume this locus to be in socially organised networks (Birenbaum: 2003). Common to both perspectives, however, is the notion of activity: it is the learner who creates meaning, affected by and reflecting his or her socio-cultural environment. The act of learning, which includes knowledge building, is in the doing and vice versa. From a constructivist perspective, assessment is considered to affect and be an integral part of lifelong learning. It is a process in which students are active participants and in which students create meaning (Havnes and McDowell: 2008).

Constructivist curricula aim for educational goals that are holistic by nature, for example active and reflective use of knowledge. But what kind of learning environment can bring about these goals? Driscoll argues that constructivist learning conditions include the following: "1. embed learning in complex, realistic and relevant environments; 2. provide for social negotiation as an integral part of learning; 3. support multiple perspectives and the use of multiple modes of representation in learning; 4. encourage ownership in learning; 5. nurture self-awareness of the knowledge construction process" (2004: 393-394). Since in a constructivist view assessment is an integral part of learning, these conditions also apply to assessments. In the following paragraphs we will demonstrate how we have implemented these conditions in the learning environment and assessment process of our Industrial Design (ID) course.

## I. ID COMPETENCE FRAMEWORK AND LEARNING ENVIRONMENT

Industrial Design at Eindhoven University of Technology distinguishes itself from other design courses by its focus on designing intelligent systems, products and related services for societal transformation as well as by its competency-centred educational model. Our aim is to facilitate, support and enhance students' development of their overall

competence of designing and vision on designing, by providing them with opportunities for self-directed learning in meaningful contexts, in which the assessment becomes part of the learning process. Our holistic and integrative approach to the design as well as learning process is captured by the ID competence framework (see Figure 1 below).

Our curriculum consists of fairly large course components, called blocks. A block is composed of a particular set of curricular learning activities that, as a whole, covers a full semester. So our Bachelor's consists of six blocks and our Master's of four. The learning activities vary in size, scope, purpose and degree of authenticity. All types of learning activities, though, are designed to facilitate competency development, either one competency area or the integration of all competency areas; students either work individually or in a team. Projects, for example, provide students with quite an

authentic learning context. Students perform design activities and roles that are derived from or similar to tasks and roles in the professional practice of designing, often involving a real client. Performing these tasks and roles is not an end in itself. It is intended to generate a meaningful learning experience: learning to determine what to perform, how to achieve this performance and why to achieve this. The 'how' refers to competencies to be developed and the 'why' to the ultimate goal of all the generated learning experiences: contributing to and shaping students' overall competence of designing, their vision on designing, their growth as a designer, and their ability to learn.

At the start of each semester, students select learning activities, depending on their individual learning needs. They need to take into account the required composition of the block they are going to do, the department's focus on

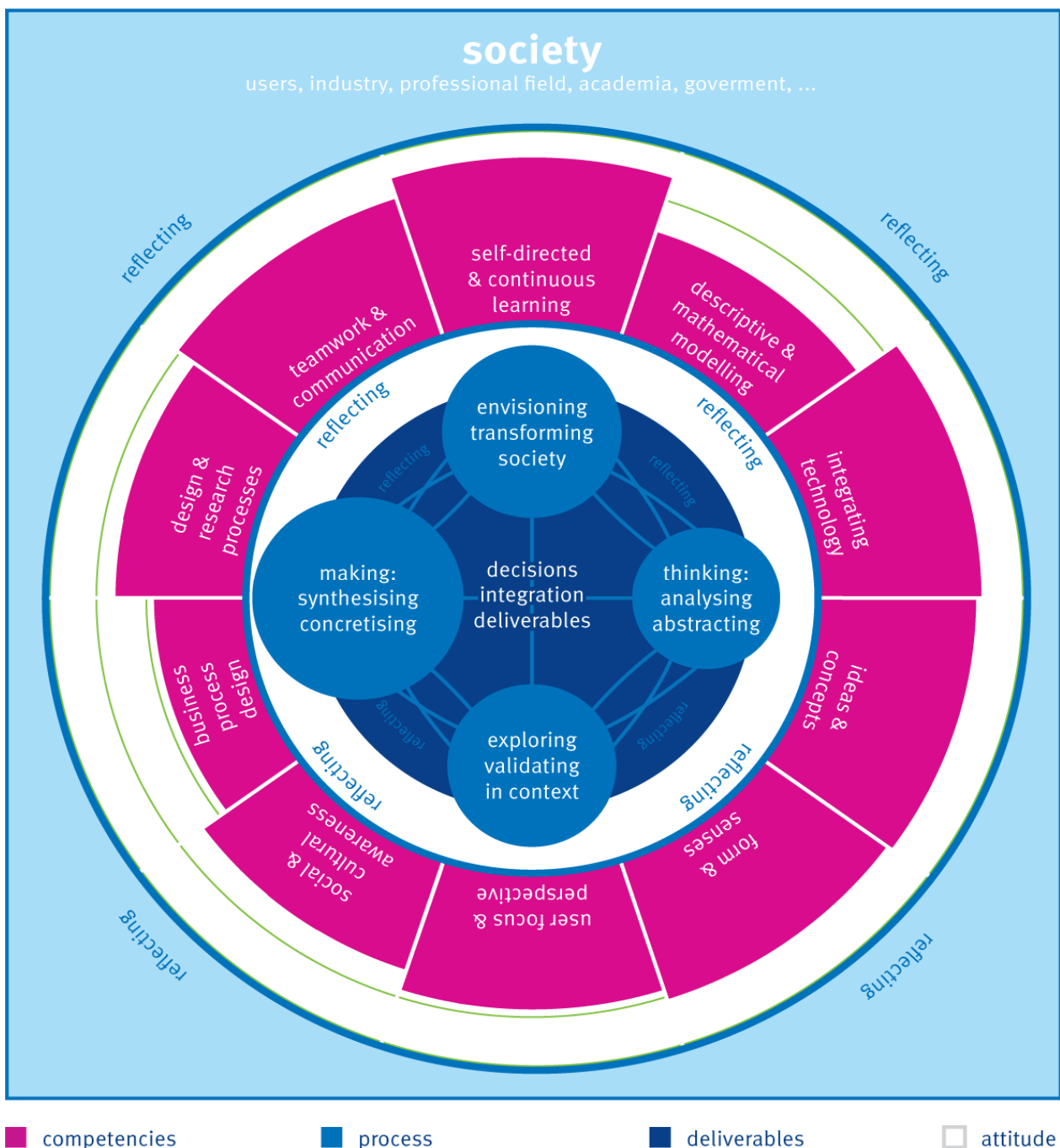


Fig. 1. ID Competence framework

designing intelligent systems, products and services, the competence framework, and their own envisioned growth as a designer as laid down in their Personal Development Plan (PDP). During as well as at the conclusion of these learning activities, students reflect in, on and for learning, supported by feedback from the staff members involved. The feedback during the learning activities is given verbally, in a dialogue; the final feedback is in writing and addresses what the student has achieved. The feedback focuses on the quality of students' deliverables, their development of competency areas within the learning activity, their design process, their professional as well as personal attitude, and advice for further learning and development. So feedback helps students understand what their learning is about, give meaning to what they are doing, and construct knowledge. As learning activities are not an end by themselves but a means to shape students' overall competence of designing, they are not graded or assessed separately.

Typical moments for overall reflection are halfway and at the end of the semester, when students reflect on their learning outcomes, process and overall development by working on their showcase. At the end of the semester students are assessed on the development of their overall competence of designing, vision on designing and growth as a designer. It is the student who has to prove or demonstrate what (s)he has achieved in the semester as a whole: his or her showcase plays a crucial part. This assessment is a formal decision but also a starting point for students' development and growth in the next semester.

From this brief description it may become apparent that our curriculum and learning environment assume student and teacher roles that are quite different compared to a more 'traditional' curriculum. Students' learning can be characterised as individual, context-related, experiential, self-directed, reflective, collaborative, exemplary, and integrative (Hummels and Vinke 2009). Staff members need to make a shift from teacher-focused to learner-centred: from being an authoritative source of knowledge to a facilitator of students' learning. The description above may also point out that in the course of a semester students go through iterative learning loops at two levels: a loop of competency development in each learning activity, and a loop of development and growth as a designer over the semester as a whole.

## II.

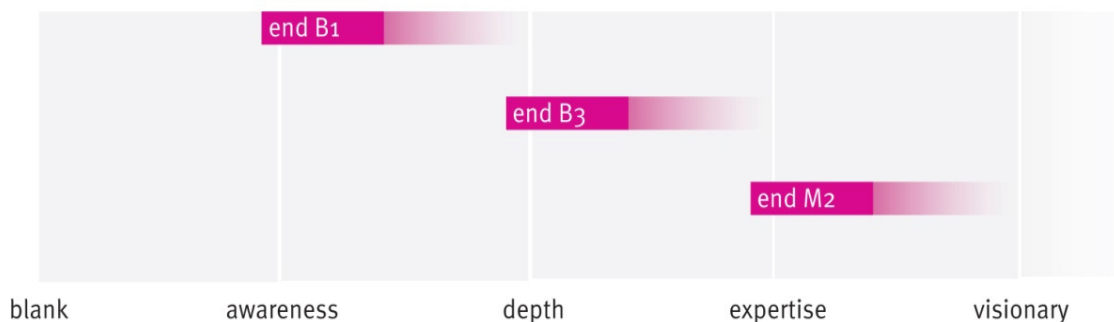


Fig. 2. Expected stages of overall development across the Bachelor's and Master's

Students perform learning activities that yield competency development (process) and particular deliverables (result), which enhances their understanding of the design process as a whole and shapes their overall competence of designing, their vision on designing, and their growth as a designer. The half-yearly assessment is not about what students accomplish in separate learning activities, but focuses on the integrated whole of students' development. It is about patterns that emerge across learning activities and semesters, and how these patterns shape students' overall competence of designing and their vision on designing.

The overall competence of designing consists of both the process of designing and becoming a designer, as well as the resulting design. It is shaped by the integration of student's competency development and profile, their ability to go through and shape their (design) process, the overall quality of their design, and their overall attitude (see Figure 1). Determinants for students' vision on designing are the extent to which students have defined this explicitly in their showcase, express it in their design process and deliverables, and use it to direct their overall development. Students' growth as a designer is reflected by the evolution of their overall competence of designing and vision on designing over time, so across semesters: how does their current development compare to their past and give direction to their future?

For the growth in students' overall development (competence of designing and vision on designing) we have described five developmental stages: Blank, Awareness, Depth, Expertise, and Visionary. In addition, we have indicated which stage students are expected to have achieved at the end of the first bachelor year, the final bachelor year, and the final master year (Figure 2). The gradients in this figure show that excellent students may well achieve beyond the expected stage.

The description per developmental stage, the indications of expected developmental stage and the student's PDP are the point of reference for taking a decision: whether or not students' overall development and growth as a designer are adequate, given the block they have been doing during the semester. The formal decision that needs to be taken is whether or not students can be promoted to the next block, and whether or not they will get 30 credits. There are three

potential decisions: (1) the student is promoted and gets 30 credits. This is represented by a 'Promotion' or P-verdict; (2) the student is not promoted and does not get any credits. This is expressed by a 'Hold' or H-verdict, which means that the student has to do the same block again, but with different learning activities; (3) the student is conditionally promoted. This is captured by a 'Conditional' or C-verdict. The student does not get the 30 credits yet but can earn them at the next assessment by fulfilling the conditions.

The assessment also gives student feedback on their overall competence of designing, vision on designing, and growth as a designer, framed in their past development and their envisioned future development; and, as such, feedback on the student's ability to self-assess, too. Last but not least assessment feedback fulfils a feed forward function: it helps students fine-tune or adjust their long-term goals and ambitions for their growth as a designer, and set competency development goals in their PDP for the next semester.

### III. ASSESSMENT PROCESS

The assessment is performed by an independent assessor. Independent means that the assessor has not been involved as the student's coach during the semester. The assessment process comprises several components, each of which provides the assessor with information from a different perspective. These components are outlined in the next paragraphs.

#### A. End-of-Term Exhibition

At the end-of-term exhibition students show their project, framed in their overall development. They exhibit visuals about their project, including their process as well as tangible deliverables. In addition, they 'pitch' their project to visiting students and staff members, including their assessor. The assessor has the opportunity to enter in a dialogue with the student and to ask explanatory as well as probing questions. The exhibition provides the assessor with extensive information about the student's project, the student's design process, his or her approach and attitude towards designing, and vision on designing. These exhibitions also create a platform for a dialogue between 'peer-reviewers'. This may contribute to a frame of reference at the departmental level: what do we consider to be an adequate or typical second-year bachelor project, for example, or what illustrates a particular developmental stage best?

#### B. Showcase Review

For the showcase-review the assessor goes through the student's showcase, which gives information on the integrated whole of students' overall competence of designing, vision on designing and growth as a designer. If the emerging picture is somehow diffuse, the assessor contacts the student's competency coach for clarification. The assessor processes the outcomes in an assessment form. The showcase review – and possibly the exhibition – may have raised particular questions or topics, which can be addressed in the next assessment step.

Students' showcase, often referred to as 'portfolio', is a pivotal element of the assessment. This showcase provides a common framework but at the same time it is open enough to allow for individual differences. It is an interactive and integrative representation of students' overall development, with a balance between visuals and reflections. In order to create their showcase students review what they have achieved in their learning activities of a particular semester, framed in the short-term goals they set in their PDP. They examine their deliverables, processes, competency development and attitude, and determine how these have shaped their overall competence of designing and vision on designing. They evaluate this overall development, with the long-term goals in their PDP as a point of reference. This evaluation results in a coherent and overall picture of what they achieved in the semester as a whole. Students link this 'top-layer' of the showcase to the evidence layer by including integrative reflections. The evidence layer contains a careful selection of their deliverables, feedbacks and reflections, which underpins their overall development and growth.

In order to demonstrate their growth as a designer across semesters, students include a time dimension in the top-layer of their showcase. The overall development students have achieved in a particular semester (present) is fitted in with their growth as a designer up to that point (past, which refers to previous semesters) and their view of the designer they want to become (future, which embodies the long-term goals in their PDP). The past is transformed, the present becomes the past, and the future becomes the present.

#### C. Meeting between Assessor and Student

The third component of the assessment is a meeting between assessor and student. This meeting gives the assessor the opportunity to either get clarification of or discuss particular aspects or parts of the students' showcase and development in more detail. This way the assessor can fine-tune his/her evaluation of the student's development and growth, and check the tentative verdict (s)he has in mind. For students this meeting is an opportunity to demonstrate their overall development and growth in a different way: verbally as opposed to the visual and written communication in the showcase.

#### D. Plenary Assessor Meeting

The last component is the plenary assessor meeting. Here a group of assessors discuss their tentative verdicts and the ground(s) on which they arrived at these verdicts. These meetings are arranged in such a way that the student's competency coach is among the participants. If applicable, assessors also discuss whether and why students qualify for 'excellence'. This discussion may result in a modification of some of the verdicts and corresponding justification. It is the assessor who, at this meeting, decides on the final verdict for the students he or she has assessed, taking into account the preceding discussion. These assessor meetings also serve the purpose of ensuring a common view of the developmental stages for the competence of designing and increasing the validity of the assessments.

#### IV. CURRENT INITIATIVES

Staff members' and students' prior educational experiences are mostly rooted in what Doll calls a "measured curriculum" (1986), which emphasises the set end predetermined, and which is built on a Newtonian, closed-system paradigm. This sometimes clashes with the "transformative curriculum" that we are aiming for and which is built on a newer, open-system paradigm: a world-view in which reality is seen as complex, temporal and multiple (Doll: 1986). In a similar vein, staff members and students sometimes express a need for clarity when it comes to assessments; by which they often mean a list of criteria that you can check. But breaking down a holistic notion such as 'overall competence of designing' would destroy its very essence. Instead, we are building an augmented frame of reference to illustrate what we mean by competence of designing and the five stages of development. This frame is a combination of a library, exhibition, inspiration place and design lounge with physical and digital examples of work from our students and alumni.

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