



**TU/e** Technische Universiteit  
Eindhoven  
University of Technology

## INDUSTRIAL DESIGN

LEARNING FOR INNOVATION



Self-evaluation report  
Accreditation 2006/2012  
Bachelor and Master program  
Department of Industrial Design  
Eindhoven University of Technology

# COLOPHON

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# PROLOGUE

*“The department of Industrial Design at the Eindhoven University of Technology has a very interesting educational model. It is based on self-directed and continuous learning in the context of 10 specified competences. The results are amazing and here at NUS we are really interested to learn from this example. As far as we know this educational approach in Eindhoven is worldwide unique and we are considering adapting this model to our situation.”* Ryohei Nakatsu, Professor at National University of Singapore and Research Director, Interactive & Digital Media Institute

*“As evidenced by their participation in the Design Vignettes Showcase at CHI2009 in Boston, the leading international conference on human-computer interaction, the Industrial Design Department at TU Eindhoven is considered a leader in this area. The success and excellent international reputation of Industrial Design rests squarely on the exemplary faculty at TU Eindhoven who are exceptional thought leaders in interaction design. Thus, I believe Industrial Design at TU Eindhoven to be at the forefront of emerging aspects of interaction design.”* Mark Baskinger, Associate Professor, School of Design, Carnegie Mellon University

*“I can with confidence say that the study program is unique on an international level within interaction design programs, in particular for its ingenious combination of aesthetic design and electronics. It operates with a groundbreaking pedagogic model that strengthens graduates’ ability to reflect and self-evaluate. Furthermore, it teaches solid design experimental skills and design research competence producing candidates of very high level.”* Jacob Buur, Professor at University of Southern Denmark

We educate students for a life, not for a diploma. Of course we do give diplomas to our graduates. But we seriously try to make these as much an outlook to the future as they are an assessment of past performance. This is why our focus is on the integral development of a student in the perspective of a life-long career, rather than a list of graded, more or less isolated curricular learning activities. As a consequence, we have a holistic approach on education, in which students focus on learning through self-directedness and competence development. The student is in charge and has control and initiative over his or her personal development. Therefore, our education is organized such that we have no lectures focused on transmitting primarily knowledge. Instead the learner constructs his or her competence, which consists of attitude, skills and knowledge. The competence development is demonstrated through a combination of student's reflections and the deliverables that a student produces throughout the learning process; therefore, the different curricular learning activities are means and not ends. Furthermore, because learning is an individual process and every learner is unique there are no pre-defined criteria. In addition, by not setting explicit and detailed criteria, learners are challenged to strive for excellence.

Because our approach is relatively unique in the academic world, as the educators are servants to the students, the framework of this accreditation confronts us with a dilemma. The accreditation standards are designed to assess curricula that assess past performance, based on a list of separately graded curricular learning activities, activities that are straightforwardly related to precisely defined learning goals or end terms of the curriculum. However, these criteria of traditional educational models do not apply to our model, at least not in the detailed manner of classical education. Should we try to stay close to the accreditation standards, at the risk of failing to communicate our spirit and liveliness that we value most, or do we challenge these standards and focus on the learning for life that we strive for?

In this report we strive to strike a balance between the two. For all factual information, we closely follow the guidelines provided by NVAO. When it comes to what we believe is the essence of our Industrial Design curriculum, we take an unusual approach. We invite you as committee member to take a variety of personal perspectives on the Bachelor and Master programs and on the careers of our alumni after graduation. We have requested a wide variety of stakeholders to reflect on their roles in our educational model. The reflections are not exhaustive, but provide an insight into the different perceptions of the people involved. The combined reflections illustrate that we are engaged in an ongoing process of reflection, self-organization and quality improvement. In addition, we have gathered as much factual information as possible on the careers of our graduates, to underpin the claims we make that we educate for life.

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# ADMINISTRATIVE DETAILS

## BACHELOR PROGRAM

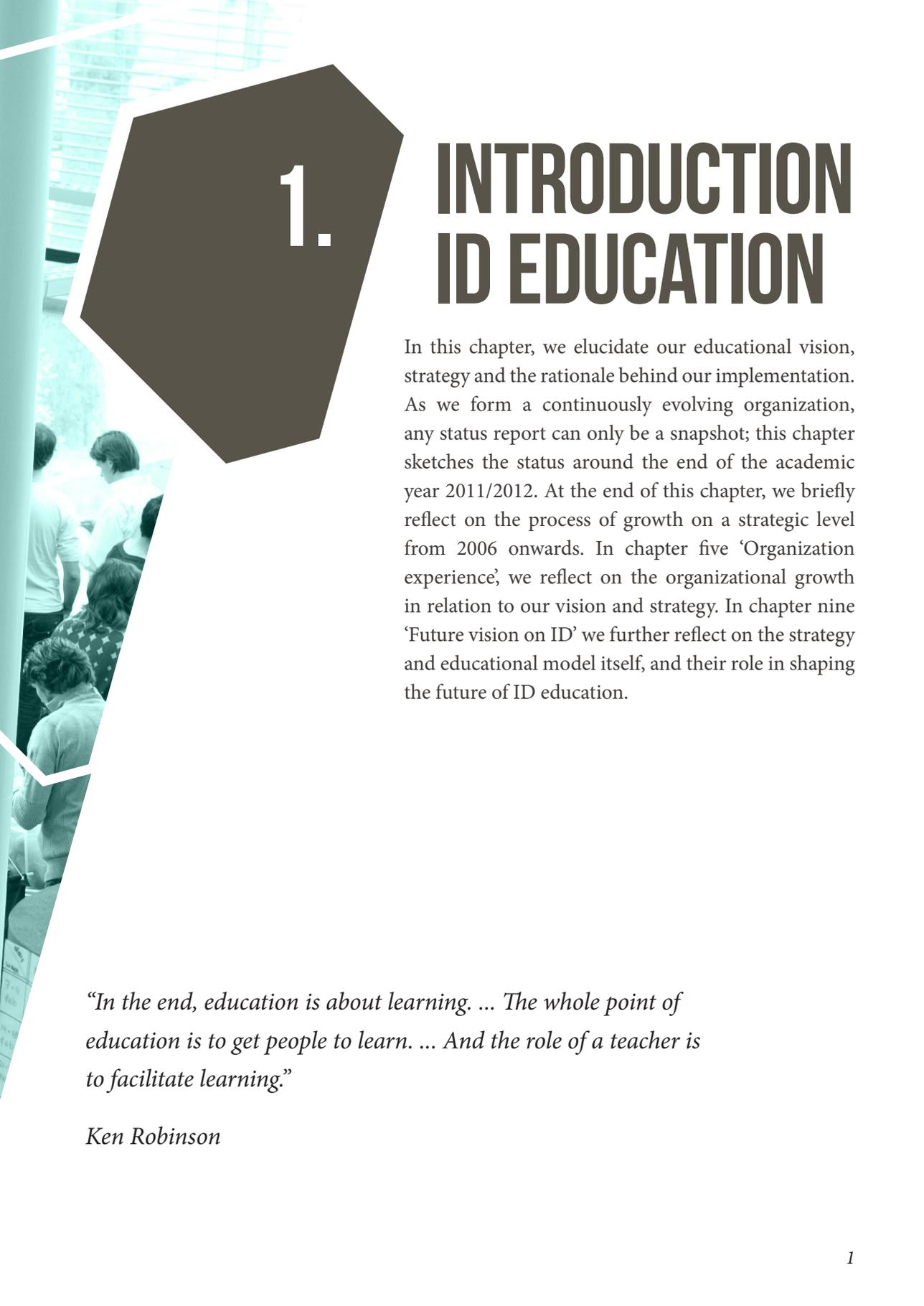
Name of program:	B Industrial Design
CROHO number:	50441
Level:	Bachelor
Orientation:	Academic
Study load:	180 EC
Degree:	BSc
Location:	Eindhoven
Accreditation expiry date:	31-12-2013
Department:	Industrial Design
Contact:	Dr. ir. M. Bruns Alonso Director of Education +31 40 247 4276 mbruns@tue.nl

## MASTER PROGRAM

Name of program:	M Industrial Design
CROHO number:	60441
Level:	Master
Orientation:	Academic
Study load:	120 EC
Degree:	MSc
Variant(s):	Industrial Design
Location:	Eindhoven
Accreditation expiry date:	31-12-2013
Department:	Industrial Design
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# 1.

# INTRODUCTION ID EDUCATION

In this chapter, we elucidate our educational vision, strategy and the rationale behind our implementation. As we form a continuously evolving organization, any status report can only be a snapshot; this chapter sketches the status around the end of the academic year 2011/2012. At the end of this chapter, we briefly reflect on the process of growth on a strategic level from 2006 onwards. In chapter five ‘Organization experience’, we reflect on the organizational growth in relation to our vision and strategy. In chapter nine ‘Future vision on ID’ we further reflect on the strategy and educational model itself, and their role in shaping the future of ID education.

*“In the end, education is about learning. ... The whole point of education is to get people to learn. ... And the role of a teacher is to facilitate learning.”*

*Ken Robinson*



*“On April 1st, 2008, I started as Director of Education (DoE) at the department of Industrial Design (ID). I was thrilled to take up the challenge of the board of ID to bring ID education to the next level of quality and maturity, and have the first steps implemented before the start of the upcoming academic year in September 2008. Motivated by the results of the accreditation report (released in November 2007), the board of ID decided that the DoE needed to be an expert on content and not merely on education and pedagogy. Consequently, I changed my office from the DQI group on the second floor to what we at that point baptised as Educational Affairs on the first floor. It soon became clear that the educational model, based on self-directed, continuous and competence-centred learning was strong, but the department needed a clear vision, strategy and implementation plan to let our students and the department blossom further. So this was the task I set myself, departing from a designerly perspective.”*

Caroline Hummels, full professor and former DoE

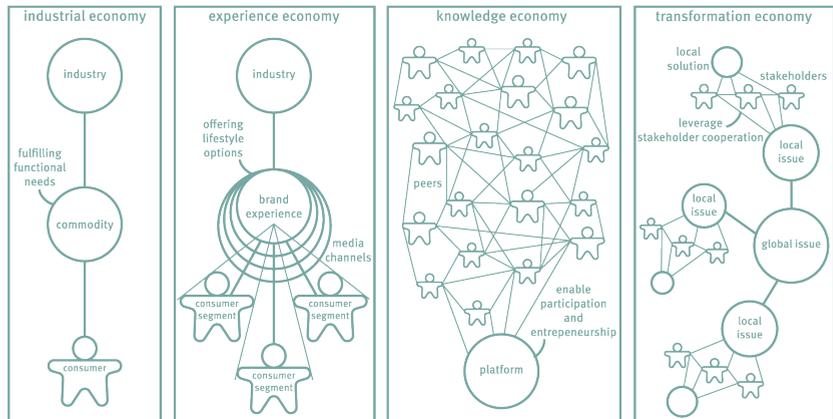
## 1.1 GOAL

We started the department of Industrial Design several years before Ken Robinson got renowned, but we operate from the same principles and have similar goals. Within the department of Industrial Design we aim at facilitating students to become excellent self-directed and continuously learning designers. We do this for several reasons. First, our society is rapidly evolving in various domains, e.g. technological, informational, economical, social and political. In such fluctuating conditions we need the ability to respond and anticipate creatively and flexibly to new and unpredictable changes in these domains. For example, given autocatalytic technologies, such as information technology, nanotechnology and biotechnology (Brand, 2000), we cannot predict which technological expertise is required in five or ten years' time, which stresses the importance to acquire the ability to direct and regulate one's learning in order to obtain the expertise needed at any time in the future.

Second, over recent decades our society has moved from an industrial economy via an experience economy, to a knowledge economy, and it is now taking its first steps towards the transformation paradigm, as shown in Figure 1. In the transformation economy, stakeholders work together on local solutions for local issues that stem from greater global issues. Society is looking for ways, products and services that help us move towards a sustainable world, which requires the strength of the collective. The main driver is the urge for meaningful living, employing empathy and cooperation (Brand and Rocchi, 2011).

Designers are par excellence suited to operate in such collaborations and facilitate innovation, due to their integrating and holistic way of working. Discussions with industrial leaders, both during the starting period of our department in 2001, and recently, have confirmed that industry is eager to hire academically trained T-shaped professionals, i.e., people that have real depth regarding their own expertise (vertical bar) while also having the competences to collaborate in a broad domain (horizontal bar). In addition, however, modern-day industry experiences an increasing need for so-called I-shaped professionals. These people have their feet firmly planted in the mud of the practical world (the capability of ‘can do’ and ‘have done’), and stretch far enough to stick their head in the clouds when they need to (in order to abstract, generalise, image and imagine), while simultaneously spanning all of the space in between via the breadth and depth of their competences (Buxton, 2009). In summary, industry wants designers that can operate in the cross-section of the design, engineering and social science paradigms (Bartneck and Rauterberg, 2007).

Figure 1. Shifting paradigms over the decades, moving from Industrial, via experience and knowledge towards the transformation economy (Brand and Rocchi, 2011)



As a consequence, we consider self-directed and continuous learning the natural approach of designers. Designers are catalysts for change; they localize (make a matter concrete), question (reflect on its quality) and open up (expand its sense) (Sennett, 2008), and thus find themselves continuously in new contexts, developing novel propositions. This requires an open attitude to the challenge at hand, to tune into the situation, and to acquire the required expertise. Such self-directed and continuous learning starts from the individual qualities of every student. Students are motivated and more prone to learn when enabled to define their own learning process. They naturally have the responsibility and passion to grow and build on their strengths. Consequently, our educational system supports, encourages and aims at personal excellence.

## 1.2 FOCUS

*“All mankind is divided into three groups: those that are immovable, those that are movable and those that move.” Benjamin Franklin*

It is the latter type of people – those who move – that we try to support and train at ID, requiring also staff members and a department that move. ID education is located at the cross-section of a unique educational system that supports people to move intrinsically via self-directed and continuous learning, and the profession of designing innovative intelligent systems, products and services that envision a sustainable society in the transformation paradigm.

*“One could wonder, and we have been asked this question many times, if the name Industrial Design is the appropriate label for the department. We personally find the explanation of professor Simon Fraser from the Victoria University of Wellington an interesting one. Industrial Design is often seen as a product of the (first) Industrial Revolution, when a single craftsman could no longer be responsible for every stage of the development of a product, and the use and development of new technology, production techniques and materials enabled the development of mass production, standardisation, modularity and diversification of designs for new target groups, requiring new forms of collaboration between different experts and new business models (Overbeeke and Hummels, 2012). As Fraser points out, this development of new technology, production techniques and materials is still going on, so the resulting profession of Industrial Design should also adjust its way of working, collaboration and business models. In fact it does, but that field of expertise is often not labelled Industrial Design. Therefore, the connotation of the field of Industrial Design should change, not its name per se.*

*Nevertheless, one can still argue that the label ‘Industrial’ only fits the Industrial paradigm and the transformation paradigm requires a different label to stress the different character of the field we are growing towards and the designer we are trying to educate. But this discussion and search has not yet resulted in a new name for the department, with the consequence that our department name is sometimes misinterpreted based on traditional expectations.” Caroline Hummels*

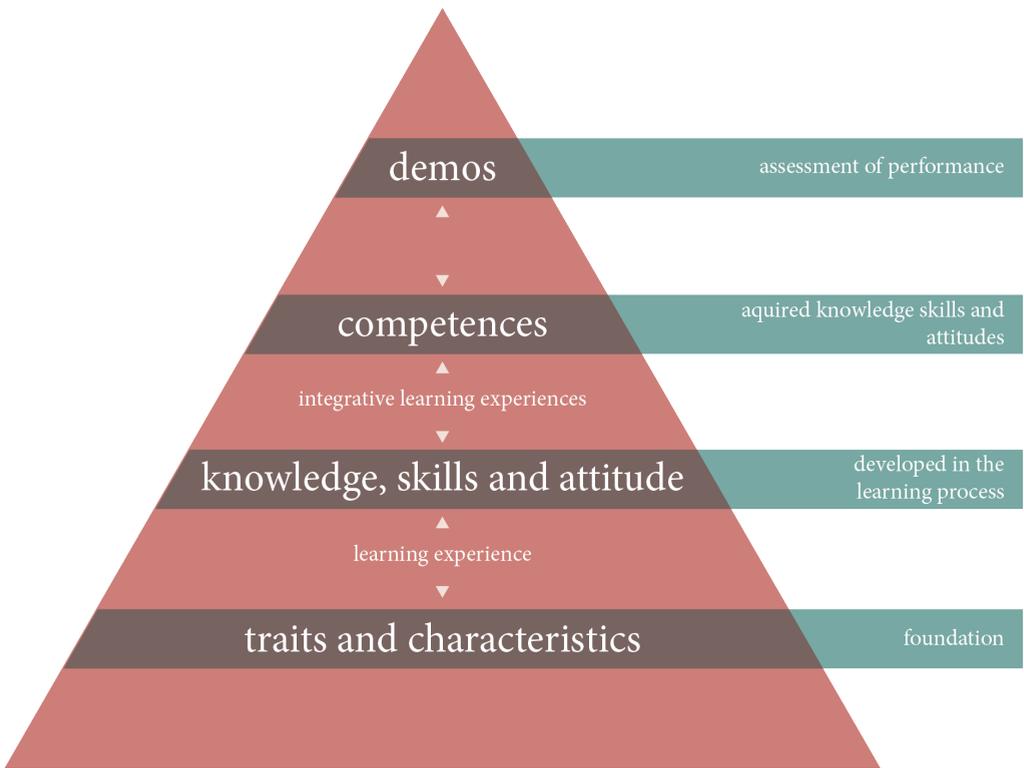


Figure 2. The conceptual learning model at ID (adapted from Voorhees, 2001)

## 1.3 APPROACH

The perspective that ID has chosen to educate excellent self-directed and continuous learning designers is competence-centred learning. We use an educational model in which learning and working come together. In this model, students, who we treat as junior employees, learn to learn (by reflecting on the what, how and why of their work), and staff members and professionals facilitate their learning. Below, we first explain the theoretical framing of our educational approach, including our core values and starting points. Next, we describe our Competence Framework and our accompanying model of growth, which are the concretisations of these theoretical starting points in the context of Industrial Design. Finally, we elucidate how we facilitate learning in three ways based on this framework, by: (1) offering our students learning opportunities, (2) facilitating learning loops and (3) stimulating a professional learning organisation that adapts to and grows along with the students.

### *Theoretical framing, core values and starting points*

Competence-centred educational approaches like the one we use at ID are rooted in the constructivist-learning paradigm. The individual or cognitive variants of this paradigm assume the locus of knowledge construction to be in the individual learner; the social or situative variants assume this locus to be in socially organised networks (Birenbaum, 2003). Common to both perspectives, which we both incorporate in our educational system, is the notion of activity: learning is an active construction of meaning by the learner, affected by and reflecting his or her socio-cultural environment. Meaning is created by actively engaging in a discovery-oriented process, which is supported by collaborative learning (Simons, Van Der Linden and Duffy, 2000). Competence-centred learning offers students the opportunity to give equal weight to knowledge, skills and attitudes. Within our department, a competence is defined as an individual's ability to select, acquire, and use the knowledge, skills, and attitudes that are required for effective behaviour in a specific professional, social or learning context.

The conceptual learning model (adapted from Voorhees, 2001) shows that people pursue different learning experiences based on their traits and characteristics. Throughout the learning process they develop various skills, attitudes and knowledge, which they integrate to develop competences. Finally, the way to assess the performance and growth regarding the competences is when they are applied in demonstrations (see figure 2).

Competence-centred learning emphasises several approaches, such as experiential learning (Kolb, 1984) or learning-by-doing, and the accompanying reflection *in* and *on* action (Schön, 1983). These approaches are important mechanisms to construct meaning, become aware of what one has learned and to stimulate growth. Moreover, competence-centred learning emphasises context-related learning and exemplary learning, both stressing the importance of learning from particular experiences (Dewey, 1933) and developing competences in particular contexts, thus preparing students to encounter new, unthought-of contexts and deal with changing roles in their professional practice. Finally,

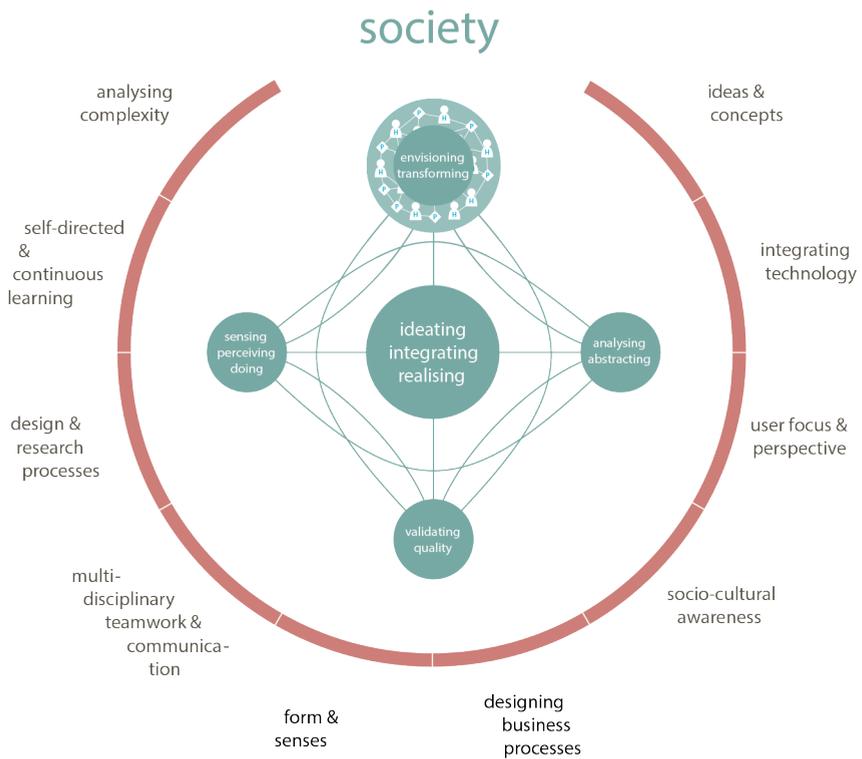


Figure 3. ID  
Competence Framework

such a competence-centred approach requires students to be responsible for their own development and self-regulate their learning in a social context with support from staff members that facilitate their learning (Zimmerman, 2002; Van Hout-Wolters, Simons and Volet, 2000).

***Competence  
Framework and  
stages of growth  
model***

At our department we not only teach our students how to deliver excellent intelligent systems, products and related services; we also teach them about processes: the process of accomplishing the excellent design, and the process of becoming an excellent designer. In order to capture the overall competence of designing, we have developed a Competence Framework. Within this framework the overall competence of designing consists of the process of designing, becoming a self-directed, continuously learning designer, and the resulting design itself. The overall competence is shaped by the integration of:

- Vision
- The student's development of the different competences, as well as the student's insight in his or her competence development. The extent to which the student is in control of his or her learning activities. We regard design as a process of taking decisions based on too little information and see two drives for information gathering: directing the design decisions through the designer's vision, and exploring and validating design decisions in a real life context with users. Moreover, these drives are incorporated within two strategies that generate information, namely making and thinking.
- The quality of the student's overall design and deliverables. This includes the extent to which the student's deliverables show the student's own 'signature'.
- The student's overall attitude with respect to designing.

These elements together shape the identity of the designer. Figure 3 illustrates the integration of these four aspects within the Competence Framework. The outer circle shows the ten competences: self-directed & continuous learning, teamwork & communication, design & research processes, business process design, socio-cultural awareness, user focus & perspective, form & senses, ideas & concepts, integrating technology, and analysing complexity (as of 2008) (described in Appendix 2). The middle part shows the meta-process that is relevant to the student's control over his or her learning activities.

In the students' overall development over the years we distinguish five stages (high level end terms): (1) Blank (when students enter our department); (2) Awareness (at the end of their first year): students understand all competences, they have experience with most of them and they know how to continue developing them; (3) Depth (the expected stage for Bachelor's graduates): students are able to integrate all competences in the design process; (4) Expertise (the expected stage for Master's graduates): students have a clear profile in their competence development and they have in-depth attitudes, skills and knowledge of the field of design in relation to their competence profile; as a result, the integration of these competences is strongly driven by their personal vision on designing; (5) Visionary

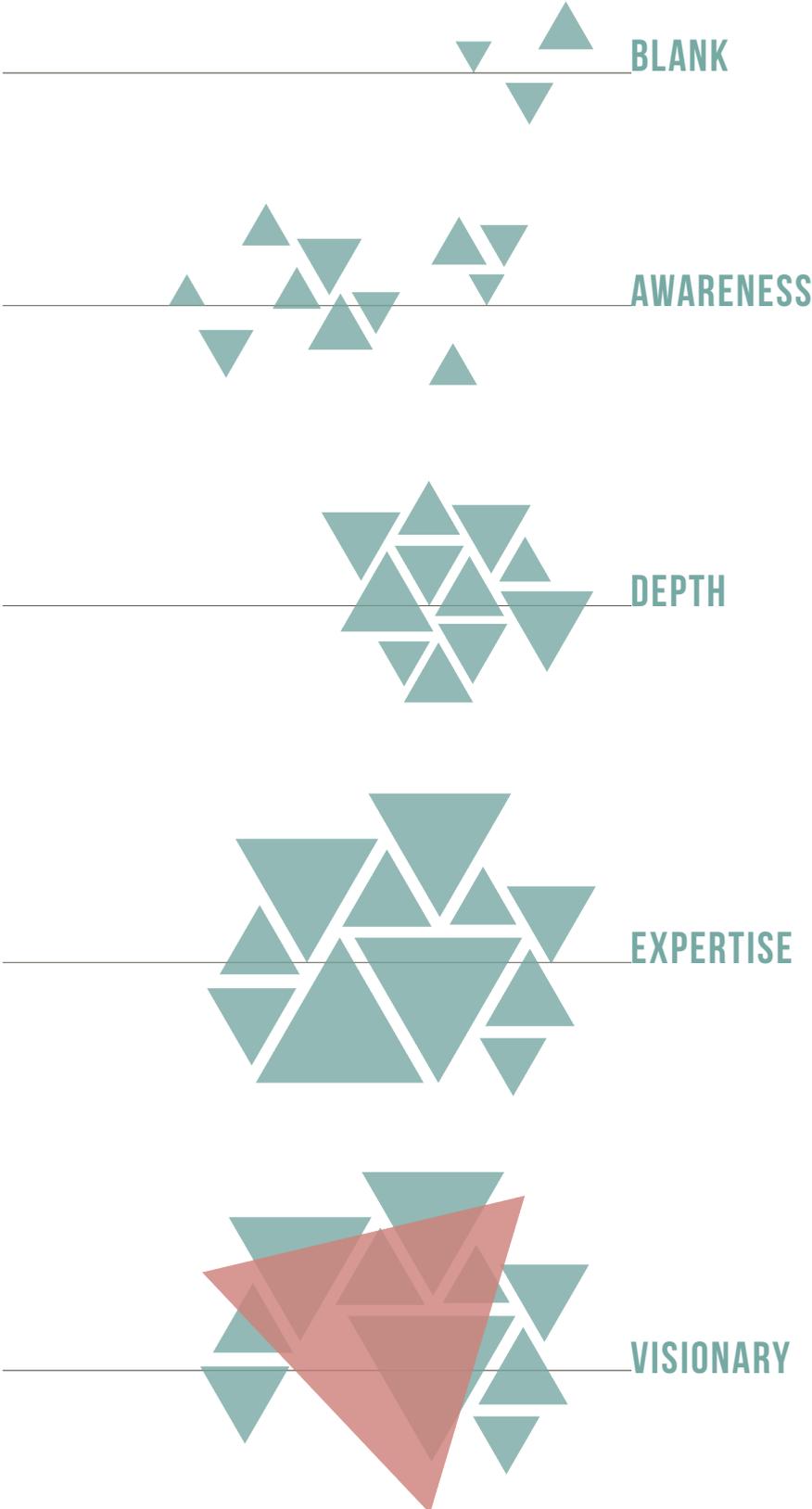


Figure 4. Stages of growth as a designer at ID

(the stage that excellent Master's graduates have started to develop and most graduates will work towards after their graduation): the student defines his or her own field in design. The five stages (see Figure 4) can be seen as the 'end terms' within our education.

***Facilitating learning***

We facilitate learning in three ways. First, we offer our students a variety of learning opportunities. Second, we facilitate learning loops by making use of self-directed and continuous learning mechanisms. And third, we stimulate a professional organisation which itself is continuously learning, in order to adapt to and grow along with the students and the societal, academic and professional context. Below, we briefly describe the rationale behind these three elements.

***Offering learning opportunities***

We offer a variety of curricular learning activities (described in chapter three 'Student Experience') to reflect and educate for professional practice. Since individual students have different ways of learning and different needs for developing their competences, we do not have one fixed program for all students (supply-oriented). Instead, we develop various types of curricular learning activities such as projects, assignments, modules, self-directed learning (SDL) activities, etc. Each activity has its specific characteristics, e.g., authentic versus constructed context; focus on competence of designing versus specific competences, individual versus teamwork. Since our students are responsible for determining what to learn, they have to decide which curricular learning activities suit their development best (demand-oriented), implying that all our curricular learning activities are 'electives'.

A constructivist perspective on learning has various implications for the roles of student and 'teacher'. Staff roles at ID vary and include competence coach, project coach, expert, assignor, module lecturer, assessor and client (see Figure 5). To offer an authentic learning environment, we have a vast number of freelance professionals that coach and lecture, next to working extensively with clients and experts from industry, research organisations, government or societal institutions, and 'users'. To stimulate integration of all these different perspectives, we have set-up Themes as carriers for joint research and education. Themes stimulate close collaboration in projects; they enhance internal and external links, and stimulate community building. Themes aim at stimulating self-directed and life-long learning for everyone, students as well as staff members. Students and staff members have their own place to sit and work in the theme space. Moreover, we have a variety of labs and workshops like the e-atelier, model workshop, 3D printing lab, a photo studio and various research labs to develop and test experiential prototypes and to perform research. In addition, we offer an organisation including Educational Affairs and the Service Desk to provide the services needed to study in our specific setting, see also chapter five 'Organization Experience'.

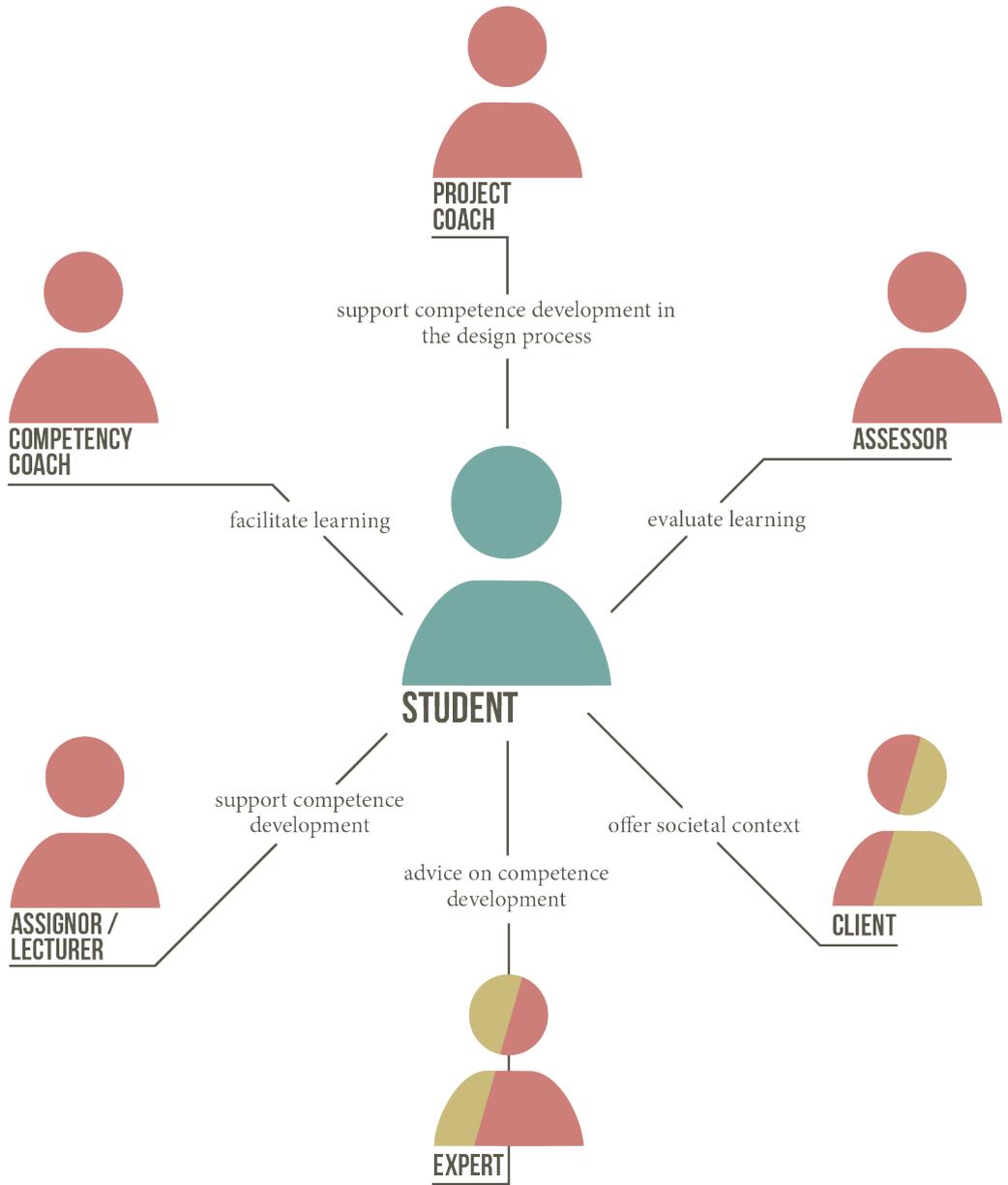


Figure 5. Roles of staff members in the development of the student

### *Facilitating learning loops*

It is the students' responsibility to determine what kind of Industrial Designer they want to become, taking into account the department's focus on designing intelligent systems, products and related services in a societal context. The most important mechanisms to realise this are the Personal Development Plan (PDP), the feedback system and the holistic assessment process.

Students capture the short-term and long-term goals for their overall competence of designing in their PDP. They manage their growth as a designer by determining what competence development this requires and what learning activities they need to select for a particular semester in order to achieve these goals. Reflection *in* and *on* action (Schön, 1983) as well as reflection *for* action, are important mechanisms to become aware of what one has learned, and to stimulate and direct this growth. Typical moments to reflect on their progress and to review and adjust their PDP are halfway through and towards the end of the semester.

During the semester, the coach, assignor, lecturer and expert provide oral and written feedback on the student's achievements and learning process in the different learning activities. The student uses this feedback to reflect on his or her development. The feedback has a formative goal to support the learning process and not a summative goal by judging if a learning activity has been successful.

At the assessment students' long-term and short-term goals serve as a point of reference to establish their development of the overall competence of designing and their growth as a designer. Since competence-centred learning naturally adopts a holistic approach, the assessment does not use a grading system for separate learning activities, but focuses on development and growth of the student, including the overall competence of designing and the vision on designing. Consequently, we only assess at the end of every semester and take a formal decision on the student's progress. There are three potential decisions: (1) the student is not promoted and does not get any credits ('Hold' or H-verdict); (2) the student is promoted and gets 30 credits ('Promotion' or P-verdict); (3) the student is conditionally promoted ('Conditional' or C-verdict). The student does not get the 30 credits yet but can earn them at the next assessment by fulfilling a set of conditions.

The process of an assessment has four components: (1) the end-of-term exhibition to demonstrate performance and growth; (2) the review of the Showcase, i.e., an interactive 'portfolio' in which students elucidate their development as a designer over the past semester in relation to their PDP, in the context of their history as a designer up to that point, and in relation to their envisioned development in the future; (3) a meeting between assessor(s) and student to discuss their progress; and (4) a plenary assessor meeting to discuss all students and finalise the verdicts. This way we can assess development both in a normative sense (in comparison with our five-stage growth model) and in an ipsative sense (in comparison to the student's personal goals).

### *ID education as a self-directed and continuous-learning organisation*

As explained above, within the department of Industrial Design we aim at facilitating students to become excellent self-directed and continuous learning designers. However, in order to reach our aim, we, ourselves have to be a self-directed and continuous-learning organisation, reflecting on our approach, identity and competences, adjusting to our own growth and developments within the field, thus improving as a learning facility for design students.

We have several ways of stimulating our own development. The assessment process is one of our major mechanisms to learn: our plenary assessment meetings at the end of every semester work as a reflection mechanism, which regularly produces initiatives for improvements. In 2008 we introduced mid-term and end-of-term exhibitions as part of our assessment procedure to stimulate knowledge sharing and reflection. Furthermore, we use special educational days that focus on specific topics such as determining growth of students, the assessment system or the quality of Showcases. And finally, writing the self-evaluation report for this accreditation boosts an intense process of reflection *in, on* and *for* action, and on new developments as described in chapter nine 'Future vision on ID'.

## 1.4 REFLECTION

Above we explained the fundamentals of our educational model. Specific reflections regarding implementation are discussed in chapter five 'Organization Experience'. We also decided to devote a separate chapter to a reflection on the specifics of our approach (chapter nine 'Future vision on ID'), because this allows us to immediately indicate which actions we have taken or will take to improve the quality of our education. We will end this chapter with a personal reflection from Caroline Hummels – who was director of education from April 2008 until August 2011.

*“The board set me a challenge at the beginning of my term. And a challenge it was. I am not directly referring to that first half year in 2008, where we still needed to begin to set up the entire structure including the program in May, although under normal circumstances an educational program needs to be finished around that time. No, the real challenge was, and still is, to live our educational system and support youngsters to create and realise their own dream.*

*I had the privilege to experience and help shaping our rich and rewarding ID Education system, that yields a relatively large amount of excellent designers and that facilitates and strengthens passion and competences of both students and staff members. As you might have concluded by now, it is far from an easy system; probably the most difficult and demanding educational system one can have. It asks for a great amount of dedication, time and sometimes frustration in order to reach great heights.*

*It requires continuous attention and initiative to remain developing and improving quality. It is a learning department striving for excellence, with the focus on development, growth and success, but with the willingness to dare to fail and learn from mistakes. We are what Ken Robinson was asking for: a humane educational system with an organic process, that lets students flourish by stimulating their curiosity, creativity while accepting and stimulating that they are all different. It is about people, passion, engagement and the willingness to learn and grow as a community. We strive for excellence. We opt for the maximum growth of every person. We rely on personal passion, since it fits the profession of the designers. And it is rewarding to see how alumni and students develop and find themselves, despite the differences and difficulties, while some students simply do not fit in our system and drop out.*

*It appears rather hard to understand and accept the values of our system when you do not live it. And it is especially challenging to communicate about our system and values, and to collaborate in the traditional setting. We do experience difficulties with respect to the clash with the surrounding classical system, both with respect to organisation and vision. It is difficult to find the time for reflection and PDPs for our own department and staff members in the rat race of everyday life. Moreover, this paradigm shift has proved to be hard at times for staff members themselves, because it touches upon their professional identity (Van Heijst and Van der Krogt, 2008). Let alone mention our alumni that have to find a job in a world that is often not ready for our engineers of the future, since our society is still on the way towards the transformation paradigm.*

*At present there are hardly any universities that use the same approach. We therefore have to develop the educational model ourselves, including all the organisational consequences, and the educational offer and content. Consequently, we gain insight through doing, including making mistakes on the way, overlooking certain aspects or not having found the right answer yet for specific educational challenges.*

*However, one of the real challenges is to innovate fundamentally in education. And that is what we try to do. So, it is no wonder that we experience difficulties, but it is worthwhile at the end of the day, when you see the glint in the eyes of our students, alumni and staff members, and see what everyone, both internally and externally, gains from the approach we are taking. ID Education is a dynamic system of passionate people that learn and grow together, based on the confidence that we are offering a valuable approach and perspective on educating the designers of the future. I hope that this self-evaluation report reveals that value, by letting a variety of stakeholders show their perspectives and reflections on our work.” Caroline Hummels*



# 2.

# READING GUIDE

At the department of Industrial Design we start from a self-directed and continuous learning system, with all its consequences for the roles of student and educator, as well as the design of the curriculum and assessment. Consequently, the setup of this self-evaluation report is slightly different from most self-evaluation reports. As explained in our conceptual learning model (see Figure 2 in chapter one 'Introduction'), within a competence-centred system performance and quality can only be assessed through demonstration. Moreover, in our efforts to continuously improve our education, we too use the mechanisms of learning-by-doing and reflection-on-action.

Therefore, we will take you on a journey, showing our doings and experiences from different perspectives, demonstrating what we have done, and sharing the reflections on our activities, development and outcome. As a reader and learner you are welcome to follow any path you choose. The points of interest are presented as experiences articulated by the students, the staff, the organization, the guardians and the alumni. Furthermore, we have highlighted how we have dealt with the remarks and conditions formulated during the previous accreditation:



### ***Bachelor***

1. Increase the selective function of the first Bachelor's year to improve Bachelor's success rates (see page 64)
2. Review the pro's and con's of carrying out an internship as a compulsory part of the program (see page 28)
3. Analyse and improve the study load of the internship and FBP (see page 59)
4. Ensure that the fundamentals of Engineering Science are adequately taught (see page 96)
5. Improve the use of the English language in the theses (see pages 31 and 45)



### ***Master***

6. Review the balance in projects between academic challenge on the one hand and the pace of industry on the other hand (see page 57)
7. Complete the assessment criteria for the final master project (see page 71)

### ***General***

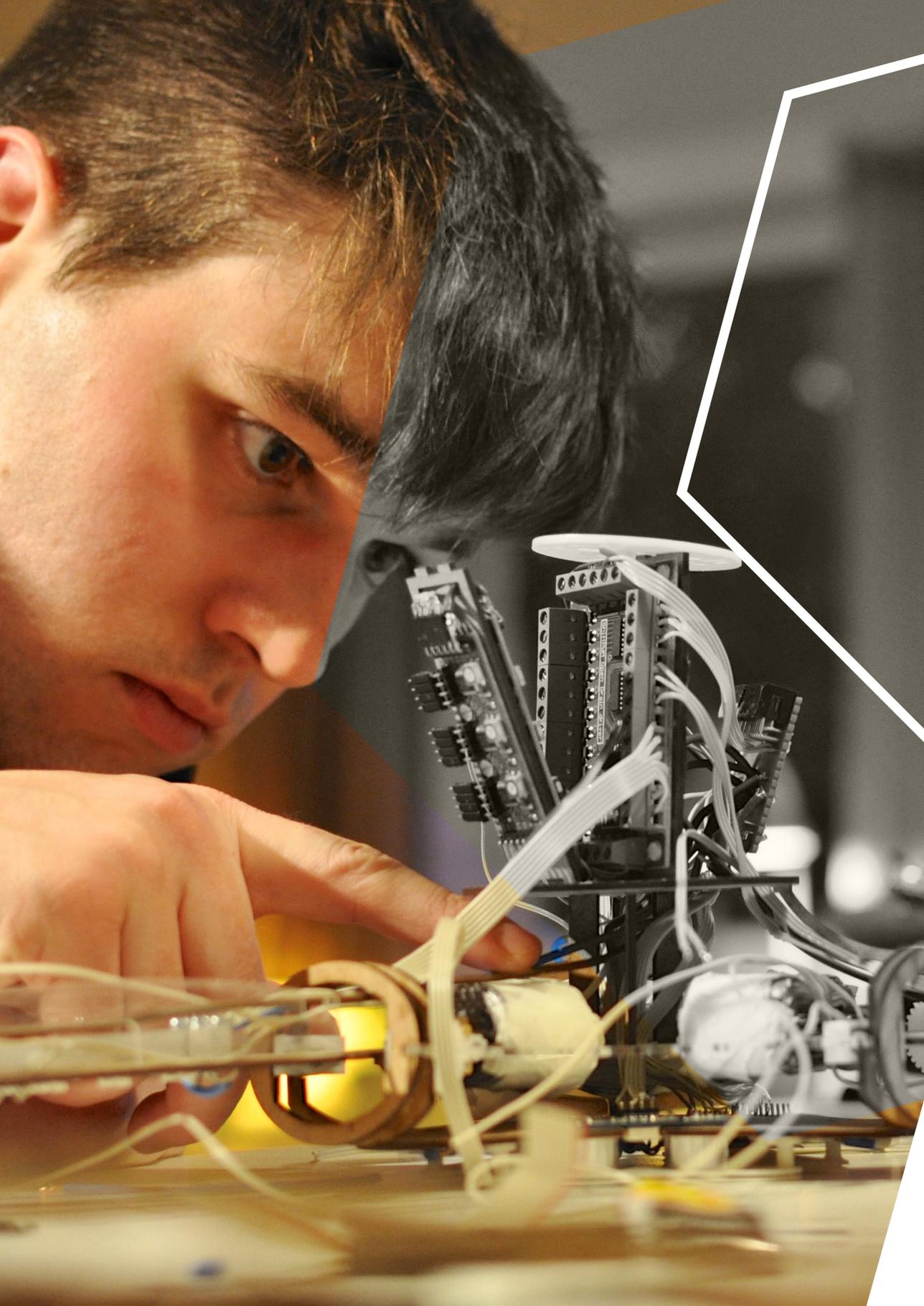
8. Develop a strategy to match the growing amount of students with the 'labour-intensive' educational model (see page 58)
9. Assess the sustainability of the assessment system in the context of growing student numbers (see page 58)
10. Pursue a stronger integration of research in the Bachelor and Master program (see page 46)
11. Review the grading system to satisfy the needs of the professional practice and institutes outside the Department (see page 72)
12. Identify the opportunities for creative ICT use (see page 58)
13. Renovate the accommodation to a facility, which is tailored to a design degree program (see page 107)

The symbols on the left refer to elements that address only the Bachelor (B) or Master (M) program. Furthermore, the numbered conditions are highlighted on the indicated pages with a similar red symbol throughout the report. In line with the sensorial richness of the interactive Showcases made by our students, we have tried to create a rich way of communication through videos, pictures and text that are highlighted with a multi-colored symbol. In addition to the report we offer an appendix, which presents all extended reflections, facts and figures. Thus we hope to convey our vision and approach, in combination with a visit to our department. We end our report by looking at the current situation and disclosing our future plans. However, the ultimate way of experiencing and assessing ID Education is captured by the saying “the proof of the pudding is in the eating”.



*“When I started as DoE of the Bachelor Program, my main ambition was to launch a central Showcase for ID that presents the departmental vision and the various activities that have shaped it. I believe such Showcase can align the different processes in the department and offer a coherent view on who we are and what we do. You can connect to additional highlighted information resources in the continuously developing Showcase app when a symbol such as the one on the left appears in this report.” Miguel Bruns Alonso, assistant professor and DoE of the Bachelor program*





# 3.

# STUDENT EXPERIENCE

In this chapter, we combine the description of our educational program with the reflections of our students on its components. We discuss how the learning activities have contributed to their competence development towards becoming a professional Industrial Designer. The reflections resulted from a diverse selection of students spanning different years, different prior experiences (High school, Bachelor IDE from TU Delft, Professional Education, Bachelor programs in other countries etc.) and different roles in student-supported bodies (Educational Committee, Faculty Council, Student Association etc) who reflected on their development in the educational program. In addition we invited a number of students to participate in a workshop where they conducted a joint reflection on their learning experiences (the individual reflections and workshop results can be found in Appendix 3).

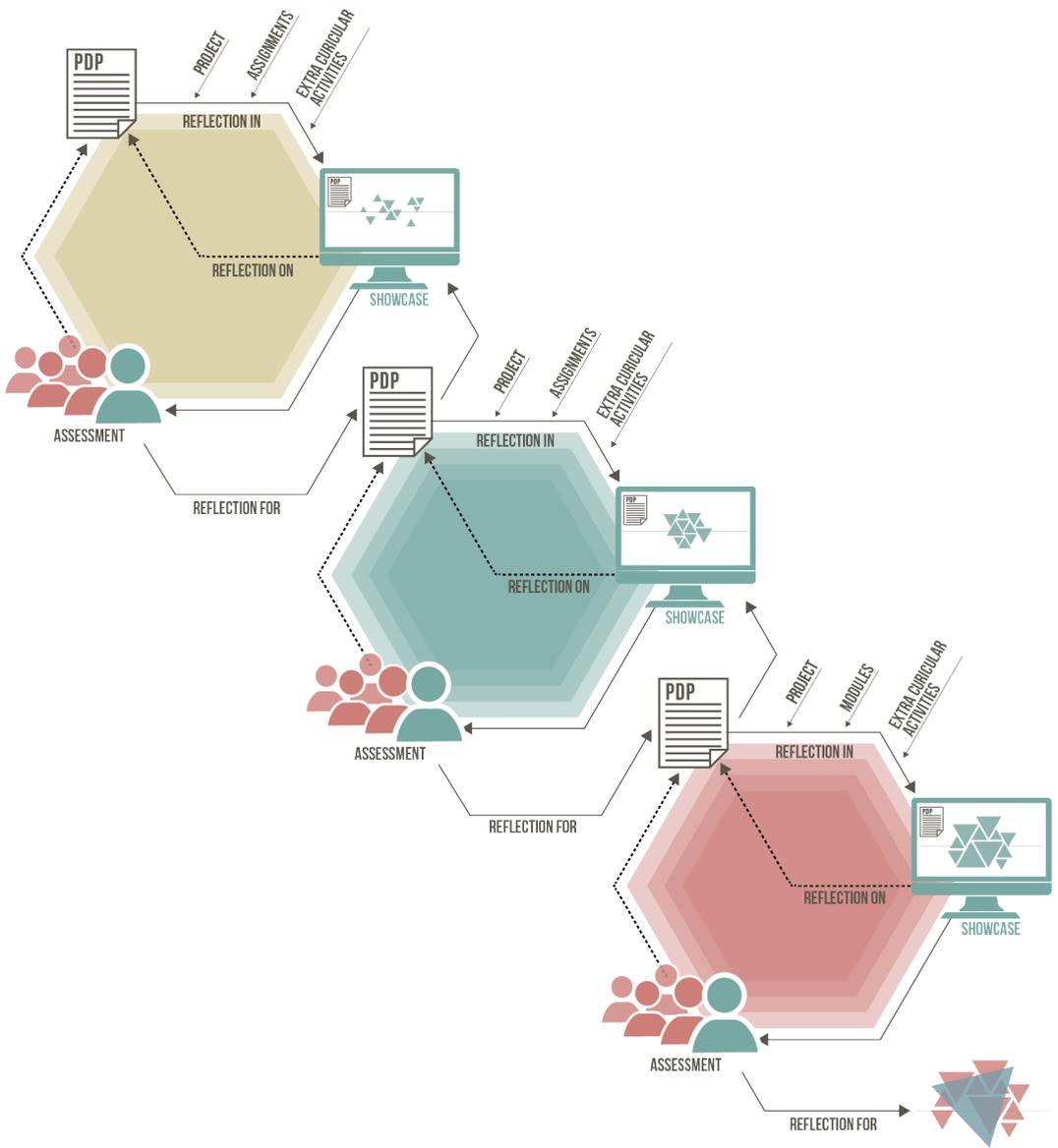


Figure 6. Schematic program overview

## 3.1 THE COMPETENCE FRAMEWORK

The department focuses on designing intelligent systems, products and related services in a societal context. It combines research, education and valorisation to address the societal challenges. Our students develop competences, by integrating the attitudes, skills and knowledge that we bring together in the department and we envision them to transform society through their acquired competences.

Students clearly recognize the important educational components of our competence-centred learning system from day one. They dive into the experience the moment they enter the department, as they need to develop their own learning path and to learn how to learn. The Competence Framework is the first thing they need to get acquainted with. Although they sometimes have difficulties in keeping a balance in developing different competences, students perceive the framework as the basis to understand design and to learn how to design.



*“When I entered at B1.1, I was slightly disappointed that I could not immediately start with the Master Program and had to do another Bachelor. Now, I fully understand this decision. I needed the extra time to get used to the educational system and especially to find out who I am as a designer and what my role in society actually is. I believe my identity and vision could not have developed to this extent in only one homologation semester.” Erik Swaagstra, alumnus (2009 - 2013)*

TABLE 3.1: STRUCTURE OF THE BACHELOR AND MASTER PROGRAMS IN WHICH DG000 IS AN INTRODUCTION TO SELF-DIRECTED AND COMPETENCE-CENTRED LEARNING, SDL MEANS SELF-DIRECTED LEARNING, FBP MEANS FINAL BACHELOR PROJECT AND FMP MEANS FINAL MASTER PROJECT

<b>Bachelor program</b>			<b>Exam</b>
Year 1	Block 1.1	DG000, 1 Assignment, SDL activities & 1 group project*	Propedeutic
	Block 1.2	3 Assignments, SDL activities & 1 group project*	
Year 2	Block 2.1	3 Assignments, SDL activities & 1 (group) project*	
	Block 2.2	3 Assignments, SDL activities & 1 (group) project*	
Year 3	Block 3.1	Minor, internship or exchange	Bachelor
	Block 3.2	1 or 2 Assignment(s), SDL activities & FBP	
<b>Master program</b>			
Year 1	Block 1.1	4 Module weeks, SDL activities & individual project	
	Block 1.2	4 Module weeks, SDL activities & individual research project	
Year 2	Block 2.1	4 Module weeks, SDL activities & FMP-brief	Master
	Block 2.2	FMP	

*\*In year 1 students work in groups of four on the same project, a minor part of the project is conducted individually. In year 2 students also work on a project in groups of four, but to a large extent the project is completed individually, or with a large individual component (see Figure 7).*

## 3.2 OVERVIEW OF THE PROGRAM

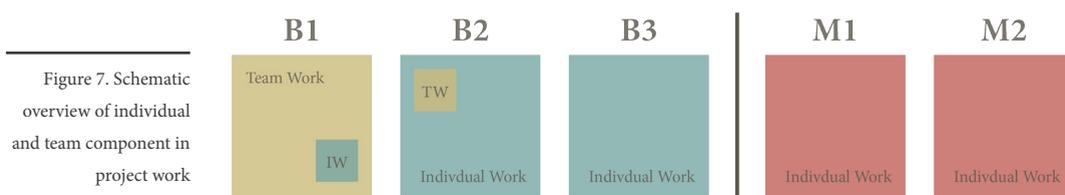
The Bachelor program consists of three years of study and includes a Propaedeutic and a Bachelor examination. It comprises six blocks along with their respective credits (30 ECTS) and curricular learning activities. The Master program takes two years and is concluded with the Master examination. It consists of four blocks along with the respective credits and curricular learning activities. Table 3.1 provides a brief overview of the two programs. For a more detailed overview we refer to Appendices 27 and 26.

The Bachelor and Master programs are structured as follows (see Figure 6).

1. At the start of each semester, students lay down their own envisioned growth as a designer in their Personal Development Plan (PDP). By making a PDP students determine per type of learning activity the ones that provide the best opportunity to develop their competences and overall competence of designing. Consequently, students select curricular learning activities taking into account the composition of the block they are going to do.
2. During these activities students receive feedback on their process and outcomes, which they store in a digital portfolio (IDcompass). In addition they reflect on the quality of their deliverables, their competence development, design process and learning process and attitude across the various learning activities they have done in a semester.
3. 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. Each student has to prove or demonstrate what he or she has achieved in the semester as a whole. His or her Showcase is a crucial component of this end-of-term assessment. The Showcase consists of reflections on learning supported by (visual) evidence obtained from learning activities.
4. The assessment is a formal decision but also a starting point for students' development and growth in the next semester.

### 3.3 LEARNING ACTIVITIES

Learning activities are activities with an emphasis on experiential learning and self-reflection while taking into account differences between individual students. They are not a target but a gate that opens up the attitudes, skills and knowledge needed by students in order to develop their competences. Learning activities are not an end but a means; therefore they are not assessed separately. We distinguish the following curricular learning activities: projects, assignments, modules, minor, (minor, internship or exchange), workshops and self-directed learning activities. During these activities contact hours vary, an approximate indication of contact hours throughout the program is given in Table 3.2.



**Projects** Projects are the backbone of the ID curriculum. Within the projects students develop their competences in an authentic context, often including a real client related to one of the themes (see appendix 4). Projects are performed individually or within a team, with an increase of the individual performance and a decrease of the team performance as students progress through the Bachelor program (see Figure 3.2). A typical Bachelor project takes up 60% of dedicated time per semester. The final Bachelor project (FBP) is an individual project. In the first year of the Master program students have to carry out a design project and a research project. A proposal for the final Master project (FMP) is written in the first quartile of the second year; after its approval the student continues with the project, taking up two semesters. With the exception of the FMP, students select a project from the offer of each theme. Staff informs students about their projects and try to convince interested students during the biannual project market. (An overview of the projects offered in the Academic year 2011/2012 can be found in Appendix 5).

TABLE 3.2: APPROXIMATE INDICATION OF CONTACT HOURS PER WEEK THROUGHOUT THE DIFFERENT BLOCKS

	B1.1	B1.2	B2.1	B2.2	B3.1	B3.2	M1.1	M1.2	M2.1	M2.2
Contact hours*	21	21	21	21	-	13	16	16	16	8

\*Contact hours were calculated for 2 - 4 (mean of 3) contact hours per week for an assignment, 2 - 4 (mean of 3) contact hours per day for a module during module weeks, and 8 hours of staff support in the themes of which 1 hour of personal contact per week for projects.



In group projects in the Bachelor program, students discover their own and each other's capabilities. They learn about design and research processes and to manage multi-tasking and to deal with time-management. Furthermore, students learn to work with clients and stakeholders, and how to involve external parties to participate in their projects. Projects offer them a ground to explore their interests, and to develop their vision and approach. Academic staff members or freelance designers coach them in the projects.



*"In my FBP I combined my experiences from assignments to choose the methods (and self-made combinations of these methods) that were most suitable for my process. For example, I have had several user-focus assignments from different points of view, and during my FBP I modelled my user involvement plans in such a way that they represented my own point of view [see figure on page 29]. In this way I felt that I was 'Mastering' the theories and methods, instead of only implementing them."* Philémonne Jaasma, student (2009 - present)

In the Master program, all projects are individual. Students choose their projects more cautiously, as they are more certain about their learning goals and learning path. They experience the project as the place to demonstrate their integral competences. At the weekly project coach meetings they receive feedback on their design, design process and project management skills. The coaches help the students understand their improvement over time and their strengths and weaknesses. Both Bachelor and Master students experience that the coaches sometimes have double roles in the project. On the one hand they write the project description and have certain expectations of the project results. On the other hand they coach the students on their competence development. Students sometimes find it challenging to maintain the balance between meeting the expectations of the coaches and adhering to their own development plans. They consider this as their personal development challenge: how to get the stakeholders on board and work together. However, sometimes coaches need more training on how to coach, in particular when they are new to the educational model.

*"In this process I was strongly supported by my coach, who stimulated me to take new steps each week, to start making early in the process and to take a step back to connect the dots. He also stimulated me to step out of my comfort zone."* Ine Mols, alumna (2007 - 2013), currently a Doctoral Candidate at ID

### **Assignments**



In addition to their projects, students participate in different assignments during the Bachelor. Assignments are individual intensive training courses that focus on integration of competences in a specific learning setting. Generally assignments take up 40% of the available learning time. Students work on deliverables and competence development, on which they get individual feedback from the assignor. A student is supposed to choose assignments that best match the learning goals and aimed competence development of that particular semester. An assignment focuses mostly on one or two competences and represents 48 hours of work (or sometimes 96 hours). As our students follow their own

learning paths, assignment groups are usually composed of students from various phases of the program.



Students experience the assignments as the basic building blocks to develop knowledge and skills and introduce them to different interesting competence directions. They realize that it is possible to apply what they have learned in the assignment to the design projects. The only limitation of the current system is that it can be difficult to get into the desired assignment due to the small size of the groups, limited number of assignments and strong competition in the registration process. (An overview of the assignments can be found in Appendix 6).

*“It was annoying as an exchange student to have chosen a university partly for the courses and then find out there is a risk of not getting the courses that you expected. That you have to compete with other students to get the courses you came for.”* Astrid Jøns Skibsted Johannsen, exchange student (2012 – 2013) from Denmark

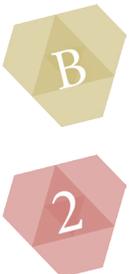
### Modules



A module is the equivalent learning activity in the Master program to the assignments in Bachelor but takes one, two or four full weeks. Students can choose modules in accordance with their own competence development goals. Most modules are intensive courses closely related to ongoing research of its lecturer and students are glad that they can contribute to the research development. In some cases the modules also offer opportunities for students to work with industrial partners. Students really enjoy those modules as they put them in close contact with industry. As students start thinking of their Final Master Project (FMP) they can use a part of the module as a preparation for their FMP. (An overview of the modules can be found in Appendix 7).

*“I was able to combine an interesting set of learning activities that allowed for both variety in development (through for instance three different modules) as well as depth: choosing modules that complement previous development and writing a paper about my previous project.”* Ine Mols

### Minor, internship or exchange



A Minor is a coherent set of course components, offered by another department (TU/e or external). A Minor can either widen or deepen the scope of the student's program, or offer the student the opportunity to progress to a non-corresponding Master program at the TU/e or at another university. Alternatively, a student can compose a free Minor, which needs to be approved by the Board of Examiners. As of the academic year 2012/2013 the Minors at the TU/e have been stopped due to the implementation of the Bachelor College (which will be discussed more extensively in Chapter 9 'Future Vision of ID').

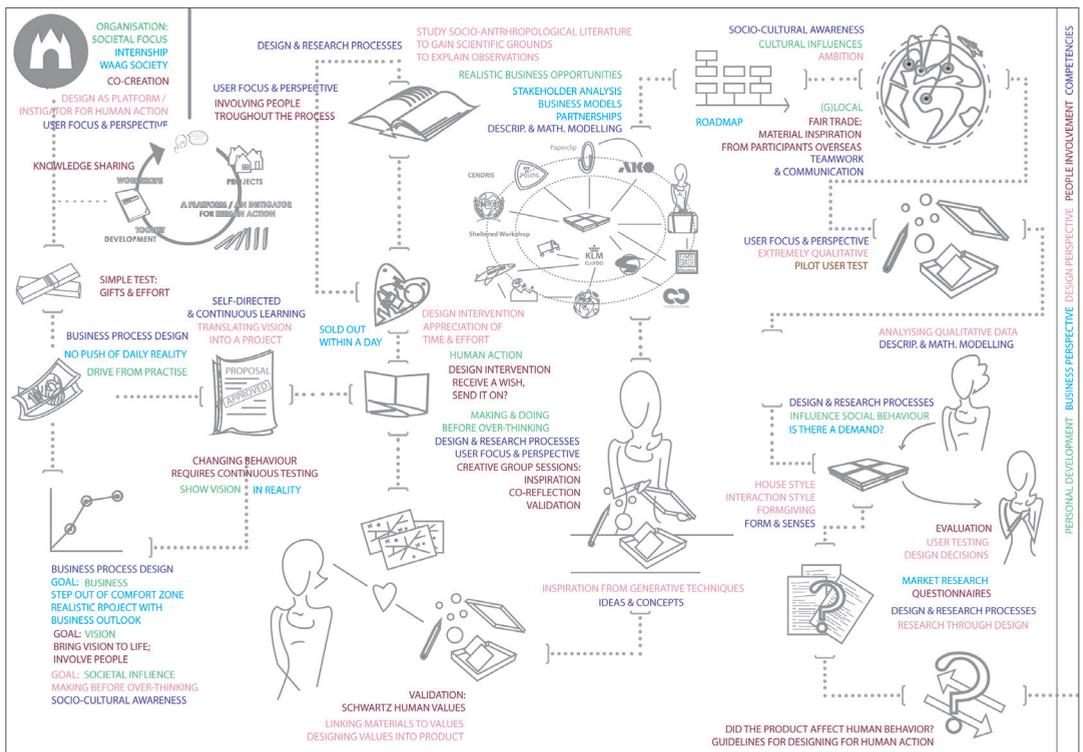
*“Doing a free minor in psychology [at the University of Amsterdam] has been of great value to the development of my vision on design and the way I see myself as a designer. On forehand, I experienced it as quite a risk to really decide to follow a minor in psychology. However, it turned out that taking a step away from design actually enables*



you to look at design from a different perspective. It actually enabled me to make a next step in defining how I want to develop myself further. I found out that I want to focus on how I as a designer can use and interpret psychological knowledge and translate this into design. Hereby, I want to focus on the translation process from 'nuances' (psychology) to generalisations (design), which I am also doing in my current project." Alice van Beukering, student (2009 - present)

Students can also do an internship in industry. During internships they have the opportunity to learn what industry needs from them and realize what they need to develop further. They consider this a real assessment on their strengths and weaknesses. Through the internship, they get a better understanding of what their role can be in a company. They learn to take their responsibilities more seriously, develop their professional conduct and support the development of their design identity.

"I mentioned the 'orientation for internship companies' already in my B1.2 Showcase. Actually it surprises me, but it proves that thinking further ahead than one semester is key for continuous growth. In the end I did an internship [at Waag Society]. This experience has given me so many clear, practical and valuable insights in who I am as designer in such a short period." Philémonne Jaasma



Finally, students have the opportunity to spend a semester abroad for example on an exchange at another university. Table 3.3 lists the number of Bachelor and Master students that spent a semester abroad for the years 2006 to 2012. This number stabilized at about 30 per year, but experienced a drop in 2012 which may have been caused by the changes in governmental subsidies (studiefinanciering) which became effective in August 2012. Due to the required preparation time, the financial aspect and the need to pass the assessment of the B22 Block, unfortunately not many Bachelor students opt for an exchange semester.

TABLE 3.3: INDUSTRIAL DESIGN STUDENTS CONDUCTING PART OF THEIR PROGRAM ABROAD

	2006	2007	2008	2009	2010	2011	2012
Bachelor	27	18	18	19	19	23	15
Master	1	5	15	8	11	9	1
Total	28	23	33	27	30	32	16

Most of our exchange students go to Australia, Singapore, the USA, Sweden and Denmark. For Bachelor students Australia has two universities that are popular choices for an exchange semester. The University of Technology Sydney (UTS) is a relatively new destination and is getting equally popular as the Royal Melbourne Institute of Technology (RMIT). The National University of Singapore (NUS) also attracts a stable number of students from our Department.

*“I think that the multidisciplinary approach in Eindhoven allows adapting fast and communicating with different disciplines within and outside the design field. It is also good to experience another system of education. It is clear to see how self-directed learning approach has influenced me as a student. That is definitely something that the students at UTS miss. Here the education is classic and students work in another way, less grown-up maybe. Seeing and learning another mentality, design approach and skill set makes me more aware and helps creating a better opinion on design and myself as a designer.”* Victor Donker, student (2009 – present), did an exchange at UTS

Although there are only a few places, the number of students that opt for either Carnegie Melon University (CMU) or Georgia University of Technology is increasing. From our European partner universities students tend to choose for the Royal Institute of Technology of Sweden (KTH) and the University of Southern Denmark (SDU).

**Foreign experience**  
**Master students**



Master students can also spend a semester or part of a semester abroad at a company or at a university. In most cases this exchange or internship is related to a specific project that they do at our department. For example, students do their research project (M1.2) at a partner institute with which a larger research project is conducted, or students approach a foreign client for their FMP and spend part of their time with the client abroad.



*“As a designer, I am interested in the values human beings create or adapt during their lifetime. People’s quality of life motivates me to design, to create for and with people, people with habits, emotions, and characteristics... I worked as a designer to try to make a change in another country [Ethiopia] where most of the values are determined by religion [and where] being the only designer was quite a challenge.”* Lia Bardoel, alumna (2010 - 2013), did her FMP for LEI Wageningen in Ethiopia

### **Workshops and other activities**



Workshops are comparatively short learning activities. Their size may vary from a few hours to a full day. Workshops provide students with an introduction to various topics, for example information brokering, design processes, reflection, group dynamics, creating a Showcase, mathematical modelling, electronics or a theme-related topic. These introductions are meant to initiate and support students’ competence development within the projects. Workshops can also provide students with specific expertise, either linked to a particular competence or to a Theme.

In addition to the workshops offered by ID, students can join a variety of courses from the Education and Student Service Center (STU), and sometimes students initiate workshops themselves. These courses support students in improving their study skills, making the right study choice, communicating in intercultural settings, and developing their social and communicative skills. Furthermore, STU offers different language courses. When the level of English of students is insufficient, students are advised (sometimes by means of a Conditional Verdict), to participate in an English course (an overview of the workshops can be found at Appendix 8).

### **Self-directed learning activities**

Besides formal curricular learning activities organized by the department, students have self-directed learning (SDL) activities in which they organize what they want to learn and how they are going to learn (explanation on SDL can be found in Appendix 9). Throughout the year five weeks are reserved for SDL activities, three halfway the first semester and one before the start of the second semester, and two halfway the second semester. Students develop a plan for what to do during these weeks in consultation with their coach. The first SDL weeks starts with the Dutch Design Week (DDW) in Eindhoven, which all students are encouraged to visit and in which many participate. Furthermore, the students’ association Lucid (see below) organizes a study trip to the Salone in Milan for first year students during the second SDL weeks. In addition to these design-related activities, some students use the SDL activities to catch up on the development of missing competences, other more developed students use SDL activities to do new projects that can bring what they have already learned into practice, such as participating in design competitions. Our students have participated and won in both national and international design competitions such as the Microsoft Research Design Challenge (2008, 2013), Tangible, Embedded, and Embodied Interaction Conference Superhero Design Challenge (2011), The Dutch National Innovation in Healthcare Thesis Award (2011), The Gerrit van der Veer HCI thesis award, ASML Young Talent Award (2013). Students reported that SDL activities really provide them with opportunities to develop their design vision further.

*“All in all, the system was difficult for me to get used to at first. But I believe that it helped me become more independent and creative in decision-making, made me a unique designer and made me think of why I want to be a designer and what I want to design.”*  
Rens Alkmade, student (2009 - present)

### 3.4 EXPERT SYSTEM

Experts are key elements of the system as they offer their expertise in particular competences to students. Both staff and students can cover the role of expert. Students highly appreciate the expert system that is in place. Through the expert system they receive valuable advice on their design approach, identity and vision. They also get inspiration from the experts for their projects. Students find that the regular meetings with the experts improve the validity of their projects. In addition, the expert meetings allow students to start creating their own network of experts.

*“For me, the atmosphere at the department is similar to an industrial environment; everyone has their own working space and project and everyone helps each other like colleagues do. Another plus is that there are experts to be found in every space, which can guide you to learn what you want or need for your project. I think it is a very inspiring environment.”* Jackie Hendrikx, Master student (2012 - present)

### 3.5 ASSESSMENT

Students are obliged to take part in each assessment that is scheduled in the assessment weeks at the end of each semester. They are required to complete and submit the assessment deliverables of the block concerned. The focus of the assessment is the student's development of the overall competence of designing, his or her vision on designing and his or her growth as a designer. Moreover, it is the student who has to demonstrate this by constructing a meaningful and coherent 'picture' of his or her learning and design achievements. Below, we take a closer look at the various components that students use to prepare for their assessment. A description of the assessment procedure is given in chapter six 'Guardian experience'.

*“The most exciting thing is that before the actual day of the assessment I will never know who will judge me and whether I can pass this semester. There are so many factors that influence the final verdict: my project, the design of the Showcase, my reflections, feedbacks I received from my coach and teachers, the assessor's opinion. I finally realized this is real life. If you fail on some details, you will fail the result.”* Zhou Leijing, Master alumna (2011/2012) from China

**Feedback on curricular learning activities** For the benefit of the assessment, the educators give constructive feedback to students during, as well as at the conclusion of curricular learning activities. Students receive feedback on their process and outcomes from the staff members involved, such as assignors, lecturers and coaches. Feedback is a very powerful way of supporting and enhancing students' learning. It provides students with qualitative information on how they learn (process) and on what they learn (results). It helps students understand what his or her learning is about, give meaning to what they are doing, and construct knowledge. We distinguish two communication media: oral and written feedback.

During the process of a learning activity, staff members give oral feedback on a regular basis and in a dialogue. This feedback helps students understand their process and competence development. Students can use this feedback to enhance their learning within the learning activity and achieve high-quality deliverables. The written feedback which students receive from staff members at the conclusion of a learning activity helps them to establish what they have achieved in the learning activity as a whole and how this contributes to their overall competence of designing. This written feedback also serves as evidence for the students' Showcase and, as such, is input for the assessor. Although the feedback gives them input on how to continue developing, the quality of the feedback is rather variable; also the feedback deadlines are not always met.

In the academic year 2008/2009 a transition was made in the feedback on learning activities. Previously students had to complete a set of curricular learning activities and it was indicated in their feedback whether students had completed or not completed their assignment. As of this year we have moved gradually to looking constructively at the intended development.

**Exhibition** Twice a year an end-of-term exhibition is organized. During the end-of-term exhibition students show their project, framed in their overall development. They exhibit visuals about their project, including the process, as well as tangible deliverables. In addition, they 'pitch' their project to visiting students and staff members, including their assessor. Students like the exhibition as it provides them with opportunities to learn about other students' projects and get to know their capabilities for potential future collaboration.

**Reflecting** In the course of curricular learning activities, our students reflect at various moments. The common element in these reflective moments is that they help students understand and enhance their learning. By reflecting they give meaning to what they are doing or, put differently, they articulate what an activity or experience means for their own learning or development. When performing a design activity, they capture valuable learning moments by reflection in action. During the (design) process they reflect on action by reviewing what they have achieved so far, or by connecting newly acquired knowledge to prior knowledge. They reflect for action by identifying what knowledge or skills they still need to acquire to accomplish high-quality deliverables or to perform a specific task or role effectively; or by determining what design activity they need to perform as a next step. Students are advised to write these reflections on a regular basis, for example in a 'learning

journal' (Moon, 2004); and to include corresponding visualisations of their deliverables and process. At the conclusion of a curricular learning activity they again reflect on and for action. They look back to establish what they have achieved in the learning activity as a whole and how this has contributed to developing particular competences. They look forward by determining how they can put this to use or expand their development in future curricular learning activities, either within the same or in the next semester.



*“At the university I learned to be creative and to think without boundaries. Alan Murray [former Director of Design] once told us that Industrial Design was a play garden and that this was the time to play and enjoy ourselves. On the other hand, reflections and self-evaluations are also really valuable and a very strong mechanism to remain sharp. This is another way of thinking that I still apply in my current work, but as I do not have a coach I am now my own teacher.”* Lissa Kooijman, alumna (2002 – 2008) currently working at Nedap Healthcare

Depending on the context and scope of students' learning and activity, their (written) reflections vary in the level of abstraction, detailing and specificity. For example, their reflections on action within a learning activity are at the low end of abstraction and at the high end of detailing. The integrative reflections in the top-layer of their Showcase, on the other hand, are at the high end of abstraction and at the low end of detailing.

**Showcase** As of the academic year 2008/2009, a Showcase replaced the written self-evaluation report. The Showcase, often referred to as 'portfolio', is a visual, interactive and integrative representation of a student's overall development. Such portfolio has a clearer relation to the way designers work than the self-evaluation report. Furthermore, it enables students not only to write their reflections, but also to demonstrate their work. Demonstration is the result of applying and developing competences and the level at which its performance can be assessed (Voorhees, 2001). The Showcase has two layers: an evidence layer and a top layer. The evidence layer contains a careful selection of the student's deliverables, feedbacks and reflections, which corroborates his or her overall development and growth. The top layer contains the student's reflections on his or her achievements in relation to the short-term goals set in his or her PDP.

Students go through iterative learning loops at the level of a semester as a whole. The Showcase plays a crucial part in this learning loop: it is the students' tool to monitor and communicate their development of the overall competence of designing and their vision on designing. 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.



## LEARNING ACTIVITIES SEMESTER B2.2

WELCOME  
VISION & IDENTITY  
GROWTH  
LEARNING ACTIVITIES  
COMPETENCY DEVELOPMENT  
CONTACT

Students enjoy making the Showcase after they have developed some basic skills of website building, Flash, etc. The Showcase gives them a helicopter perspective of their growth and their future directions. Reflecting, they experience that the assessment results are subjective and depend on the assessor but do not experience the assessments as unfair, because they are partially the result of a plenary assessor meeting. However, not all students are aware that the verdict is only reached in the plenary assessor meeting. They hope that the assessors will inform them better and trained to achieve a higher level of consistency.

*“The Conditional verdict forced me to reflect more critically and frequently and this gave me more insights in my strengths and weaknesses. I found out that I had to change my approach towards the design process and I understood more clearly in which directions I wanted to grow. I started to involve more experts in my work and asked for feedback on a more regular basis which improved the quality of my concepts.”* Yasemin Arslan, student (2010 - present)

### 3.6 INTERNATIONAL STUDENTS

#### *Incoming exchange students*

In the early days the department had no strict policy regarding the set up of bilateral agreements with other universities. Therefore, we exchanged students in an ad hoc way and accepted students from universities we had no agreement with. Students simply contacted the exchange coordinator and asked if they could spend a semester at our department. However, since a few years our department has established agreements with partner universities with whom we want to cooperate both in research and education (see Appendix 10 for an overview). This means we now more evenly exchange students with our partner universities and the number of students we receive is gradually growing. Table

TABLE 3.4: INCOMING EXCHANGE STUDENTS FROM 2006/2012

	2006	2007	2008	2009	2010	2011	2012
Australia	3	1	1			4	2
China							2
Cyprus					1	1	
Denmark			1	1	4		4
Finland			1	2		1	
France						1	3
Germany			1	3			
Hungary	2	2	1	2	1	1	1
Italy	1		2	2	1	2	
Japan					1		
Nw. Zealand					1		1
Singapore		6		5	1	5	7
Sweden			2	2			
Taiwan					2		
Turkey	4						
United Kingdom		1	2				
USA			2		1	3	1
<b>Total</b>	<b>10</b>	<b>10</b>	<b>13</b>	<b>17</b>	<b>13</b>	<b>18</b>	<b>21</b>

TABLE 3.5: INTERNATIONAL STUDENTS AT ID FROM 2006/2012

	2006		2007		2008		2009		2010		2011		2012	
	EU	Non EU	EU	Non EU	EU	Non EU	EU	Non EU	EU	Non EU	EU	Non EU	EU	Non EU
BSc	3	1	4	4	4	11	3	3	9	5	10	7	8	1
Homologation*		2				1	1	1		1	2	2	1	1
MSc			1	1	2		2	1	1	2	2	5	2	5
<b>Total</b>	<b>6</b>	<b>6</b>	<b>10</b>	<b>10</b>	<b>18</b>	<b>18</b>	<b>11</b>	<b>11</b>	<b>18</b>	<b>18</b>	<b>28</b>	<b>28</b>	<b>18</b>	<b>18</b>

\*Homologation students are those students that cannot immediately enter the Master, but do one semester (in B2.2) to adapt to the educational model and develop weaker competences.

3.4 lists the number of incoming exchange students broken down per country and year. As can be seen in the Table, we received 21 exchange students in 2012 whereas in 2006 we received only 10.

The increase in exchange students is related to the new bilateral agreements and/or the renewal of contact between staff of both universities. Furthermore we have noticed that our outgoing students have been excellent ambassadors of our department. Due to new agreements, we expect to receive more students from Jiangnan University (JU) China, National Taiwan University of Science and Technology (NTUST) and CMU USA in the near future. Furthermore, we expect to receive more students from European countries such as the United Kingdom (Northumbria University), France (University of Technology Compiegne) and Italy (Politecnico di Milano, University of Florence and University of Siena).

*“The first approach with the educational model of Industrial Design was not easy for me, because it is very different due to the freedom that is given to the student to build his own career and personality as a designer. I found it very stimulating, because the ‘challenge’ to declare every semester your vision about design is not easy: during my five years of studying design I obviously asked myself what design is for me, but this was like a passing thought, while writing it down is different and requires a bigger effort. So I found this point useful.”* Lorenzo Frangi, Italian exchange (2013) student from Politecnico di Milano

**Incoming  
international  
students**

Due to the fact that our program runs fully in English, we are open to attract international students to follow our full Bachelor and Master programs. We have welcomed a range of international students from UK, Germany, Spain, Denmark, Greece, USA, Canada, Iran, China and many other countries. Table 3.5 lists the numbers of international students from EU and non-EU countries from 2006 to 2012. The table shows that the number of international students strongly varies from year to year, with an average of about 15 per year.

*“I have to admit that the lack of regulation boggled me, but it turned out to be nice experiencing this much freedom. Yet, without the guidance of a senior student I would not have known what to do. During my second and third year, after having established a solid base, everything was easier than before. This was due to knowing the activities, the people and the places. The past three years have been an experience I would not have been able to get in Germany. Even though it has not always been easy, I wholeheartedly recommend it to anyone who is looking not only for academic, but also personal development.”* Robin Pohl, Bachelor alumnus (2010 - 2013) from Germany

*“During the semester the other students were more than helpful in explaining everything I needed to know... Due to my lack of knowledge in programming and electronics it took me a lot of time to get acquainted with it. Unfortunately, there are no courses that teach Master students from different backgrounds how to use*



*programming in their design process. However, in the department there are a lot of people, coaches and students, willing to provide help to whoever needs it. With their help I managed to have a working prototype for my first project and I showed a huge development in the competence of Integrating Technology.”* Theodora Kyrgia, Master student (2012 - present) from Greece

### 3.7 STUDY ASSOCIATION LUCID

Lucid is the study association for students of ID. They are a growing and active community and organize various educational activities such as excursions, workshops, lectures and study trips abroad as well as social activities for students and employees (see Appendix 11 for an overview). Through these activities they try to form a bridge between students and companies or organizations. Furthermore, they run a bookstore selling a variety of books recommended by the teaching staff or that Lucid members find inspiring for the students' competence development. An overview of these books can be found in Appendix 12. As representatives of the students, they are actively involved in collaboration and discussions with the director of education and are represented in both the Faculty Council and the Educational Committee through a member of the board.



*“Within an organization like Industrial Design you need to have someone that can act as a bridge between the students and the Board of the department. The commissioner of education gives the students a voice and a place to go, to ventilate their opinions. I was able to do this especially in a weekly meeting with the Director of Education and by meeting students throughout the day.”* Tim Scholten, Bachelor alumnus (2007 - 2012), currently self-employed by Less or more web solutions

### 3.8 REFLECTION

In our curriculum students do various curricular learning activities. These activities become learning experiences through the meaning students give to them. The activities are programmed in such way that the curriculum allows for active student participation and control, offers ample opportunity for interaction and provides an authentic context for students' learning. Although the assessment is perceived as fair, students and coaches need to be better informed about the process. Finally, we have a growing amount of incoming international students, which we need to strengthen. However, we should also support that our students go abroad more often to gain valuable learning experiences.



# 4.

# EDUCATORS EXPERIENCE

In this chapter, we look at the different roles of the educators. First we discuss the involvement of staff in the program. Consequently, we give an insight into the distribution of the expertise of our staff. With the establishment and development of the four different research groups Designed Intelligence (DI), User Centred Engineering (UCE), Designing Quality in Interaction (DQI), and Business Process Design (BPD) we illustrate how the integration between research and education takes shape and how we exploit the synergies between the different areas of expertise. Finally, we reflect on the variety in roles that staff members take as educators (the individual reflection can be found in Appendix 13).

## 4.1 OVERVIEW OF TEACHING STAFF

ID aims to have 90 Full-Time Equivalents (Ftes) on the payroll for research, education and support tasks. Table 4.1 shows the total amount of Fte for education for the Bachelor and Master programs in relation to the number of students. The calculation is based on our financial administration, taking into account the following basic assumptions:

- Scientific staff members spend 50% of their time on education;
- Doctoral candidates on 1st money stream spend 20% of their time on education;
- External teaching staff members (freelancers) spend 100% of their time on education.

In Table 4.1 we see that in 2011/2012 the total number of students per Fte education was 23.2. This figure is comparable with a benchmark by the Operational Audit Committee under authority of the Executive Board, executed at the end of 2006. At that moment the average number of students per Fte education for all TU/e departments was 28 (with a minimum of 12 and a maximum of 51). We are striving for 25 students and 7 graduates per Fte education.

TABLE 4.1: TEACHING STAFF IN FTES AND STUDENT-STAFF RATIO

	06/07	07/08	08/09	09/10	10/11	11/12
Fte Academic	17	19	20	19	15	13
Fte PostDoc/Doctoral candidates	1	1	1	2	2	2
FTE External	18	11	5	6	9	8
Total FTE educators	36	31	26	27	26	23
Number of student BSc	394	409	406	421	428	420
Number of student MSc	49	85	104	109	105	114
Total number of students	443	494	510	530	533	534
Number of graduates BSc	71	67	72	83	111	91
Number of graduates MSc	6	10	37	34	37	37
Total number of graduates	77	77	109	117	148	128
<b>Student/Staff Ratio</b>	<b>12.3</b>	<b>15.9</b>	<b>19.6</b>	<b>19.6</b>	<b>20.5</b>	<b>23.2</b>
<b>Graduate/Staff Ratio</b>	<b>2.1</b>	<b>2.5</b>	<b>4.2</b>	<b>4.3</b>	<b>5.7</b>	<b>5.6</b>

TABLE 4.2: QUALITY OF TEACHING STAFF 2011/2012

Degree	Total	Master	Doctorate	UTQ
Bachelor	88	78%	43%	7%
Master	67	88%	55%	9%
Total	100	81%	43%	6%

***Control of staff  
quality***

The department aims at staff levels that are sufficient to ensure that the Bachelor and Master programs meet the required standards regarding content, didactics and organization of the course program. The personnel policy of both TU/e and ID is based on the motto 'Excellent people attract excellent people'. An overview of the degrees of educational staff is given in Table 4.2. Consequently, recruiting top talent had and has high priority. We continue to ensure that:

- Expertise of the teaching staff is in line with the objectives of the Bachelor and Master programs;
- Human resources, recruitment and internal training policy monitor and promote teaching quality.



## 4.2 EXPERTISE OF TEACHING STAFF

The Competence Framework defines in what competences students need to develop. Consequently, these competences must be reflected in the expertise and background of the teaching staff. Appendix 14 contains an overview of the teaching staff and their fields of expertise. This overview shows that the expertise and background of the teaching staff covers all the competences. In the Dutch national evaluation by Keuzegids Hoger Onderwijs of 2006 to 2012, students were annually asked about their opinion on the quality of the whole program, including educators and lecturers: their expertise with respect to contents, clear transfer or explanation of the subject matter, stimulation of the learning process and the availability of educators. The score for ID was and still is the highest compared to the other two academic design courses in the Netherlands (Appendix 15).

**Internal staff policy** The staff policy is directed towards creating a ‘rich’ learning environment, where all students (graduate and undergraduate) are junior employees coached by senior employees (professors, associate professors, assistant professors, doctoral candidates and external teaching staff). In their contacts with the students, staff members take on different roles (competence and project coach, client, assignor, lecturer of a module, expert, and assessor) depending on the learning activities and situation (see also chapter three ‘Student Experience’).

**Scientific staff** When recruiting new scientific staff to fit in this rich learning environment, ID uses the selection procedure and criteria for scientific staff formulated at TU/e level as a starting point. In order to take into account the needs related to the departmental mission, ID has developed more specific selection criteria, i.e., scientific research, industrial/design experience, scientific education, management and administration (see Appendix 16). Representatives from both research and education are involved in the selection committees for scientific staff and external teaching staff. Once hired, staff members are continuously encouraged to keep developing. We offer various courses to support academic leadership, the quality of education, management of competence development, and the English language (Appendix 17). Specific training programs stimulate the professional development of doctoral candidates and young assistant professors. The ID doctoral candidates follow a training program “PROviding Opportunities For doctoral candidates” (PROOF). For young assistant professors strategic professional development training is provided. Furthermore, all new teaching staff (scientific and external coaches) go through a compulsory introduction program, with information about the educational model and the roles of the core team members. Finally, the TU/e offers a variety of specific didactical courses, for example ‘Teaching and learning in higher education’. Our staff make good use of these opportunities.

The UTQ (University Teaching Qualifications, ‘BKO’ in Dutch) program is an agreement that was established by the three Universities of Technology (3TU) as an HRM policy. The UTQ describes the competences that a University teacher must have and the criteria

for evaluation. As of 2009, all newly appointed University teachers have to meet the UTQ within three years to qualify for a permanent position. Furthermore, the UTQ is required when teachers and professors want to get promoted, and/or when the results of their teaching evaluations are poor. Participation in the UTQ program is carefully recorded and the number of UTQ certificates earned is constantly monitored. To this date 6 out of 25 full-time senior academic staff members obtained their UTQ.



In 2011 all scientific staff members had to undertake an English Language Assessment. A minimum of C2 (Common European Framework of Reference for Languages) was required for all academic staff members. The University offers a variety of courses to improve the level of English of its employees. Overall the department of ID scored high on the assessment.

Since 2005 the department runs a cycle of ‘performance and personal development interviews’ as part of the annual staff appraisal. Each individual staff member prepares an Annual Report including a Personal Development Plan (PDP) as input for the staff appraisal. This PDP is used to discuss personal growth, reach agreements on the activities required to achieve this, and monitor progress.

**External and professional expertise (freelancer)**

To complement the expertise of academic staff with the expertise of non-academics from the professional field and bring our students in contact with these professionals, we hire every year a significant amount of freelancers as educators. Table 4.3 provides an overview of the areas of expertise (based on an inquiry from May 2013, see Appendix 18), split by expertise groups and. Overall the least expertise is available for the core competences DMM and DBP, and the highest amounts in expertise are for IC and DRP.

TABLE 4.3: OVERVIEW OF EXPERTISE DISTRIBUTION AMONG ACADEMIC STAFF AND FREELANCERS OF THE DOMAIN-SPECIFIC CORE COMPETENCES IDEAS AND CONCEPTS (IC), INTEGRATING TECHNOLOGY (IT), USER FOCUS AND PERSPECTIVE (UFP), SOCIAL AND CULTURAL AWARENESS (SCA), DESIGNING BUSINESS PROCESSES (DBP), FORM AND SENSES (FS), DESCRIPTIVE AND MATHEMATICAL MODELLING (DMM) AND THE META COMPETENCE DESIGN AND RESEARCH PROCESSES (DRP); THE PERCENTAGES INDICATE THE CONTRIBUTION OF OUR EDUCATORS NORMALIZED BY GROUP SIZE (STATUS MAY 2013).

Groups	IC	FS	IT	DMM	UFP	SCA	DBP	DRP	Staff
BPD	5%	0%	15%	19%	9%	9%	34%	9%	5
DI	5%	5%	30%	29%	10%	3%	2%	17%	10
DQI	26%	21%	8%	0%	9%	11%	0%	25,5	8
UCE	13%	9%	16%	4%	29%	4%	0%	25%	12
Sum for academics	12%	9%	17%	13%	14%	7%	9%	19%	35
Freelancers	23%	19%	10%	0%	7%	15%	7%	19%	36
Overall	18%	14%	13%	6%	11%	11%	7%	20%	71

**Competence Responsible** The director of education had responsibility for the competences Self-directed and Continuous Learning and Teamwork and Communication. Until 2010/2011 the capacity groups were responsible for the competences that related most to the research conducted in the group (see below). These responsibilities included ensuring a balanced offering of assignments and modules relating to the competence, contacting experts for offering these learning activities, controlling the quality of the offering and providing an introduction to first year students. Different staff members in the research group could take up this responsibility. In some cases one single person was responsible, on other occasions teams of experts distributed the work over e.g. Master and Bachelor curricular learning activities. Competence responsables were free to involve scientific staff as well as freelance experts in the field.

*“On several occasions I had to shunt responsibilities to the DoE, which I do not like to do when I am negotiating. I prefer being clear about what I expect, without simply being ‘the messenger’, or perceived as such.”* Bart Hengeveld, assistant professor and competence responsible for IC and FS (2009 - 2010)

As indicated by the quote above, the responsibility for a competence often caused problems and insecurity. On the one hand less experienced staff members were able to deal with the requirements of this task in a timely manner, but they had insufficient seniority to take a stance when problems arose. Therefore, as of 2011 full and associate professors were assigned as competence responsables although, they often still delegated responsibility to other staff members.

## 4.3 THEMES



In 2008 ID started to establish cross-disciplinary themes to cluster all student projects and related activities (see also chapters one ‘Introduction’ and five ‘Organization Experience’). We started with thirteen themes, and over the years several changes happened. The most recent – and relative stable – list of themes covers seven different topics (see Appendix 19).

TABLE 4.4: OVERVIEW OF PERCENTAGES OF EXPERTISE PER COMPETENCE FOR ALL THEMES

Themes	IC	FS	IT	DMM	UFP	SCA	DBP	DRP
CB	17%	5%	4%	4%	5%	13%	19%	34%
CBinHC	9%	8%	22%	10%	19%	5%	5%	22%
LTSM	19%	17%	16%	1%	6%	12%	11%	18%
NN	20%	20%	15%	2%	8%	12%	2%	20%
OoC	17%	16%	14%	13%	8%	9%	4%	19%
PI	14%	16%	8%	5%	25%	9%	5%	19%
WS	30%	16%	14%	7%	3%	15%	2%	11%

***Integrating  
research and  
education***

The expertise of all educators in all themes is not entirely equally distributed over themes given different topics of interest; each theme has also a different amount of teaching capacity depending on students' project choices and therefore required coaching capacity. Based on 71 educators' areas of expertise (see Appendix 18) the actual distribution is given in Table 4.4.

***Integration of  
education and  
research***



In our themes we try to integrate education and research by connecting students to ongoing research projects in programs such as CRISP (Creative Industries Scientific Programme) e.g. 'Smart Textile Services', 'I-PE' or 'Grip'. Students ranging from first-year Bachelor to final-year Master are actively involved in ongoing research and take part in producing scientific publications under the professional guidance of coaches. A quick search in Google Scholar with search terms 'Industrial Design' and '@student.tue.nl' yielded a considerable amount of peer-reviewed conference and journal publications in which students were first author ( $\pm 50$ ) or co-author ( $\pm 250$ ) since 2006. Furthermore, the modules in the Master Program are a means to involve students in ongoing research as modules support the development of our research programs and serve as a means to reflect upon new insights. A concrete example is the module Exploring Business Landscapes (related to the work of doctoral candidate Ehsan Baha), that is conducted in the context of the CRISP project 'Grey but Mobile'. Other examples concern the EDL approach, DQI theory, Sensual Dynamics (relating to the doctoral thesis of Eva Deckers 'Perceptive Qualities in Systems of Interactive Products'), GHOST (relating to the EU funded FP7 project with ID, Copenhagen University, Lancaster University and Bristol University), etc.

***Theme Champ***

Each theme is headed by a 'Theme Champ'. Some Theme Champs are members of the scientific staff, whereas others are freelance coaches. A complete list of Theme Champs from 2008 to 2013 is given in Appendix 19. Theme Champs have certain autonomy in how to shape this role. The Director of Education (of the Bachelor program) has regular meetings with all Theme Champs. Every semester all Theme Champs coordinate the project offer from their theme and propose a set of projects to the DoE. The DoE finally approves the content of these projects.

*"My main drivers as a Theme Champ [of Wearable Senses] are being a mediator between students, staff and organization, both on a strategic and executing level; keeping coherence and balance in the different topics addressed by the theme; and building a community. I try to know all students in the theme, involve them and motivate them to get the most out of themselves. Furthermore, I organize staff-days and recruit freelance coaches that fit the vision of our theme." Maarten Versteeg, freelance coach and assignor and Theme Champ of Wearable Senses*

## 4.4 CAPACITY GROUPS

During the period 2006 - 2007 ID had three capacity groups. A fourth was created in 2008 (an extensive description can be found in Appendix 20).

***Designed Intelligence (DI; since 2001)*** The DI group aims at designing the quality inside(-out) of intelligent systems, platforms and tools. It focuses on adaptive systems, autonomous systems and aware environments. The DI group was responsible for the competences Integrating Technology and Design and Research Processes. In addition to the curricular learning activities, the DI group offers the students infrastructure and support in both dedicated educational facilities, such as e-atelier, and research laboratories, such as the Cultural Computing Lab, the Robotics Lab and the Simulation Lab.

***User Centred Engineering (UCE; since 2003)*** The UCE group investigates how to design, develop and evaluate innovative applications and concomitant interaction solutions in the area of Human-System Interaction. The research is focused on understanding the human aspects of the interaction of people with intelligent systems. The group's primary objective is to create added value for the end users of intelligent systems by designing systems that match people's needs, abilities and desires. The UCE group was responsible for the competences User Focus and Perspective and Descriptive and Mathematical Modelling.

***Designing Quality in Interaction (DQI; since 2006)*** The DQI group focuses on how to design for highly interactive intelligent systems. DQI is shifting its research and teaching context from Human Product Interaction, which mainly focuses on opening up the functionality of products, towards a broader approach aimed at enhancing interpersonal and societal values, including those in the personal, aesthetic and socio-cultural domains, through the application of highly interactive intelligent systems. The group was responsible for the competences Ideas and Concepts, Form and Senses, and to some extent for Socio-Cultural Awareness.

***Business Process Design (BPD; since 2008)*** The BPD group investigates designing and analyzing business processes for the design of intelligent systems, products and related services. In this context intelligent systems are defined as systems that consist of a set of products and/or services that have the ability to adapt their behaviour based on the situation, context of use and users' needs. In particular the group focuses on those systems that are of benefit to individuals, societies and different cultures worldwide, as well as on the underlying problems and opportunities. The BPD group was responsible for the competences Design Business Processes and Socio-Cultural Awareness.

***Core chairs (full time, full professor)*** In 2011/2012 the Department has developed a new plan for the core chairs of the department, which it is currently implementing.

- Designing for dynamic interaction in context: creation of new interaction patterns within complex socio-technical systems in a societal context (new chair);
- Design for user experience: creating, analyzing and modelling new forms of user experiences in interaction with intelligent systems (Berry Eggen);
- Design theory of intelligent, adaptive and interactive systems, products and services: a phenomenological, first person perspective design approach towards societal transformation (Caroline Hummels);
- Field analysis of complex real-life systems: analysis of dynamic intelligent systems in an open society (Aarnout Brombacher);
- Interactive systems design: creation of intelligent, adaptive and interactive systems, able to adapt to and register dynamic interaction patterns in the area of social and entertainment computing (Matthias Rauterberg);
- Interactive systems design / system realization: realizing experience-able propositions using state-of-the-art technology (Loe Feijs);
- Socio-technical systems design: creation of complex dynamic socio-technical systems in a societal context (new chair).

The chairs are not directly coupled to one specific competence, but generally speaking chairs contribute to one or two competences as leading experts in the field. For example, the chair ‘Design for user experience’ has a strong relation with the competences UFP and FS, whereas the chair ‘Field analysis of complex real-life systems’ has a strong relation to DBP and DMM.

## 4.5 ROLES OF TEACHING STAFF

**Competence coach** The competence coach is responsible for coaching the individual student on his or her competence development. For this purpose the competence coach has regular meetings with the student (on average every other week). In these meetings they discuss the student’s competence development plan and/or learning goals (PDP). The coach can advise the student on how to achieve these learning goals and can give feedback on progress. Also, very importantly, the coach supports the student when writing the self-evaluation (Showcase) at the end of each semester.

*“I approach teaching as a service to students and it is my role to support their value creation process. Similarly, I approach teaching as a meaning creation process. Teaching is a service the value of which can only be assessed by the student through interaction. As beneficiaries students co-create their own value since they determine what is of value.”* Sander Mulder, freelance coach



**Project coach** The project coach is responsible for coaching the project team or individual student. The project coach has weekly meetings with the team to discuss progress. In these meetings the design process, the project deliverables, and – if applicable – the team processes are addressed. The project coach normally brings in a client, either from inside ID or from outside via the professional network.

*“I reflect on how I adjust feedback style to student style. Some students, e.g., the insecure ones, are more in need of motivational coaching, whereas others, e.g., those who have trouble taking responsibility, are more in need of direct and confrontational feedback. Students that are very proactive themselves can be coached by discussing progress, being a devil’s advocate and sometimes by joining in specific activities, such as setting up studies.”* Tilde Bekker, associate professor

**Client** The role of client can be taken by someone from outside university (e.g., industry, non-governmental organizations, etc.) or from inside the university (scientific staff from ID). The client represents the problem owner and discusses the project brief with the student or student team. The client provides feedback to the proposed solutions during the semester and gives final feedback at the end of the semester.

*“The students are genuinely interested and were able to formulate relevant questions to me as the client. The students listen very well to the client, nurses and parents and are able to select the information that is necessary to perform their project adequately. I would like to be consulted more frequently during the project. Mostly I see the students at the start and only once more in the first phase of the project. An extra meeting after 6 weeks would give us the possibility to advise and correct the students if necessary. Sometimes I have the feeling that at the end there is not enough time for the students for important iteration.”* Sidarto Bambang Oetomo, part-time professor

**Assignor** An assignor provides one or more assignments in his or her field of expertise. Assignors stem either from ID’s research groups, from other departments at the TU/e, or from the professional field. Assignments are focused curricular learning activities carried out either individually or in a team, and targeting skill- and knowledge-based development.



*“The assignment focuses on the development of co-reflection sessions applied to multiple stakeholders, experts, and users or between designers. The students developed and ran the sessions as part of the co-reflection assignment... but the contexts of application were their own half-year design projects. This means that the sessions were part of a real design process instead of a controlled activity and the students had to develop them according to their project needs with real stakeholders, experts and real users.”* Oscar Tomico, assistant professor

**Lecturer of a  
module**



A lecturer of a module is actively involved in one or more modules related to his or her field of expertise and ongoing research. Lecturers stem primarily from ID's research groups, from other departments at the TU/e, or are highly experienced professionals from the field of Industrial Designers. Sometimes we invite internationally renowned academics to present a module.

*“At ID qualitative feedback is used to evaluate the results of the module for each individual student. How to give feedback that is clear, well founded and actionable to support the continuous learning of students is a must competence for teaching in ID. From my own experience, I think a two level-feedback approach is very appropriate. At micro level, timely feedback during the curricular learning activities serves as an early signal/warning and encourages continuous learning within the curricular learning activities. At macro level, the final feedback at the end of the curricular learning activities serves as an overview of the learning process of the students and provides them with materials for further reflection and improvement. In short, I really enjoy teaching modules at ID.”* Yuan Lu, associate professor

**Expert**

All members of our teaching and technical support staff are also experts in one or more topics related to our Competence Framework. Individual students or project teams can approach an expert with a question or problem that they encounter in the project, the assignment or module, or in individual work.

*“In the last seven years I have had the chance to build a workshop in which the students can explore the worth of their concepts. Assisting the students with an open mind, encouraging them to take a step further, is probably the most rewarding part of my work. Of course this is a technical endeavour in which I can hand them my skills. Skills that I have thanks to working experience in mechanics, crafting wood, teaching and prototyping. Especially the mix of skills is a source of invaluable advice for the ID department of TU/e. I have learned at the TU/e that students search for affirmative guidance. Guidance in how to approach conceptual designing and in how social interaction works. I think this faculty is an inspirational environment to learn, work and reflect on your work.”* Chet Bangaru, supporting staff member of the D-search Labs

**Assessor**

The assessor evaluates the student's self-evaluation and deliverables, and assesses in a holistic and ipsative manner the student's level of competence development with respect to the minimal growth expectations that have been formulated for the particular semester the student is in (see also chapter six 'Guardian experience').

*“I've been involved in student assessments within the department for over ten years now. It took some time to get skilled in assessing students, but ID Education proved helpful guidelines for how to do assessments and what to address in assessment reports, although throughout the years I kept having trouble with the notion of 'Overall growth*

*as a designer', as in my opinion this notion is ill-defined. What I find difficult to see here is how levels of development can be defined for things such as 'vision/identity' and 'relation between vision/identity and the (self-directed) development'. In sum, although in my experience I usually agree with the coach about the verdict for a student (which might be taken as evidence of a sound process), I feel that the verdict often arises in a rather implicit manner and the arguments are provided as a justification afterwards, instead of the other way around."* Jacques Terken, associate professor

***Assigning staff  
to educational  
activities***

Depending on the contractually agreed number of working hours in terms of Ftes, 50% of each staff member's available time is allocated to teaching activities. For a scientific staff member (1 Fte) this means 824 hours per year (out of 1648 total working hours per year). Per semester he or she can spend 412 hours on education. A regular coach load comes down to 200 hours of coaching in a theme and 4 modules or assignments of 40 hours and 56 hours respectively.

## **4.6 REFLECTION**

The driving force of our department is ID's constellation of staff members from both the scientific and the professional field and their shared ambition of developing a unique academic design department where they realize the synergy of research and education activities within a learning environment for both students and staff. In both the Bachelor and Master programs the connection between research and education continues to grow stronger. The connection benefits from the fact that all staff members spend equal portions of their time on research and education, resulting in 'research inspired education' as stated by our last international visitation committee for education. ID aims at providing the student with an inspiring learning environment with both academic and professional role models in the field of Industrial Design.





# 5.

# ORGANIZATION EXPERIENCE

In chapter one 'Introduction' we explained that we facilitate learning at our department to enable students to become excellent self-directed and continuously learning designers. This requires a specific organisation, culture and processes that support the growth of students, faculty and the department, as well as the economic stability to do our job well. In this chapter we reflect on our approach, more specifically on the mechanisms, structures and organisation that we implemented in order to facilitate learning. In this chapter, we describe and reflect on the collaboration and integration to enhance quality and efficiency; the support given by the study advisor; technical support and facilities; and the administrative processes and scheduling (the individual reflection can be found in Appendix 21).

## 5.1 COLLABORATION AND INTEGRATION TO ENHANCE QUALITY AND EFFICIENCY

We currently have approximately 226 staff members (36 senior scientific staff, 64 freelance coaches, assignors and lecturers, 55 doctoral candidates and post-doctoral researchers, 35 post-graduate USI students and 36 supporting staff) and 500 students at the department of Industrial Design. In contrast, in the academic year 2006 - 2007, after 5 years of existence, the number of people in our Department was still rather small, which made it possible to have rather informal communication. There was an organisational culture in which staff and students were stimulated to find their own way and/or means in executing tasks and activities. In 2006/2007 there were four so-called Domains in which students could perform projects. Diana Vinke, one of the developers and implementers of the educational model within our department, describes Domains as small communities of practice that gave their members a feeling of 'belonging' as well as ample opportunity for exchanging expertise.

*"In the year of 2006/2007 the organization was still exploring possibilities and directions within our educational system. This was applicable both to the content of our educational program, as well as the process of delivering it. This led to an organizational culture in which staff and students were stimulated to find their own way and/or means in executing given tasks. At that time the number of people involved was much smaller. Besides, our organization was divided in smaller parts. This made it possible to explore and work in a very flexible way: communication within a small group was informal and easily done! But then the department started to grow very fast and there was a need for adapting to this bigger size. Wherever possible, the department used aspects that already had proven to be effective and applied it to a bigger group: the need for an autonomous and explorative culture was not that big anymore. Nevertheless, the strongly needed cultural change was not completed yet. This is leading to situations in which compliance to a general policy is sometimes a bit difficult (for both students and staff)." Henri in 't Groen, coordinator Educational Affairs*

In April 2008, a new director of education, Caroline Hummels, was appointed (see Table 5.1). Based on constructivist learning theories, she created a vision that seamlessly connected learning how to design with learning how to learn, and with the organisation and culture needed to facilitate this process. The entire transition, including the implementation of this vision, was run as a design process with characteristics similar to the design processes run by our students.

TABLE 5.1 OVERVIEW OF DIRECTORS OF EDUCATION

	Bachelor Program	Master Program
September 2003 - March 2008	Dr. Ingeborg Janssen Reinen	
April 2008 - August 2011	Dr. ir. Caroline Hummels	
September 2011 - February 2013	Prof. dr. Panos Markopoulos MSc.	
November 2012 - present	Dr. ir. Miguel Bruns	
February 2013 - present		Prof. Dr. Matthias Rauterberg

Hummels’ vision included the need for a different way of collaborating, captured in so-called Themes. A year before Hummels became director of education we had already noticed that Domains could easily drift apart and create their own version of the educational concept that was no longer coherent with the overall model of ID. During the development of Hummels’ vision, it also became apparent that education and research were hardly connected.

*“It was rather peculiar to see that education was lead by external professionals and research by the professors, and there was not much (strategic) connection between them. Moreover, the capacity groups were fairly divided and acted as silos. It felt that there was a strong need for integration at all levels”.* Caroline Hummels



These considerations led to the creation of the Themes. Compared to the old Domains, Themes are more flexible and dynamic groups of various people (students, staff, professional designers, clients) that integrate education, research and the link to the outside world. The Board of the department explains the origin of the Themes as follows:

*“Educating students in the field of Industrial Design, especially in the context of our mission, means operating in a highly dynamic field where the academic, technological and societal contexts are subject to a high rate of change. This implies that, as a department, we cannot use a static research and education program to fulfil our mission. Students will have to develop an ability to ‘learn to learn’ on a continuous basis to be prepared for a future career in this field and the research within the department has to have the ability to continuously adapt to new and emerging patterns; both to technological developments as well as to societal changes in the field.”*

Aarnout Brombacher, full professor and dean

TABLE 5.2: OVERVIEW OF THE VERDICTS OF THE BACHELOR (B32) AND MASTER EXAM (M22)

	06/07	07/08	08/09	09/10	10/11	11/12
Verdicts Bachelor Exam						
E	NA	NA	6	12	16	14
P	44	67	66	81	86	81
C			1	7	10	16
H	6	1	8	27	20	12
Verdicts pending	1	7				
Verdicts Master Exam						
E	NA	NA	2	11	12	8
P	1	10	35	23*	25*	28*
C				2	1	4
H					2	1

\* Number of Ps include updated P-verdict after having met the Conditions from the Conditional (C) verdicts.



It turned out over the years that the Themes were a really good mechanism to enhance collaboration and mutual respect, e.g., between the different capacity groups and with external partners. Of course, the introduction of the Themes could not solve or prevent all problems. Due to the increasing number of students and the growth of the department over the last few years, a need has arisen to adapt various processes and ways of communication. Knowledge sharing and keeping track of development is extremely important in our educational model.



As shown in chapter one 'Introduction', we devised a method to visualise the design process and the designer's development in the Competence Framework, which clarified the educational concept in a way that text-only communication could never achieve. We also redesigned many tools and mechanisms in the Department. The self-evaluation forms were replaced by the Showcase; IDportal was replaced by IDcompass; the assessment behind closed doors was replaced by midterm and end-of-term exhibitions; the ID café was made to have a general meeting space; the selection of design projects was changed from an administrative procedure to an open project market where students can select a project; the feedback forms were updated; and as a result of the all the actions the whole assessment process improved. Furthermore, we tried to raise a discussion on quality of deliverables, and the levels of competence development through the Frame of Reference project, aiming to show project and Showcase examples as bench marking for student's development and an instrument for assessment. Despite several attempts, this process is still not completely successful, but it will be given another boost by building a Showcase of ID. The actions have enabled us to sharpen our educational concept and improve the implementation process of the innovative concept of our educational model.





In addition to enhancing collaboration in 2008, we tried to make the overall program and structure of ID as simple, transparent and uniform as possible, e.g., by having a semester system for all years, including the first year of the Bachelor (which was previously divided into quartiles) and the Final Bachelor project (which was in most cases extended by one or two quartiles). Finally we strived for a better fit within the university, e.g., by adopting the same semester system as all other departments, and we improved the efficiency and financial incentives while maintaining quality. For example, we introduced a binding study advise (BSA) after the first year of study, (see table 5.2) we made the assessment at the end of every semester obligatory for all students (with the exception of 'special cases') and we adjusted the student-staff ratio for educational activities. This resulted in a considerable improvement of success rate, especially in the higher years of the Bachelor.

**Evaluation  
learning activities**

Various mechanisms ensure the quality of our education. There is a continuous discussion regarding quality through e.g. the plenary assessor meetings and Education Days. As assessors check the feedback and results of learning activities they attend coaches, assignors and lecturers, or in some cases the Director of Education if quality lags behind. Furthermore, at the end of each curricular learning activity, students fill out forms in which they give feedback on how the learning activity supported their development. The quality control officer checks the anonymized forms, informs the DoE and returns the results to the responsible assignor or lecturer. Assignors and lecturers use the results to improve their learning activities in discussion with the competence responsables and DoE.





*“I consider my educational activities very much of a continuously improving design process. I observe a specific need for development that is somehow related to my expertise as a researcher or designer and consequently I develop a curricular activity that revolves around this topic. When introducing myself to the students I generally present myself as a life-long learner too, I am very open and keen on hearing their feedback to develop the course and as an educator. Through reflection-on-action, i.e. by observing the reactions of the students, and taking their feedback into account, I try to develop and improve the content of my courses and other teaching activities. Therefore, it is very important to keep a good overview of other curricular activities in the department and of state-of-the art research and developments to be able to point out students in the right direction” Miguel Bruns Alonso*

The quality control on assessments is evidenced by the appeals (see chapter six ‘Guardian experience’). The Board of Examiners evaluates the appeals made by students and informs the DoE if an assessor does not perform well. Furthermore, as all learning activities are elective, there is a strong selection mechanism by the students. When projects, assignments or modules offer insufficient opportunity for development, the word spreads fast through word of mouth and social media.

*“Anyone experience with the assignment anti-dogmatic design? Is it valuable? What do you learn and develop?” [post on ID Facebook page, February 1, 2012] Rik Bootsman, student (2010 - present)*

When preparing the next semester with theme champs (for projects) and competence responsables (for assignments and modules), the DoE takes the number of first choices for projects and the amount of students that selected an assignment or module into consideration. If these numbers drop or are too low, the learning activity is cancelled and the responsible educator is requested to develop a new learning activity in discussion with the DoE and theme champ or competence responsible. Finally, final master students are the ultimate litmus test for the quality of our educational staff. Academic staff highly appreciate coaching FMP students as some strongly support research and/or valorisation. As it is the student who selects a coach, there is a natural selection mechanism. To involve FMP students in their projects and research staff members are forced to improve the quality of their coaching.



## 5.2 TECHNICAL SUPPORT AND FACILITIES

Within the learning activities we want our students to focus on exploring opportunities for competence development that enable them to accomplish high-quality deliverables. To facilitate students in accomplishing these deliverables, technical support is provided and several facilities are made available to the students (see Appendix 21 for an overview). We think that the offered facilities, such as the facilities in the workspace in Vertigo, are compatible with the ambition of our department to stimulate an open and exploring attitude of students. Despite the limited offer of facilities the students can still come to very innovative solutions, which results in quickly realised and to-the-point prototypes. Furthermore, since we educate our students to be open-minded and persistent, they achieve high-quality deliverables by involving experts in prototyping outside the university, thereby overcoming their less-developed knowledge of specific fabrication techniques. In terms of electronic prototyping, students benefit strongly from the availability of several relatively low-priced, easy-to-program microcontroller platforms (e.g., Arduino and MS Gaddeer) that are supported by a large community. These platforms enable them to learn with only little guidance. However, the department would benefit from some more extensive facilities for the finishing of prototypes, such as a spray cabin.

Another point for improvement is that the availability of technical support is limited. Due to the time structure of the education program there are peak periods in required technical support, especially before the final exhibition and during time slots for assignments and modules. During these peak loads the support of staff members is limited. To better manage these peak loads several alterations have been made in the organization of the support. One of the improvements is that interns and student assistants are deployed to fulfil more routine tasks, and to be supportive in the preparation for peak loads. We nevertheless notice that the technical support staff do not have enough time to be continuously up-to-date proactive towards new developments and they are not yet clearly embedded organizationally in the department.

Finally, the number of students is still increasing and we need to take care that high quality support and facilities do not suffer. A possible solution could be to integrate high-fidelity prototyping facilities and labs in one location within the department, which could become an inspiring place where students can share ideas, technology and knowledge. In order to keep the making facilities close to the themes, another solution might be the integration of facilities with a stronger focus on low-fidelity prototyping in labs that will get a central position in the themes.

## 5.3 SUPPORT BY STUDY ADVISOR

Besides support from the coach (see chapter four ‘Educator Experience’), students can consult a study advisor from the department for support and/or advice regarding their study progress. Throughout their studies, students are encouraged to analyze and reflect on their personal development.

*“As study advisors we try to stimulate and coach the students in directing their own learning. By asking questions to students we encourage them to reflect on their personal situation, and preferably come to a solution, plan for action or a set of possibilities. We try to encourage the students to use their own capacities, to make their own choices, and to take responsibility for their own actions.”* Yolanda Hübner, study advisor

Even though we think that encouraging students to reflect on their personal situation is most adequate for the majority of students, there are some who do not benefit from this approach. Furthermore, this approach is not applicable to all situations. Therefore, to be able to support students in the most appropriate way and to reach an optimal result, we adjust our communication with students to the situation and the student(s) involved.



Our educational model is not appropriate for all students. Students that enter our Department without having deliberately chosen for our educational model can get into serious difficulties throughout their studies. We think that the information prospective students receive is important to bring in the best students for this department. Although we have active and experienceable open days for prospective students, it still happens that students register for our Bachelor program without being aware of our educational model. In our opinion the Binding Study Recommendation (which became effective in 2009/2010) is in that case an adequate means to select the students who suit our educational model best, although we are currently also exploring introductory meetings with the students before they start their studies to learn about their plans and ideas. Table 5.3 provides an overview of students dropping out per year for cohorts since 2007.

TABLE 5.3: OVERVIEW OF DROPOUT PER COHORT

Cohort	2007	2008	2009	2010	2011
Dropout after 1st year	8%	10%	20%	7%	22%
Dropout after 2nd year	-5%*	2%	0%	3%	
Dropout after 3rd year	8%	3%	2%		

\* Homologation students enroll into the second year causing the negative amount

## 5.4 ADMINISTRATIVE PROCESSES AND SCHEDULING

Since students have different ways of learning and different needs for developing their competences, the department of Industrial Design does not have a fixed curriculum for all students. The students are given the opportunity to compile their own range of individual learning activities. As a consequence the execution of administrative and scheduling activities is complex, demanding an 'ID-customized' solution. The Educational Office is challenged to come up with adequate and transparent processes that are in line with these learning activities as well as keeping in mind the requirements of the administrative and scheduling activities of the TU/e in general. The supporting processes are complex and time-consuming. Staff members of the Educational Office execute their tasks in challenging surroundings and often changing circumstances and therefore need to be flexible, accurate, tolerant to stress and continuously think in terms of solutions.

*"It is not the easiest of tasks to execute your job and responsibilities in a department that is in a more or less constant state of development. Even more so as this department has established itself in a University that (still) uses systems and (planning) procedures, which are, based on (neo) classical education patterns. Virtually every task in the field of scheduling, planning, registration, use of various systems and supporting the management, ends up with you needing to find an 'ID-customized' solution. The great challenge here is finding a transparent solution that is in line with the educational vision of the Faculty, but also keeps in step with the rest of the University and can be explained to both students and educators."* Lenny Apon, Head of the Educational Office

## 5.5 REFLECTION

We are a learning organisation ourselves too. We have implemented many mechanisms to improve our education, but we are of course still coping with many challenges, such as the increasing amount of students, the adjustment to university-wide developments, financial pressure, having enough time for reflection to maintain or improve the quality of our department. The challenges will be further elucidated in chapter nine 'Future vision on ID'.





# 6.

# GUARDIAN EXPERIENCE

In our department, there are several bodies (Educational Committee, Departmental Admission Board and Board of Examiners) that are required to evaluate, regulate and give feedback on affairs that are directly related to education. As the pace of change during the whole lifetime of our (relatively young) department has been high, and our educational model demands a high level of flexibility, it is important that these bodies are proactive and adaptive in their functioning, in order to give adequate and relevant signals that help to inform the changes that shape our growing department. In this chapter, we present shortened first person perspectives on the activities within these bodies, to provide insight in their role and functioning within the department, and to illustrate how they address the various challenges posed by our educational model (the extended reflections can be found in Appendix 23). Furthermore, we present a more detailed view on the transparency, validity and reliability of the student's assessment process resulting in the quality of the assessment procedure from the perspective of the assessment coordinator and quality assurance officer, who are also members of the Board of Examiners.

## 6.1 EDUCATIONAL COMMITTEE

The Educational Committee (Dutch: OC) can formulate advice in educational matters. The advice given by the OC is helpful to the departmental council in formulating or approving decisions, and helps the directors of education get a better view, i.e., a view from various perspectives, of the consequences of existing or proposed measures. To this end, the educational committee is composed of staff members and students, and is assisted in her tasks by a secretary.

An advice normally pertains to educational matters. It may include the (changes in) formulations of the Education and Examination Regulations (Dutch: OER) and Assessment Rules and Procedures (Dutch: RR) (see Appendices 24, 25 and 26), but may also concern other education-related matters, e.g., changes in schedules or working conditions of the students and staff members regarding education. Anyone can approach the committee when they feel they have an issue that the OC needs to consider.

*“Experience shows that different committee members care about different aspects, and that it is crucial that the committee has members that represent different perspectives in the department... In principle this process should work quite well, as it assures that voices of different stakeholders are heard, but as the committee has only advisory status, the recommendations they formulate will not always be implemented. In particular, as there is considerable time pressure in many situations, deadlines are often too short... The OC has quite recently tried to address the deadline problem through the mechanism of giving informal advice, which can be formulated quicker by individual members, and which may also anticipate on possible changes or foreseen problems. Still, we feel that the increased pace at which departmental processes proceed nowadays makes the committee work more difficult.”* Mathias Funk, assistant professor and member of the OCC

## 6.2 DEPARTMENTAL ADMISSION BOARD



The Departmental Admission Board (Dutch: FTC) takes decisions about the admission of students to the Master program. These decisions can concern students from the Netherlands or abroad who have a Bachelor degree from a university Bachelor program other than those listed in the ‘doorstroommatrix’ (listing of Bachelor programs giving unconditional admission). The decisions may also concern students from within the Netherlands who have a degree at HBO level (professional school).

*“We base our decision on several factors. In particular we look at the foreign students’ personal motivation, e.g., what kind of designer do they want to be, and whether they fit in the mission of the department. This is mostly evident from their motivational letter. We also try to get a picture of their personal profile and affinity,*

*based on evidence like a CV, a portfolio, or the choice of particular electives, and working experience if available. Finally, we try to assess their overall potential, as evidenced from GPA [Grade Point Average], the university where they study, grades for particular subjects, etc... One problem that we do have is that foreign students who are admitted will not always take up the offer; especially if we require them to enter the homologation semester, ...[as] the expenses of this homologation semester are not covered by a scholarship... A potential solution is to let students already work on their homologation while they are still at their own university. Together with universities we have extensive cooperative ties with, like Zhejiang University in China, we are exploring opportunities to do so... we [also] have started to reconsider whether it is possible to offer other ways to make students fit into our Master program, for instance by broadening the scope of acceptable student profiles. The discussion whether and how this can be done is currently being initiated within the department.” Jacques Terken, associate professor and chair of the FTC*

## 6.3 BOARD OF EXAMINERS

The task of the BoE is to assure that the quality level of the examinations at our department is maintained. Also, the BoE needs to take decisions in handling daily matters regarding special circumstances or requests. It grants dispensations and permissions; grants or rejects appeals against assessment outcomes; decides on applicability of free Minors, and deals with miscellaneous student requests. It also handles fraud cases, and decides whether to grant cum laude, etc. Furthermore, it approves the RR and it decides on education and examination authorities of all staff members.

*“In daily matters our basic principle is that we try to have a clear view of formal matters, and try (as much as possible) to delegate content-related judgment to the relevant experts. We also try to relate new cases to previous ones, in order to apply similar criteria.*

*Of course it is very important that we keep monitoring the consequences of our decisions. When we approve proposed changes to the assessment procedure, for instance, the full consequences of changes in procedures are not always completely foreseeable...*

*Concerns about the sustainability of our educational model have further grown with the advent of the university-wide Bachelor College which has important consequences for our curriculum and assessment procedure, consequences over which we only have very limited control. We have taken several initiatives to prevent possible problems. After consultations with the education department, we decided in 2011 to install a Task Force, under the presidency of one of our members Dr. ir. Pierre Levy, to organize an active reflection on the assessment process itself and on how it is monitored. The Task Force delivered its report [see Appendix 27] in April 2012 to the BoE.” René Ahn, assistant professor and member of the BoE*

## 6.4 ASSESSMENT COORDINATOR

The assessment is the moment in which we determine whether the student has or has not developed sufficiently throughout the semester. Since we assess our students holistically, and only twice a year, it is of utmost important to do this as carefully as possible. First of all, the assessment process needs to be consistent with our educational model, in which students are considered to be junior employees. Therefore, we believe that the assessment should adhere to the standards in which student will be evaluated in a professional context. In the light of this, validity and reliability are defined and operationalized. To guard and improve the assessment process, it is carefully considered and monitored by the assessment coordinator in close collaboration with the DoE and the BoE.

In this section, we start with a brief description of the assessment process as it is implemented and the possible verdicts. Next we underpin the validity and reliability of it, and briefly discuss other quality assurance issues..

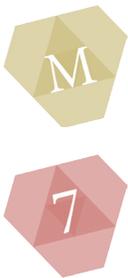
### *The assessment procedure*

In the assessment two parties are involved: the student and an independent assessor or assessment panel. In the assessments of blocks B1.1 through B3.1 one assessor is involved; for an assessment of blocks B3.2 a two-member assessment panel is involved, one member being the student's coach. The same set-up applies in the Master assessment. The four main components of the assessment process are:

1. End-of-term exhibition
2. Showcase review
3. Meeting between assessor and student
4. Plenary assessor meeting
5. Appeal procedure

During the end-of-term exhibition the assessor enters in a dialogue with the student and to ask explanatory as well as questions concerning the student's development, goals, etc. The exhibition provides the assessor with extensive information about the student's project. In addition, the assessor gets information on the student's design process, his or her approach and attitude towards designing, and vision on designing. The assessor generally informs the student during the exhibition of elements that require special attention in the showcase. Furthermore, these exhibitions 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?

The assessor reviews the student's showcase, which is delivered a few weeks after the exhibition. In this process the assessor examines the main learning activities and how they have contributed to the development of the student. The Showcase should link to feedback provided by coaches, assignors, lecturers and experts. After a general overview, the assessor reviews the elements that he or she considers doubtful more in depth. Consequently, a meeting with the student gives the assessor the opportunity to either get clarification or discuss particular aspects or parts of the Showcase in more detail. For the student this meeting is an opportunity to demonstrate his or her overall development and growth in a different way: orally as opposed to the visual/written communication in the Showcase. Assessors and assessment panels determine a tentative verdict and justification after the meeting with the student. At the end of the assessment period a plenary meeting is organized, in which all the assessors or assessment panels involved discuss and decide on the final verdict and its justification.



### ***M2.2 assessment***

A slightly different procedure applies to M2.2 students as they only do one project: their individual final Master's project (FMP). With their FMP students should demonstrate they have achieved the stage of expertise (or beyond) for their overall competence of designing and corresponding deliverables and competence development. In addition, the FMP should breathe students' vision on designing. In the week prior to the plenary assessor meeting, M2.2 students have the opportunity to give a public presentation of their vision, identity and development for the panel of assessors. After the presentation, there is room for questions from the audience. During a subsequent private session, the assessor panel has a final discussion with the student in which he or she has a final opportunity to demonstrate his or her overall development and growth (see Appendix 28 for a more extensive overview).

Over time, there are many elements that have been introduced in the assessment procedure that help assessors to see how students perform in comparison to others. The procedure also requires discussions between the assessors within the department, which helps to build up a shared body of knowledge. In particular, during the exhibitions, the assessors will not only see the work of the students that they assess, but they also see the work of other students, some of whom are in the same phase, while others are in different phases of their studies. Assessors usually coach students in the same semester. Therefore, they are well aware of the development of their own students, which provides them with further material for comparison. Furthermore the assessment procedure requires the coaches to comment on the assessment of the students that they coached, and the case of each student is discussed in a plenary meeting, where the verdicts for a large number of students in the same block are being discussed. Cases giving rise to doubts or disagreements or differences of opinions between assessors and coaches are subjected to more extensive discussions. During these discussions, various considerations that underlie the given judgment are made explicit, which allows assessors to check whether their considerations and criteria are similar to those used by their peers. . These discussions are structured and

focused at relevant aspects of student development by our verdict system and assessment form. As explained in chapter on 'Introduction', students could get three verdicts, P, C or H, described in table 6.1.

TABLE 6.1 POSSIBLE OUTCOMES OF AN ASSESSMENT

Verdict	Consequence
P: Promotion to the next block*	The student is promoted to the next block and gets 30 credits.
C: Conditional promotion to the next block	The student is conditionally promoted to the next block. He or she does not get the 30 credits yet but can earn them at the next assessment by fulfilling specific conditions.
H: Hold	The student has to do the same block again, but with different curricular learning activities.



\* If applicable, a student who has received a P-verdict can be awarded an 'excellence' qualification, indicated as 'E'. This additional verdict was added as requested during the previous accreditation to provide excellent students with an additional form of grading.

For students whose development is doubtful, a possible C verdict will be considered, and the discussion will concentrate on the progress that these students will need to show in the next semester to alleviate any remaining doubts. Such discussions tend to focus less on numbers or averages than on specific aspects of student development in terms of their different competences, their vision, identity and attitude. They generally lead to well-considered judgments that provide the student with actionable feedback.

The plenary discussions indicate that views on student development are strongly aligned. For the majority of cases, this judgment is intersubjective. However, if a student does not agree on the verdict they can submit an appeal to the BoE.

*“Learning is an individual process in a social context. In the educational model of ID, it is essential that we allow for very personal development paths. Yet we are responsible for the quality of the education we offer and for the value of the diploma’s we hand out. This defines the field of tension that I work in as assessment coordinator. We have been through rounds of refining the competence framework into more detail, and abandoned that as students started to fill out checklists. We have tried to do without any guidelines, but then slowly diverging sets of tacit criteria started to develop. We now work with concise guidelines for assessments per semester, in which on an abstract level developmental stages are described, while leaving much freedom for individual development. In general, assessors indicate that these guidelines are adequate. Nevertheless, the discussion continues. Some people feel we should still be more explicit, some say they are already too specific. I think this is a good thing. Assessments are so crucial in our system that we should never cease to be critical on ourselves. The assessment guidelines are more than criteria: also the procedures and the aspects to be documented are made explicit. These aspects are then checked for every student*

*at the plenary assessment meeting. Though there is resistance to this, especially from experienced staff members that were relying increasingly on their intuition I believe this is a necessary development in view of the growth of the department.” Mark de Graaf, assistant professor and assessment coordinator*

**Validity** In literature validity is defined in different ways. By validity of assessment we consider whether our assessment procedure actually assess what it is intended to assess. This implies that validity depends on the purpose of the assessment. The function of the assessment is both formative and summative. It is also important that the assessment aligns with the educational model and the way students are educated to reach these goals. Therefore, the assessment must be integrated and embedded in the learning process and multiple competences (an integrated whole of knowledge, skills and attitudes) must be assessed in an authentic way. The learner has the primary responsibility for the assessment (Gibbs, 1999). As a consequence, to be valid the assessment procedure needs to adhere to the following requirements:

1. The assessment must lead to an adequate and relevant judgment of the performance level of a student. To make such a judgment it is important that an assessment procedure meets several characteristics. First, the assessment must adequately reflect the goals of our educational program. The assessor must base his verdict on the development of the knowledge, skills and attitudes resulting in the competence development and include all relevant aspects, such as vision, identity, meta and domain-specific core competences and the assessment should reflect these aspects. Second, knowledge, skills and attitudes have to be assessed in an integrated and holistic way. Third, the assessment should provide evidence for students' learning and development. Fourth, the assessment should give learners a fair chance to demonstrate their competence. Fifth, the assessment should recognize individual differences between learners and must be suitable for the entire learner population. Sixth, the assessment should recognize the importance of the (future) work environment and social context.
2. The assessment must provide the student with relevant feedback. This means that students need to know where they are in their learning and development and where they need to go.
3. The assessment process and criteria need to be transparent to students and assessors. To achieve transparency, students, assessors, and other stakeholders should be able to understand what is being assessed, how an assessment takes place and what should be achieved.
4. Another necessary condition for validity of an assessment is reliability. This is discussed in the next section.

During the assessment, assessors get information directly from the student, (both through the exhibition and the Showcase) but also through the student's coach, or by feedback to the student from clients, experts or assignors. So in the procedure there is a large capacity

for the transfer of information about student activity and results to the assessor. Also this information can pass through a number of different channels. Some of these channels (like exhibition and Showcase) are further shaped in ways that correspond fairly directly to the practice in the field. Therefore, we conclude that our assessment procedure enables the assessor to form a rich and well-informed image of the development of the student. We expect this image to be consistent with the image that a future colleague or employer of this student will form.

The student presents himself or herself to the assessor directly through various types of evidence, like prototypes or graphic materials, or through the review of results, like computer programs, electronic circuits, or user test results by knowledgeable third parties. A more formal result consists of feedback on course completion by assignors or module lecturers. However, it is the responsibility of the student to present these results as part of an ongoing development, where they can be contrasted with earlier results, and related to their desired development and future plans. Of course the image of the assessor may be influenced by the communicative, social and overall presentation skills of the student, and one may argue that this image is therefore not objective. However, these presentation skills, which do indeed play a role in the exhibition and the Showcase, are essential skills for a designer within the professional field.



*“We need people that are pro-active, are good in communication, who are able to actually bring ideas to the public to the marketeers to the sales, to the technical people, the software engineers, the mechanical engineers. (Former) ID students do not have a specific expertise profile but can cross the lines. Although I believe ID students sometimes miss a good sense for aesthetics I really like how they are natural makers who can prototype with cardboard or foam in combination with electronics. They don’t say let’s do that, but we do that!”* Marja Zuurman, Creative Director Healthcare Philips Design

Students that start out first need to learn how to present themselves, and assessors need the ability to see ‘hidden’ qualities that a student has not been able to employ. Assessors have the opportunity to do this, because they also have access to the feedbacks that clients, assignors or experts have given to the student, and, in particular, they can see feedback from the students’ coaches, and will also consult with the coach before they give a final verdict. As the coach supports the student through the semester, he or she often can and will provide the assessor with further insights that help an assessor to better judge the information provided by the student.

Finally, we consider whether the verdicts of the assessors are in accord with the impressions of external parties. This question is of particular importance when we consider the verdicts that decide whether students get their Bachelor or Master certificates. Concerning the Master certificates, we get much feedback from the clients of our students, as well as from their subsequent professional careers. We observe that a considerable portion (roughly

30%) of our Master students start their own company, and in most of these cases they already have paying clients when they graduate. Many of the students are hired by their clients immediately after graduation. We hear that clients are particularly impressed by the autonomy that our students exhibit. Also the combination of technical skills with design proficiency and user-centred thinking is considered to be valuable. It is not uncommon that clients clearly express that the students had a strong added value for them, and have helped them to innovate or have strongly influenced their perspective.



*“Wouter Kersteman [alumnus, graduated 2009] and Lissa Kooijman [alumna, graduated 2008] are ahead of what the market wants and come up with new solutions. They really think for themselves and come up with a better solution than the customer could ever had thought of.”* Jan Hendrik Croockewit, Nedap Healthcare

### **Reliability**

Because the assessment deals with qualitative information, it inevitably involves some degree of subjectivity. To improve interrater reliability, Driessen et al. (2005) defined five strategies to make the assessment of portfolios credible without obliterating the essence of portfolio assessment in terms of flexibility, personal orientation and authenticity. The following qualitative research criteria solve the issue of reliability in the evaluation of portfolio assessment:

1. Triangulation (different information sources are combined, showcases causing persistent disagreement are submitted to an assessment committee)
2. Prolonged engagement (coaches provide feedback and guidance on student reflections)
3. Member checking (the feedback is discussed with the student and submitted to the assessor)
4. Audit trail (the assessment process was thoroughly documented)
5. Dependability audit (quality assurance procedures with external auditors are used)

Firstly, we address triangulation through discussions between assessors, coaches and assignors or module lecturers during the plenary assessor meeting. The chair of such meeting generally gives sufficient room to discuss difficult cases. Secondly, we support prolonged engagement by involving the coach in the plenary assessor meeting. The competence coaches have guided the student throughout a semester and know them well, they can always give an opinion during the assessment of groups and are a member of the assessment panel from B3.2 and up. Thirdly, member checking is done extensively. Not only do assignors and coaches provide feedback to the students which they can reflect upon, during the exhibition and assessor-student meeting students have the opportunity to discuss their development. The whole process of feedback, and assessment is thoroughly documented in the student portfolio on IDcompass. The internal quality procedure enables a student to appeal to the Board of Examiners against the outcome of the assessment. The external quality procedure entails the current audit by the NVAO.

Furthermore, new assessors receive an obligatory training on how to assess. Also more experienced assessors are strongly invited to join this training every few years. All staff members are invited to special education days, in which the assessment is oftentimes discussed.

An ongoing point of concern is the 'calibration' of the different levels of development that we expect from our students in the different study phases. As the profile and the activities of the students do, especially in later years, reflect personal choices and ambitions, there are relatively few fixed elements in the program that need to be concluded by all students in a similar manner. It is therefore not always easy to judge whether, for instance, a student with a very technical profile, and a student with a more user-oriented profile, are at a similar stage in their development. Also, assessors differ in terms of their background and expertise, and may place a slightly different emphasis on various aspects of student development.

***Quality  
improvement***

Our educational model is in continuous development one and we are also continuously learning. To improve the assessments, feedback is gathered from a variety of sources. One of the most important sources comes from the appeals to the BoE. Appeals are always a reason to reflect. To give some examples: it has happened that an assessor was not sufficiently aware of the assessment procedures or criteria, and we have improved the training of and information to assessors. Some assessors came poorly prepared to assessment meetings, we have given concrete directives to the process steps in the assessment including minimum time to be spent on evaluating the showcase, duration of the assessment meetings and so on.

We have also used feedback from the plenary assessment meetings to come to better and more consistent assessments. We now ask every assessor to prepare a short motivation on standardized items for every student's verdict, to enable good decision-making. We also have standardized the process during the plenary meetings, to assure that every student gets due attention during the meeting, and undergoes the same process. These and various other issues have been included in the assessment guidelines, that on its turns are evaluated with assessors after every assessment period.

A further improvement was achieved by assigning the most qualified people to the important tasks. In our view the first year is the most crucial one in view of setting the right expectations about our program. Therefore, the most experienced coaches are assigned to the first year students. Furthermore, we have instated that the chairs of the plenary assessment meetings are either member of the BoE, or (former) director of education. This guarantees that they are very well informed about the assessment procedures and criteria, and have the experience to manage the meeting well. Finally, not every assessor is allowed to assess in every semester; as said only experienced staff is assigned to the first year. For B32 and M22 sufficient relevant experience is mandatory, and the research semester in the Master can only be assessed by someone with substantial research experience.

All the above-mentioned points have been improved in recent years. This might explain the developments observed in table 6.2. The table shows the appeals that students made to their verdict (normally after receiving an H). When the appeal was granted by the BoE the re-assessment generally did not yield a different verdict. We observe a decreasing trend in the number of appeals in the Bachelor. Apparently trust in the assessments is steadily improving. However, a margin of error always remains.

TABLE 6.2 OVERVIEW OF ASSESSMENTS, APPEALS AND RE-ASSESSMENTS BY BACHELOR AND MASTER

	06/07	07/08	08/09	09/10	10/11	11/12
Assessments Bachelor	705	687	706	787	807	759
Appeals	27	27	23	23	13	10
Granted	8	13	7	7	3	5
Re-assessment H	8	10	2	6	3	5
Re-assessment C			2	1		
Re-assessment P		3	3			
Assessments Master	107	151	215	181	148	185
Appeals	8	1	1	1	1	3
Granted	1	0				2
Re-assessment H	1					2
Re-assessment C						
Re-assessment P						

The importance of an assessment is immense to a student, and we strive for zero mistakes. We do realize that even if we would succeed in this, we will still see appeals from students that do not want to accept that they failed an assessment, and basically ask for a retry. This is already the case in most appeals.

## 6.5 REFLECTION

The guardians of our educational model take a bird's eye perspective on evaluating the quality of our educational program. Due to the different backgrounds of their members (we aim at one from each capacity group in case of staff), they have sufficient backing from the organization. They control the quality and development of all educational related activities, such as the program (OER) and the assessment, and ensure that the quality of incoming Master students is sufficient. Furthermore, our assessment process is carefully considered and in line with our vision on education. It fits the standards that designers will encounter in their professional careers. The process we take adheres to the required values of transparency, reliability and validity. The quality is regularly controlled, and the outcomes indicate a thorough process that is appreciated by the employees of our alumni.



# 7.

## ALUMNUS EXPERIENCE

“We educate students for a life, not for a diploma” are the opening words of this report. In this chapter, we focus on the verification of this claim. For this purpose, an alumni study was carried out together with our alumni association IDEa. We sent an extensive questionnaire to everyone who completed either a Bachelor or a Master at ID. We asked them to give feedback on a range of aspects of the ID program from the perspective of an alumnus and to assess the value of these aspects for their further professional development after graduation. Around 350 alumni are registered as such and we received 184 responses, of which we present the most important outcomes.

## 7.1 PROGRAM

We asked alumni whether they thought if ID was a good preparation for their career and the answer was a clear 'yes' (77% are positive, 21 % neutral and 2% negative). Consequently, we asked them to rate the program on a number of elements regarding the workload, challenge, and quality of our educational model. The alumni consider that the program offered by ID encourages their personal growth (53% rate this aspect very high, 42% high). The program is considered to be difficult by a small majority. The workload is considered to be high by almost all alumni (31% answer very high, 60% high). The high workload is confirmed by self-reported values for the number of hours spent on the program per week. In view of these answers, unsurprisingly, the challenge is found to be high (26% report very high, 67% high). However, despite the high workload and difficulty, the vast majority of the respondents have enjoyed the program (31% very high, 64% high). The quality of the program is considered to be high, although scores are less extreme (58% are positive or very positive, 35% neutral and 7% low). A similar result is found for the relevance of the program (58% are positive or very positive, 34% neutral and 8% negative). Finally, we asked them a few overall questions to get a condensed appreciation of the ID program. 91% of our alumni would advise ID to future students and 88% would choose ID again if given the chance to turn back time – the difference between these two answers is mainly motivated by a changed interest. When asked if they would be interested to become a coach at ID, 82% answered positively.



*“I am really happy to have the 3 alumni in my team because they bring new ideas. We are highly orientated on cars and engines from a machine point of view and they bring in the creative and user-centred aspects from sound design. They are very well educated in the (software) tools of sound design and how sound affects people.”* Rainer Beer,  
Director Advanced Sound Design BMW

### **Assessment**

In the questionnaire we also addressed our assessment system to understand whether it is consistent with the ambitions of the program. Figure 8 displays results from our request to rate the assessment system on relevance, fairness, focus, motivation and acknowledgement of effort. Respondents clearly confirm that the assessments focus on the relevant topics for their professional development. There is less clarity about the fairness of the assessments (43% are positive, 28% neutral and 28% consider the assessments unfair). Subjective behaviour of individual assessors is mentioned more than once in the remarks section of the questionnaire. Despite the criticism on the fairness of the assessment, it supported alumni to focus on the important aspects of their development (64% are positive, 22% neutral and 14% negative) and it stimulated them to get the best out of themselves (62% are positive, 21% neutral and 17% negative).

## Looking back at the way Industrial design assesses students, can you score the assessments on the following topics? The assessment ...

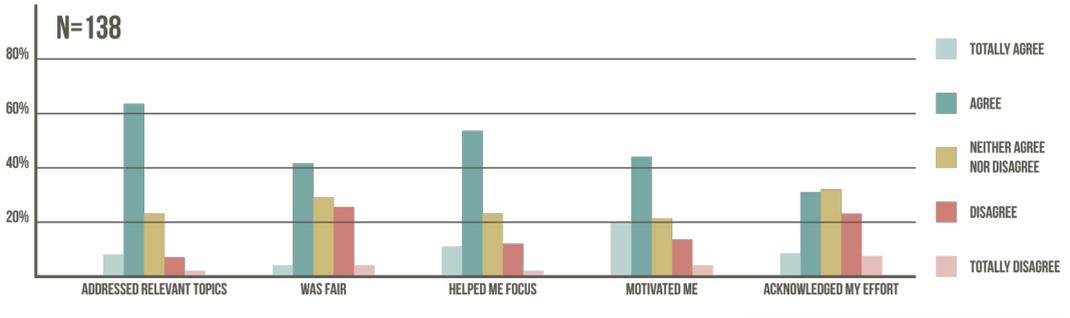


Figure 8. results from alumni inquiry regarding assessments

### Competences

The aspects that alumni learned and found most valuable in their professional development after graduating were design thinking (80%), self-directed learning (75%), dealing with complex challenges (72%) and professional attitude (60%). Engineering was mentioned by a surprisingly low number of respondents (20%). Although our students have less developed skills in mechanical engineering than traditional ID programs, they indicate that they could easily develop to the required level if needed. Bachelor graduates that left to pursue a Master degree at a different institute confirmed the importance of self-directed learning. Although more than half of them reported missing competences for their new program, only 11% reports difficulty in catching up on those competences.



*“At ID I learned to work from the complete start by defining opportunities, what the users want, what their context of use (the hospitals) is, who the stakeholders are. Consequently, I can really translate that from the fuzzy front end up to the implementation in software and hardware design by combining technologies through prototyping. I came well prepared to communicate with electrical engineers, researchers and software developers.”* Jaap Knoester, alumnus (2003/2010) currently working Philips Design Healthcare

## 7.2 SWITCHING TO ANOTHER MASTER

Nearly 25% of our Bachelor graduates switches to another Master. Approximately one third choose one of the Master programs from Industrial Design Engineering, TU Delft, one fourth choose a Master program abroad and the others spread over a wide variety of Masters including innovation sciences, human-technology interaction, business and artificial intelligence programs. Motivations to switch are diverse and include that we do not offer a specific specialization in design such as Integrated Product Design in Delft or a change in interest, e.g. towards management, psychology or art. However, some alumni also indicate that they wanted to change to another educational model.

We asked students that switched to another Master about their experience. The workload in other Master programs is approximately 10 hours lower than what our own Masters indicate. Furthermore, they indicate that the ID Bachelor was a good preparation for their new Masters, (70% are positive or very positive, 24% neutral and 6% negative). In an open question, we asked switchers to compare their new fellow students to ID students, as they knew them from the Bachelor. They indicated that ID students are self-directed and highly motivated learners. Although they have less theoretical knowledge on areas like mechanical engineering, material science they are more used to work hard, reflect, and collaborate.

*“I observed that our drive for self-directed and continuous learning and the ability to look for external expertise was remarkable. Our knowledge on theory was much less than the Delft students, but we were far better educated in applying these methods”*  
Anonymous, alumnus

*“ID students lack a bit of scientific knowledge but are eager to learn new things”*  
Anonymous, alumnus

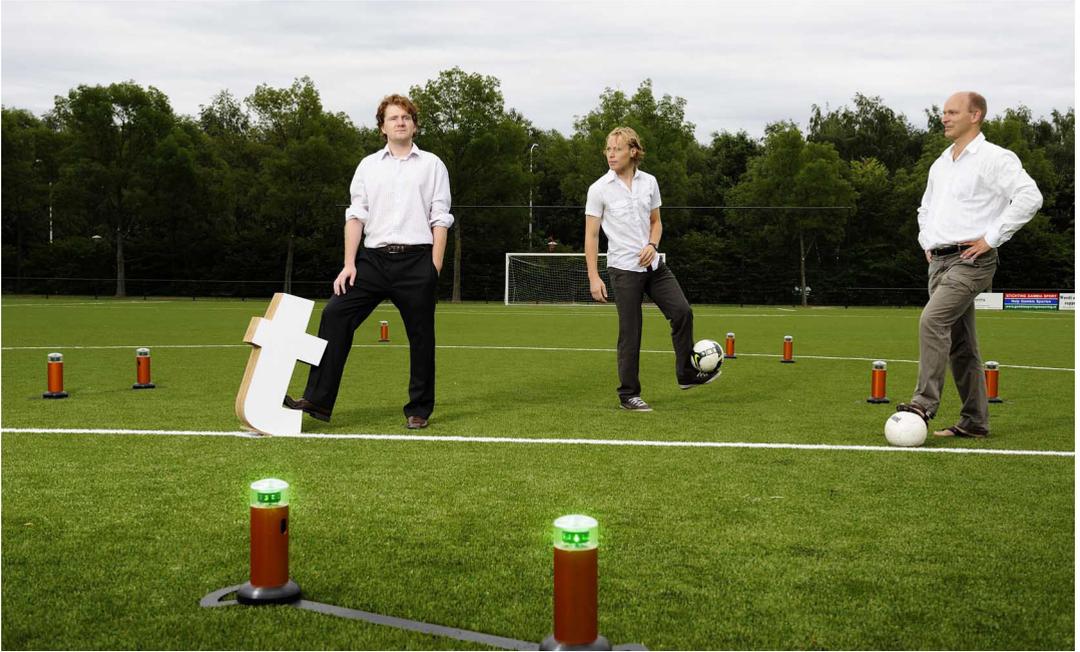
*“ID students have a personal drive and work for their own development. Other students seem to care less and just do as they are told”* Anonymous, alumnus

## 7.3 PROFESSIONAL CAREERS

Of all respondents that have graduated and entered the labour market, 50% work at a company of which 86% report to be working at or above university (WO) level. About half do design-related work, often in combination with other activities. 58% of the alumni currently employed by a company, have the ambition to start a company in the future. 31% of our alumni start – and still run – a company and another 12% work as freelancer. Of the people running a company, 84% are actively doing design-related activities. For freelancers this percentage is 82%. 8% of the respondents reported that they are currently doctoral candidates. A personal counting revealed that 39 ( $\pm 11\%$ ) of our alumni started their doctorate studies, and six already obtained their Doctorate (see Appendix 29). Unfortunately, 51% mentions that potential employers are still very unfamiliar with the ID profile and that this has been an issue when applying for a job.



*“I never really dreamed of being an entrepreneur, but with the support of coaches at industrial design and the innovation lab of the TU Eindhoven I was able to slowly step into becoming one. When I graduated I knew about industrial design and intelligent systems, but I did not know much about running a business and writing business plans. But because we learned to learn it was very easy for me to appropriate. I still remember how Kees Overbeeke told me to stop sitting behind my laptop just start doing.”* Chris Heger, alumnus (2002 – 2009), currently self-employed at SmartGoals



## 7.4 REFLECTION

The feedback from our alumni is very clear. We do educate for a life, by providing a good preparation for a career and by providing excellent opportunities for personal growth. Design thinking, self-directed learning, and dealing with complex challenges are the most important lessons we give to them for their career and they hardly miss anything in the program. Although we challenge our students to the limit and despite some comments on the assessment procedure, alumni have enjoyed the program. A rather large part of our Bachelor graduates switches to another Master. Some of them wanted to change of educational system, however, the vast majority made a very deliberate choice for a specific direction, which confirms our success in helping students to become self-directed. With respect to their professional careers, a tenth of our alumni work in academia, half work for a company and a third start for themselves. Most of them are active as designers.





# 8.

# OVERALL REFLECTION

Our program is very challenging and we demand a high level from our students. In 2008 our Bachelor program was evaluated by means of the ACQA standards (Meijers, Van Overveld, Perrenet, 2005). One of the conclusions was that for most individual competences (competence in one or more scientific disciplines, in doing research, in designing, has a scientific approach, in cooperating and communicating, possesses basic intellectual skills, takes account of the temporal and social context), education and assessment was on a Bachelor level as well as on a Master level (as defined in the Criteria), with our assignments being more on a Bachelor level, and our projects, activity weeks, self-evaluation, assessments and individual learning time regularly on a Master level. Furthermore, it should by now be apparent that we are running a very complex system and try to create a stimulating and rich environment for students to flourish. We are certainly achieving our goal of delivering excellent self-directed and continuous learners in the field of intelligent systems, products and related services. This conclusion is corroborated by the results from our alumni questionnaire, which show that our graduates highly appreciate their education at ID. In this current chapter we discuss our strengths, but as there is always room for improvement, we also highlight our weaknesses and points of attention.

LOOK



Informational text panels on the left wall.



## 8.1 STRENGTHS

**Program** Based on the student reflections, we can conclude that the strength of the competence-centred education program is the self-directed learning approach. With the support of internal (assignors and lecturers), external (internship mentor, project clients, and module clients) experts and fellow students and alumni, students were able to define their own learning path and follow it with full strength.

*“Last year I finished by Bachelor Industrial Design. I always had a passion for animation and after my Bachelor decided to develop myself into an animator. I started studying important animator skills by myself and after a few months joined an animation studio in Amsterdam, who were thrilled by what I had taught myself. Hereby I want to thank Industrial Design for teaching me one of the most important skills you will ever need: self-directed learning”* [post on ID Facebook page, July 01, 2013] Tommie Kerstens, BSc alumnus (2008 - 2012)

**Students** Because of the open-ended education program, an individual student can formulate his or her own learning goals and learning approaches with strong support from internal and external expertise. It makes this education program a highly dynamic and individual learning program. As a consequence, our graduates are very autonomous, versatile and self-propelling, and have well-developed innovative capacities. Their technical skills often tend to exceed those of design students from other departments.



*“ID alumni are incredibly versatile in creating experiential prototypes and are very independent and pro-active. They dive into the project and start building rather than starting with background research on existing projects.”* Emar Vejt, alumnus (2003 - 2009), currently employed by BMW

Moreover, since they are self-propelling, staff members are generally challenged by eager students who want to learn. Our students are well-informed and they can cope with and make optimal use of our open education system. They organize their own informal ways of learning with and from each other. Given the current economical situation we are encouraged by the fact that over 30% of our alumni successfully run their own business.



*“At ID I learned to be entrepreneurial. An industrial design engineer from the TU Eindhoven is much more focused on concept development, embedding technologies and working on the interaction between user and product.”* Maarten Hendriks, BSc alumnus (2001 - 2006), self-employed by Little Mountain

**Staff** With respect to the deployment of teaching staff we feel that in terms of background and expertise, the teaching staff (from research and from the professional field) together cover all the competences. This enables us to support and facilitate our students in developing and growing into industrial design engineers. Furthermore, the combination

of ID scientific staff and external teaching staff is complementary, of added value for the department and is inherent to our mission and educational model.



*“At the university you have many experts, both educators and fellow students, who can help you in developing your competences. Everyone has his or her own expertise and the department offers a creative environment where you can build upon projects and each other.”* Kirstin van der Aalst, alumna (2004 - 2010), currently employed by Fonckel

The most important unique selling point of this educational program is its mix of a future-oriented self-directed and continuous learning system, a competence-based holistic approach in teaching and assessing, and the fit for purpose with our definition of industrial design for intelligent systems, products and related services in a societal context. We are bootstrapping a new type of industrial design program to educate a new type of design engineer. Self-reflection is a core feature of our department, and we are highly motivated to improve whenever necessary. After twelve years the different type of experts reached a level of mutual respect, and we are all very proud of our educational program.

*“I have a Masters degree in physics and have a PhD in logic and computer science and when I joined the department I observed that the demands put on the students were high and diverse, and that it was difficult for them to gain sufficient depth in all relevant competences. In the beginning, given my background, I had a tendency to see design as a form of problem solving, and was particularly focused on the formal aspects, and wondered whether students would be able to acquire the necessary depth of technical knowledge as well as proper research and argumentation skills. Later, I realized that designers operate as nodes in a network of multiple stakeholders, and need interfaces to talk to different types of ‘peers’ and that there is no fixed skill set that can prepare them for this.”* René Ahn, assistant professor

### **Organization**

The department and all its stakeholders are highly committed to our educational model, despite its complexity and demanding nature. Both our junior and senior employees show the high flexibility and supportive attitude that enables us to reflect and iterate and thereby continuously improve and develop our program. We are very proud of our organization and all its members. Furthermore, we are already recognized across the world for our courage and successes. We plan to extend our national and international relationships. Via appointed part-time professors we are already linked to Zhejiang University (China), University of Technology (Sydney, Australia), Kyoto University (Japan), University of Siena (Italy), National Taiwan University of Science and Technology (Taiwan), Hogeschool van Amsterdam, Maxima Medical Centre, Microsoft Research and Van Berlo. We are already the best ID Master program in the Netherlands (Keuzegids Hoger Onderwijs) (see Appendix 15), and we would like to become the best in Europe, and of the world.

## 8.2 WEAKNESSES

**Program** Due to the complexity of the program, students are not fully aware of, for example, the structure and purpose of the assessment process including assessor-student meeting and plenary meeting for assessors. Students are not adequately informed that the final verdict of the assessment is determined in the plenary assessment meeting to prevent subjective assessment. Therefore, students have the impression that the verdict is too subjective and they are insecure about the result. Furthermore, since the program is aiming at educating a new type of industrial design engineer, there is still misconception and unfamiliarity with this type of designer in the professional design field, which hampers the search for a job after graduation. Finally, a rather large part of our Bachelor graduates switches to another Master and we are losing students because at the end of the Bachelor they are able to set out their own path of development.

**Students** Our students and alumni are often considered maverick, and may be perceived as headstrong and unorthodox by potential employers. Furthermore, as our model is challenging for students with a high workload, it is sometimes difficult for us to provide a successful educational path for the weaker students who have difficulty in becoming self-propelling. Thirdly, due to the self-directed nature of our educational system it is difficult to formally guarantee specific reproducible knowledge and skills, which certain external parties may still expect from us such as mechanical engineering and 3D modelling. Finally, we are not yet fully recognised as an institution that delivers excellent designers with a high level of autonomy and strongly integrated design skills. As the industry and other players in the field gain experience with our alumni, future graduates will have easier access to positions where they are the most useful to their employers or clients.

*“Some alumni have problems with stating where they are from and to explain what the value is of what we do. Luckily this is changing as I recently saw new job openings in which they specifically ask for both industrial designers from Delft and Eindhoven. Although the program is quite young and it may take some time for the labour market to get accustomed, we should put more effort, in building the identity for the department.”* Eva Deckers, alumna (2004 - 2009), chair of the Alumni association

**Staff** Based on the student reflections, we can conclude that the main weakness of our program concerns the system requirements of implementing such program in practice. If the students are expected to develop themselves according to our approach, the teaching staff need to have the capacity to provide the required learning program. However, most of our teaching staff were educated using the traditional classroom approaches, such as theory-based education. Therefore, different teaching skills, knowledge and attitude for staff need to be developed and assessed on a continuous basis.

Another weak point is that, at this moment, the proportion of external teaching staff in relation to (permanent) scientific personnel is still a bit too large, and not all competences are sufficiently supported; in particular we have a lack of expertise in the competences 'Descriptive and Mathematical Modelling' and 'Designing Business Processes'. Furthermore, we need to improve the closing of the loop of our quality assessment cycle and therefore we need to carry on with the cycle of performance and personal development interviews, in order to continuously improve the staff's expertise and teaching quality. As a result we need to analyze the training needs of the teaching staff, and start developing activities to further professionalize the teaching staff and monitor the balance of expertise in the themes and projects. We need to stimulate our academic staff to obtain their UTQ and ensure that they have sufficient time to do so.

Due to our uniqueness we are difficult to understand from the outside, and even we ourselves do not always share the same view on certain aspects of our program. An approach, which has served us well so far, is to try out several solutions and discover their pros and cons as we go along. We still have to work on a shared language (based on a shared ontology) to improve our internal and external communication.



***Feedback and assessment***

Since feedback has a formative and not a summative character, it is important that oral and written feedback is of high quality to support the student's reflection and growth. Before 2008, feedback forms were still based on judging instead of supporting, e.g., by checking a tick box if the learning activity was completed successfully. Although the feedback form changed in 2008, a minority of coaches and lecturers are still in the judging mode, while others give rather short feedback due to timing, both resulting in insufficient support for students to reflect and develop. The assessment knows similar problems: the quality of the feedback is not always up to standard and the time needed to decide upon an appropriate verdict is sometimes not available. Through educational days and discussions

we are increasing awareness about the importance of feedback and are exploring new mechanisms to reduce the workload and time needed to provide feedback. Although as educators we are confident of this process, we need to inform students better on the steps and our observations, as some students consider the assessment to be subjective.

**Organization** One of the main problems, as addressed by our students is communication. The information that is available is often difficult to find, and since we are a self-reflective organization, changes happen frequently. We have to do a better job at informing our students and staff of the processes such as the assessment, and make sure that crucial information is easily retrievable.

Finally, we can identify several threats in our direct environment but also on national level. Like most other European countries, The Netherlands is under financial pressure. This pressure affects our university, and forces us to increase our number of students (Bachelor and Master). Besides, our university is streamlining the administrative and supportive processes to improve cost efficiency. What we actually experience is the change from a trust-based culture (which is necessary for the success of our program) to an ‘in-control’ management style based on outdated Taylorist principles. Finally, the recently established Bachelor College and upcoming Graduate School (see next chapter ‘Future vision on ID’) pose a certain threat to our educational system. Both are based on traditional educational models; as far as we are obliged to become involved in and contribute to these two organizational structures, we are severely constrained in our own education. It is unfortunate, that due to its different educational model the department is the odd one out and is hardly considered when policy changes are made on a central level.



# 9.

## FUTURE VISION ON ID

As society changes and we reflect on our educational program we need to continuously develop our vision and development plans for the future. Currently the university is undergoing a thorough change with the implementation of the Bachelor College and the Graduate School. In addition to the challenges resulting from this change, there are two other grand challenges that ID is facing. The second grand challenge is a more general one but is also a direct result of the participation in the BC. It concerns the reduction of income due to the decreasing first money stream and the spread of courses over other departments (Calculus, Physics, Modelling and USE). The third challenge is the increasing number of students. The combined challenges pose a genuine threat to the sustainability of our educational model. In this chapter, we address each of the three challenges in more detail while shaping the future vision on ID.

## 9.1 BACHELOR COLLEGE AND GRADUATE SCHOOL



As of the academic year 2012/2013 the TU Eindhoven (TU/e) has implemented the Bachelor College (BC), which replaces the existing Bachelor programs of all faculties. Through the BC the TU/e aims at attracting a wider range of students to their engineering programs. The BC allows for both depth and breadth in development by offering increased freedom of choice and more embedding in a societal context. The Bachelor College is a three-year Bachelor program in which students can create their own study program that fits their interests and ambitions. Within the BC students have to course six compulsory subjects mathematics, physics, modelling, USE (User, Society and Entrepreneur) basics, design and professional skills as well as an elective package of subjects that look at engineering from a USE perspective. A Major forms a substantial part of the Bachelor's study. It is where students choose the field in which they want to work as an engineer. TU/e currently offers twelve Majors. In addition to the Major students can choose electives that will accentuate their study program. An experienced coach (although different from the coaches at ID) supports the student throughout his or her studies with personal advice on his or her curriculum from the very start of the study.

Actually, the intentions of the BC closely correspond to what the Department of ID has been doing over the past twelve years. However, by participating in the BC ID loses 22% of its freedom of choice: Bachelor students are obliged to take six basic courses and 3 USE courses of 5 ECTS each. Since five of the six Basic Courses (Calculus, Physics, Modelling, USE Basics and Design) are offered in the first five quartiles of the Bachelor program, the first year has undergone a radical change with respect to previous years (the Basic course Professional Skills is embedded in the learning activities of the Major). The Basic Courses interfere severely with the programming of the ID projects and assignments. But, more importantly, the setup of the Basic Courses is highly focused on traditional knowledge-centred education, making the connection to ID oftentimes unclear.



Furthermore, in March 2013 the TU/e has started the university-wide Graduate School (GS). All post-Bachelor education at the TU/e is provided through the GS: 15 graduate programs each focus on a specific field of research. Our ID graduate program consists of one Master program with the possibility to continue with a Technological Designer (User System Interaction, USI) or Doctoral program. These three post-Bachelor programs offer our students the chance to specialize within the research discipline ID along with the freedom to define and shape their own research project. So after they have completed their Master, they can opt for a designer program within our domain or apply for a suitable PhD position or to start a career in industry (including starting a company). The strong relationship between research and education within our graduate program ensures that the results of state-of-the-art research are naturally integrated into the education.

We plan to integrate our Bachelor and Master students with our USI and Doctoral candidates to enhance the exchange of expertise. This mix of multidisciplinary expertise is considered to be essential for our envisioned new type of Industrial Design engineer. Since 2008, 24 of our Master alumni started in our doctoral program (of which 3 obtained their doctorate already) and 4 started in the USI program.



*“At the department students are supported to combine the making and doing with research and analytics. They learn that it is about getting your head and your hands around the matter and to investigate what the implications are for design and for the people using [the intelligent systems].”* Eva Deckers, received her doctorate Cum Laude 2013



## 9.2 INTEGRATION IN THE BC AND GS

### *Changing roles and responsibilities of the directors of education*

Traditionally the education programs at the TU/e were largely independent programs with the departments as primarily responsible. With the start of the TU/e Bachelor College (2012) and the TU/e Graduate School (2013) (of which the USI program of the Stan Ackermans Institute have recently become a part) a more complicated structure has emerged which requires careful alignment in terms of, on one side, realizing the departmental and university goals and, on the other side, the distribution of the available resources.

Since our department wishes to maintain a strong connection between research and education it has decided that members of the academic staff coordinate the education programs. The department has appointed three different directors for the three different programs, who are supported by a deputy director in charge of the pool of freelance staff, and a quality-assurance and educational development officer. Since all three programs are

part of the same department and rely largely on the same resources careful coordination between the three programs is required. The Industrial Design Educational Board is the main platform where the discussion on the direction of and the alignment between the three programs take place.

### ***Involvement in the BC***



We will connect the themes to the courses developed in the context of the BC. During these courses students will develop the competences required for designing while focusing on the subjects relevant to the themes, e.g., Designing for Games and Play (Playful Interactions), Intelligent Textiles (Wearable Senses), Design and Evaluation of innovative sports technologies (Sports), The Liberation of Light (LTSM). Students from other departments will receive assignments dedicated to the competences required to deal with the topics addressed and work on projects within the themes.

The benefits this will offer is that truly multidisciplinary teams can be formed between design students and other types of engineering students. Furthermore, coaches from a theme can also be involved in education in the BC becoming more cost-efficient and creating a stronger integration of research and education. And finally, good students from other Majors can be scouted and can be offered direct access to our Master program as they have conducted part of their Bachelor program in our educational model.

### ***Basic Courses***



The basic courses cover some of the worries external parties have on the development of the engineering knowledge and skills of our graduates. It is acknowledged that the competence Descriptive and Mathematical Modelling (DMM), which covered many of the elements addressed in the basic courses Calculus and Modelling, often was one of the least developed competences by our students. We have decided to highlight the importance of this competence in our program by making it a core competence (see below). Furthermore, we can benefit from the expertise in the whole university, as we have least experts in this competence in our department. However, we need to continue developing the basic courses such that they become integral elements of the competence development of our students in the future. In the upcoming years we will incorporate more assignments on modelling in our curriculum and increase the potential for development of this competence in our projects. Thus we will ensure a stronger integration of the attitudes, skills and knowledge developed during the basic courses into our Major.

We have started this process of integration by becoming more involved in the basic course Applied Physics – for which the department of Physics is responsible – which covers many topics relevant for our department. However, in its present form this course only involves pre-cooked exercises, which is not what our students or we are looking for. They need to learn which physical laws to apply, which material/physical parameters need to be determined, and which parameters to look up in order to successfully solve a typical physics-related ID project. In the upcoming semester we will offer different topics that are relevant for industrial designers in typical projects. These projects are now being collected in consultation with internal experts (Berry Eggen, Loe Feijs, René Ahn, Mark de Graaf

and Frank Delbressine) and the themes, which typically run projects with Applied Physics aspects such as Light.Time.Space.Move, Comfort and Bonding in Healthcare, Next Nature and Wearable Senses. Students will finish the Applied Physics course with a reflection report about what they have done and learned. The reflection report will be assessed as a regular assignment.

Second, the basic course User, Society and Enterprise (USE) – for which the department of Innovation Engineering and Innovation Sciences is responsible – shows a strong focus on engineering history and ethics. The need for a better consideration of ethics has become increasingly evident, given the focus on intelligent systems, products and related services that change and affect our daily life. Furthermore, the historical perspective offers an understanding of society that needs to be extended to the context of design as students are less inclined to build upon the experience of others given their role as innovators. In our model we need to make examples from the past more accessible, enabling students to elaborate on them.

Third, the basic course design – for which the departments of Build Environment and Industrial Design are responsible – offers us a great opportunity to involve students and experts from other departments in our educational vision. Furthermore, it highlights the importance of multidisciplinary in addressing the challenges our society faces. The basic course tries to go beyond the concept of design thinking and supports design acting as the instigator of innovation. Within the basic course students will conduct a project that focuses on the university-wide strategic area of Health, thereby connecting researchers from different disciplines.

Finally, on the long term we are involved at the TU/e level in describing the engineer of the future and the future of education through the expertise of Caroline Hummels and one of the founders of the department Diana Vinke.

***Future  
developments  
with respect to  
assessment***

There are concerns about the influence of the university-wide introduction of the Bachelor College on the education at Industrial Design: Right from the start it was clear that the visions on education within the BC and ID do not align. While ID's vision is highly innovative, many of the other departments want to maintain their traditional educational model.

The BC includes obligatory courses that are largely being prepared and assessed by other faculties. These courses are based on a more traditional educational model. As a consequence, their approaches to teaching and in particular their assessment methods do not interface well with the self-directed and competence-centred learning approach that we aim for, and thus threaten the consistency and alignment (Biggs, 1999) of our educational program. Furthermore, we encounter (rather disruptive) scheduling constraints and other impracticalities. These combined problems place a heavy burden on our students, who have to deal with the inconsistencies between the two approaches.

We are not comfortable with the current situation as we already notice that the traditional form of education with exams is severely interfering with our holistic assessment. While it is clear that measures need to be taken, the nature and extent of these measures is still under discussion. A possible solution might be to distinguish between two variants for the Basic Courses: a competence-centred one and a more traditional one. This seems quite a logical step to take, given the fact that there are currently also two main variants for the Education and Examination Regulations (in Dutch: OER) at the university level, which already reflect the same distinction. A further advantage of this approach is that it will also support other departments that are interested in switching to our educational model in the future.

*Change of verdict  
from C to P+C*

With the changes caused by the Bachelor College we were also forced to reconsider our verdict system. After consulting with the Educational Committee, the Board of Examiners and a relevant sample of coaches and students, the verdict system was updated in the academic year 2012/2013. The former C verdict – a conditional promotion to the next semester – was replaced by a P+C verdict. For the original C verdict, ECTS credits were not yet given; instead, they would be given at the next assessment if the student had met the conditions given with the C verdict. The direct occasion for this change was the stricter Binding Study Recommendation (BSA) that was introduced university-wide. This simply did not allow for postponed ECTS credit awarding as it would lead to massive numbers of negative BSAs. But we also took the opportunity to reconsider the verdicts, the C verdict already being under discussion for several reasons.

In practice, conditions were too often formulated looking backwards: what should be repaired from the past, like write a better report, improve your Showcase, finish this task. Assessments in our view essentially should look forward: what future development do we want a student to show. A second issue was the occasional use of the C verdict as a way to postpone a decision by an assessor; it can be easier to give a C verdict than to dig deeper and come to a real decision. A third consideration, especially important from the student's perspective, was that the practical consequences of a C verdict sometimes were too harsh. For example, a student who got a C verdict due to an insufficient level of reflection could end up with a double H (hold) verdict at the next assessments, resulting in a one-year study delay.

For the above-mentioned reasons, the C verdict was replaced by the P+C verdict. With a P+C verdict, credits are awarded but the assessor can set conditions for future development. This adjustment addresses all of the above issues: the assessor always has to take a real decision, the advice is looking forward, credits are awarded in time for the BSA and a student is assessed for one semester at a time.

In the coming months and years we will evaluate the effect of the P+C verdict on the assessments and study results. One issue that has already arisen is the ambiguous character of the 'C' in the P+C verdict. It can be given for different reasons such as a missing Basic

Course (with an excellent overall development) or a serious competence development deficit. In the perception of students and staff, however, a P+C appears to be a 'weak' P in both cases. We are considering another option that might be more rigorously consistent with our educational philosophy: no P+C verdict at all. A student would either get a P (possibly with an Excellence) or an H. The conditions that are currently connected to a P+C verdict would then become integral part of the feedback given by the assessor.

## 9.3 DEVELOPMENTS TO SUSTAIN EDUCATIONAL MODEL

### *Revision of the competence model*

Over the past years the competence-based educational model has had a dominant relation to either skills or knowledge, depending on the preference of the educational staff involved. However, a competence is an integrated ability consisting of clusters of Attitudes, Skills and Knowledge (ASK), necessary to perform and being able to function effectively as a designer of intelligent systems, products and related services in a societal context, both professionally and academically (Mulder, Gulikers, Wesselink, & Biemans, 2008). Evaluation of competence development is achieved by demonstrating results. But, whereas skills and knowledge are naturally evaluated by means of a portfolio and exams, respectively, we have not found the appropriate means to evaluate the attitude of our students as part of the competences. Because attitude primarily concerns professional attitude, we have requested experts to ensure a better balance between ASK while defining the competences. Finally, a new structure has been proposed for the competences to organize the educational activities, as explained below (see figure 9).



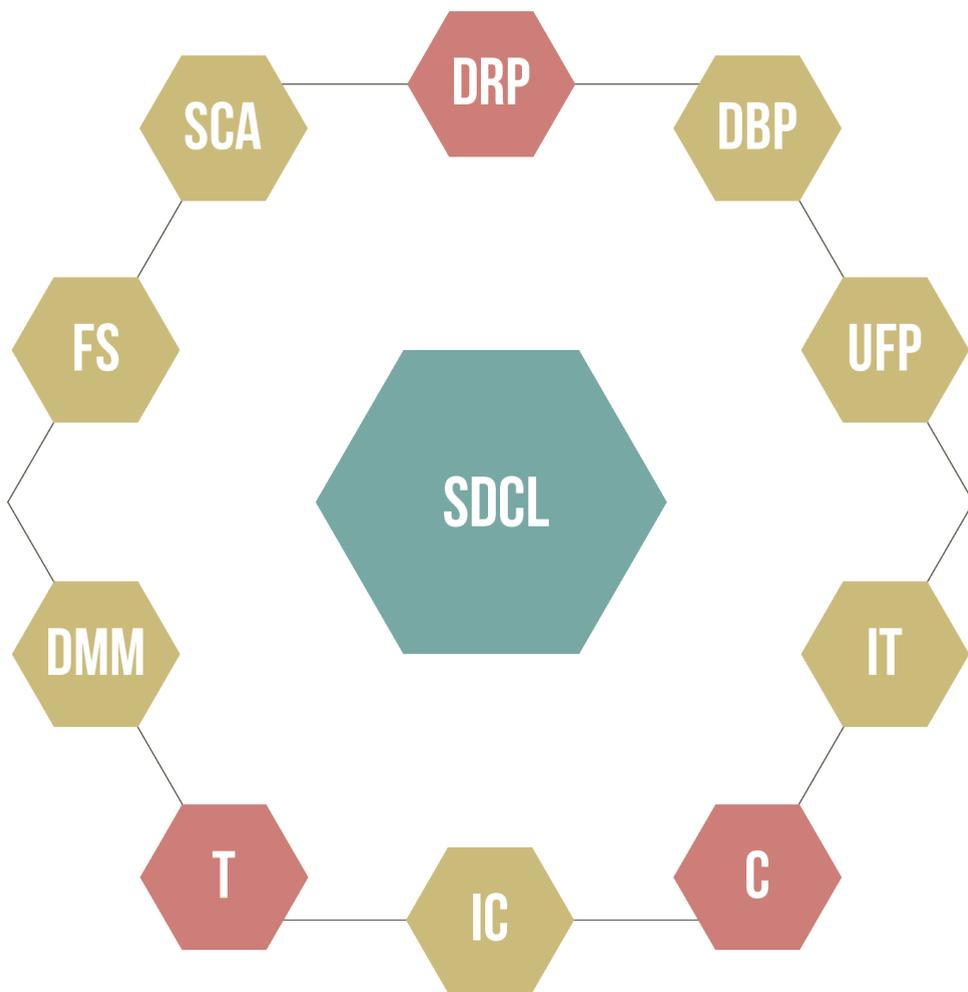


Figure 9. revised ID  
Competence Framework

- Basic Competence** 0. Self-directed and Continuous Learning (SDCL) as an Industrial Designer of intelligent systems, products and related services

SDCL in a societal context is the fundamental competence of our educational model. Therefore, this competence is emphasized in all our educational activities and is explicitly addressed by the students through competences goal specification in the Personal Development Plan (PDP) and reflections in the Showcase. This basis competence enables our students for life-long learning and is one of our unique selling points. Besides SDCL we use seven domain-specific competences and three meta-competences in our educational model.

**Domain-specific Core Competences** Seven competences provide the profile for the development of an industrial designer of intelligent systems, products and related services in a societal context.

1. Ideas and Concepts (IC)
2. Integrating Technology (IT)
3. User Focus and Perspective (UFP)
4. Social and Cultural Awareness (SCA)
5. Designing Business Processes (DBP)
6. Form and Senses (FS)
7. Descriptive and Mathematical Modelling (DMM)

In addition to integration in their projects, students can develop these competences in curricular learning activities, such as assignments, electives and modules that address a specific competence or a subset of competences.

**Meta-Competences** Three meta-competences are relevant for the academic and professional competence development of all our students over all semesters.

8. Design and Research Processes (DRP)
9. Teamwork (T)
10. Communication (C)

Overall these competences are developed throughout projects. However, also workshops are offered to develop T and C. Furthermore, given their strong connection to research in the Master program, also modules are offered that provide more depth in the DRP competence.

**Expertise** Over the past year a tension has emerged between the meaning of competences and how they are related to disciplines. Given the structure of the department, some competences are naturally related to a specific research or capacity group (IT to DI, FS to DQI, DBP to BPD and UFP to UCE). This has led to a strong focus on competence-related curricular learning activities addressed by the research capacity available in the groups. Competences with less embedding in the department or 'belonging' to research groups with little capacity have been neglected or relied strongly on external expertise. Furthermore, the perspective on the competence has sometimes been rather one-sided, because the different views on research processes (traditional research vs. action research) were not represented by the associated teaching staff in a balanced fashion. This made it more difficult for students to integrate these competences in the design process.

Rather than making a single person responsible for each competence, effectively considering a competence as a chair, we are currently forming teams of experts across capacity groups to take responsibility over the competence. This will make the integration of research and education as well as the connections between competences more apparent. Each such team of experts is headed by one senior staff member, who will act as competence responsible; together with the team of experts he or she is responsible to describe the competence, including attitudes, skills and knowledge (ASK). The teams of experts are also responsible for defining, proposing and evaluating the curricular learning activities addressing their competences.

**Revision of coach involvement** Educators at ID have multiple roles: they are project coaches, competence coaches, experts, clients, assessors, and some are also assignors or lecturers. For educational purposes it is often difficult to keep all roles separated. We therefore propose to separate some of the roles in the future in the following manner.

Each student is assigned a competence coach that only coaches the student on the basic competence SDCL and the meta competences DRP, T and C. Competence coaches can only give feedback on these competences to the students. Students need to request experts (who in some cases can also be their coaches) to support their development in the core competences by means of assignments, modules, workshops or expert meetings. These experts will provide expert feedback on the core competences. Furthermore, each project should have a client; this can either be an external party or a researcher or research group. Clients need to provide feedback to the student on the quality of their project and will thereby serve as project coach. The only semester in which the competence coach and client can be one and the same person is in block M1.1, which will become a research semester.

**PDP as input for assessment** The Personal Development Plan (PDP) is fundamental for determining the development of the students at the end of the semester. It is part of the Showcase. Students need to reflect on their achieved development as envisioned in their PDP at the end of the previous semester. Over the past years the PDP has not been given sufficient attention due

to the increasing number of coaches with a variety of perspectives on the relevance of a PDP as a tool for development. It is our intention to re-instate the PDP as the input for the assessment. In the end the PDP is what determines the curriculum of our students and is the ultimate mechanism that supports reflection-on-action. Therefore, it is the main tool to assess the basis competence in our educational model (SDCL).

***Introducing the educational model in year 1, Bachelor***



One of the goals of year one is to determine whether students are potential industrial designers of intelligent systems, products and related services. They need to show sufficient responsibility to be self-directed learners and sufficient awareness of how to continue developing all competences.

As of the academic year 2013/2014 the TU/e will raise the Binding Study Recommendation (BSA) to 40 ECTS. As the first year of the ID consists of two blocks of 30 ECTS each, the BSA has consequently been raised to 60 ECTS for ID students. Therefore, we have decided to change the structure of the first year. As in previous years, students will go through two assessments and will receive two verdicts. However, they will only receive credits after the last verdict. If the student receives a P or P+C he or she may continue the program; if the student receives an H for the last semester he or she will receive a negative study advice and cannot continue the program. The last assessment will therefore be over the entire year, which also has consequences for the set-up of year one.

In Quartile 1 students will get an introduction to self-directed, competence-centred and continuous learning. Each theme will offer a project in which students will be introduced to all competences with the support of a coach. In addition to the coaching support on SDCL, DRP, T and C, students will have meetings with experts from the core competences twice a week and with experts in SDCL, DRP, T and C once a week. The Quartile is completed with a draft Showcase.

In the first quartile of year 1 we intend to involve more alumni in coaching our students under the supervision of scientific staff. The Master graduates, who have worked in a theme during their Master, can coach first-year students on their development. They are well-aware of the system and very critical of the work of the students. The intention of this approach is to achieve an early filtering of weak students, approaching the maximum allowed dropout of 20% after the first year, hence reducing the time invested in students. A clear picture is required of the potential of students after this semester, for which the introduction to the educational model is essential.

***Vision development in year 2, Bachelor***



One of the goals of the second year is for students to develop a vision on design and society. They will start to develop depth in particular competences and need to have a clear idea of the direction they want to take as designers. Instead of assigning coaches from the scientific staff, we have decided that during the second year the students will be coached mainly by freelance coaches, i.e. professional designers. These coaches serve as role models and support the students in developing their vision on the type of designer



that they want to become. Furthermore, design practitioners have a stronger ability to coach students towards integration of competences in the design process (the level of depth) in contrast to the more ‘mono-disciplinary’ competences of some researchers. During the second year the students need to take a decision upon the internship, exchange or Minor that they want to conduct in their third year.

***Integration and  
direction for  
expertise in year  
3, Bachelor***



The first half of year three consists of the internship, exchange or Minor. This internship, exchange or Minor may serve to clarify the decision for their follow-up Master program. An internship at a company can indicate the type of Master program in design, an exchange can provide insight into a foreign Master program, and after a Minor they can decide to change to an industrial design program at another University or a non-design related program. Alternatively, students can decide to conduct an internship at a research group, either at ID or at another department, to determine whether they envision an academic career. In the past it has never been made explicit that the B3.1 semester offers an opportunity to define the plans for the Master. We need to ensure that students have sufficient opportunities that support their development during B3.1. Therefore, students have to be motivated to start thinking about their internship already at the very start of B2.2. We also need to explore how we can avoid that students do not choose for an internship or exchange abroad if they are uncertain about their B2.2 assessment. Therefore, we need to ensure that students start to think about their internship already at the very start of B2.2.

In the second semester of year 3 students do their Final Bachelor Project (FBP). At the end of their FBP students need to show depth in their overall competence of designing which is expressed in a holistic reflection and integration of all competences in the design process.

***Master***



We need to attract more students in the Master for which in the upcoming years the Master program will require a thorough revision. The first reasons for these changes is the fact that some of the students graduating from the Bachelor program find the Master program less attractive because they have the impression that it is too similar, and it has an equal or even higher workload as the Bachelor. Second, we attract insufficient students from other departments and schools. This is caused by the fact that they are often not at the same level of development as our Bachelor students in which case we require them to homologate, causing a delay and involving high costs. Finally, the University will soon finalize the implementation of the Graduate School, which was launched in March 2013, in order to be prepared for the first graduates from the Bachelor College.

Some of the plans currently under discussion address the above-mentioned issues in a constructive manner. On the one hand, we are proud if students have developed in such a way that after their Bachelor program they have a clear plan for future development and apply for other Universities and Schools that can support the achievement of their vision, on the other hand, we need to address the fact that students feel that our Master program is

too similar to the Bachelor program. First of all, we need to communicate more explicitly that the integration of research and education is even stronger in the Master than in the Bachelor. Whereas Bachelor students work on research projects in a relatively superficial manner, Master students are deeply involved in the research projects and in modules that support ongoing research. Currently students need to conduct a research project during their M1.2 semester. In the future we will start the Master program with a research project under the supervision of an experienced researcher or doctoral candidate. This will ensure that students do a project that is significantly different from their Final Bachelor Project, and that incoming students from other Bachelor programs immediately get involved in and adapted to the education and research program of our department. This not only ensures a strong involvement, but researchers may also benefit from students with a stronger research background from outside.

Concerning the second point – attracting insufficient students from other departments – we are considering introducing the option for students to specialize by selecting four out of seven core competences in which they want to become an expert. Students coming in with a different competence profile than our own students (i.e., no balanced depth by integration of all seven core competences) can decide to become an expert in four competences while working on the other three meta-competences through their integration in the design process. This will ensure a more streamlined adaptation of new students in our Master program.

Finally, we are already heavily involved in the discussions on setting up the Graduate School. We have learned that during the initiation of the Bachelor College we should have put forward a stronger argument in favour of our Educational model. We will ensure that when the Graduate School starts to run, we will not run into similar problems concerning the clash of educational paradigms in the BC.

**Assessment** The assessment procedure has been under strong debate as apparent from some of the discussions in this self-evaluation. We are working on improving the assessment procedures to make them even more valid, reliable and transparent. We conduct rater training with newly involved coaches and request assessors to provide structuring of argumentation for their verdict. We have made it explicit in the procedures of the plenary assessor meeting that all parties are heard. Furthermore, members of the Board of Examiners and Directors of Education chair plenary assessor meetings since the academic year 2012/2013. In the plenary meetings multiple assessors take part in reaching the final verdict. This process has strong parallels with senior peer review, a well-acknowledged standard in academia. As of the academic year 2012/2013 we have also started to document the assessment process during the plenary assessor meeting to enable external audits, thus realizing dependability – the pendant of reliability (Driessen et al., 2005).

## 9.4 DEALING WITH GROWTH

In the early days of the department, the number of students and staff was so small that everybody knew each other and each other's expertise. Furthermore, informal communication was relatively easy as staff members of the department were involved in all curricular learning activities. With the increasing numbers of students and our participation in the BC, which provides the freedom to select courses across the whole university, the expertise is scattered and the control over the program and development of students suffer. To increase the effectiveness of the program solutions need to be explored to:

- Improve information streams, which we have started by introducing a bi-weekly newsletter, updating and re-organizing the website
- Increase social control
- Create awareness of the expertise of coaches
- Allow coaches and students to focus on their expertise instead of having to communicate about program-related administrative aspects

**Showcase ID** With this report we have included a first iteration of a Showcase of ID. The Showcase enables us to align the different processes in the department and offer a coherent view on who we are and what we do. Not only will this facilitate discussion regarding our research program, most importantly it will offer students a clear start for their development. The Showcase starts with the mission of ID and elaborates on the competence-centred learning model and competence descriptions. Furthermore, it links and shares project examples, Showcase examples, key publications, expertise, opportunities for development, assignments, modules, etc., in a dynamic and cumulative way, contributing to the development of students and employees as well as to the departmental vision. It is accessible and open for contributions and reflections, offering different pathways or entry levels for students, staff, potential students, researchers, clients, etc.

**Stimulate making  
and doing**



Our department should play a leading role in the development of the Experiential Design Landscapes and research-through-design methodologies. As making is a key aspect in this development, we need to offer our students a lab environment that facilitates it. Furthermore, this environment with its prototypes and exhibitions should be the physical extension of the ID Showcase, as many of the evidence we develop should be experienceable. We are currently involved in discussions concerning our new premises in the main building of the university. The ambition is to develop a multi-functional environment that combines labs for making with educational and research spaces.

### *Sustain quality*

When the department was still small quality control was inherently interwoven in the assessment. The assessment meetings naturally offered possibilities to discuss the quality of curricular learning activities and coaches, thus closing the quality assessment loop. Due to the growing number of students, staff members and curricular learning activities, the number of assessment meetings increased substantially and a complete overview is lost. In addition the BC further increases the complexity, which necessitates the development and implementation of a new approach to quality assessment over the next years (see Appendix 30).

Up to now, only new coaches have received an introduction to the educational model. However, given the recent changes and experiences with the educational days, also coaches who have been in the system for a while need to be updated. Furthermore, coaches need to be clearer about the assessment process and inform students about procedures. Also coaches need to be more responsible towards the students in giving them quality an in-time feedback. To ensure that these improvements will increase both the perceived and actual fairness of the process, we have appointed a quality officer and educational developer who is an expert on assessment in competence-centred education, who will coach the coaches and assessors in June 2013.



## 9.5 CONCLUSION

The department needs to change its direction again to a trust-based organization, which requires a bottom-up approach. Both scientific and freelance staff need to be passionate about the program, become more self-reflective and continuously guide their personal development in such a way that they contribute to the organizational vision. It is therefore important to focus our human resources department on acquiring staff with expertise in relevant areas (becoming more and more multi-disciplinary) but with an attitude that supports the organization as a whole. Dealing with the complexity of this educational model and organization requires a pro-active work attitude.

### *Industrial design*

The field of industrial design is changing and our department changes with it. Although some may still consider industrial designers as professionals that create and execute design solutions for problems of form, usability, physical ergonomics, marketing, brand development, and sales, our program looks towards the future. The transformation economy requires life-long developing designers that combine attitude, skills and knowledge that bridge the fields of engineering, social sciences and business. Academic institutions (e.g., University of North Umbria, University of Technology Sydney, Interactive Institute Sweden) and leading companies in the field (e.g., Microsoft, BMW, Frog Design, Philips Design, Nedap) acknowledge the need for this new breed of academically developed designers by hiring our alumni. We are defining the future of Industrial Design and intend to become leaders in how design research and education can merge from the first day new talents arrive at our department.

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# GLOSSARY

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ASSESSMENT	An investigation into the student's development of the overall competence of designing and growth as a designer, including the evaluation of the outcomes of that investigation.
ASSESSMENT PANEL	A panel of assessors who jointly decide on the assessment verdict and its justification. The student's coach is a member of this panel.
ASSESSOR	A member of staff who has been appointed by the Board of Examiners to conduct assessments.
BLOCK	A particular set of curricular learning activities that, as a whole, cover a full semester.
COMPETENCE	An individual's ability to select, acquire, and use the knowledge, skills, and attitudes that are required for effective behaviour in a specific professional, social or learning context.
FEEDBACK	An instrument to help students understand what their learning is about, give meaning to what they are doing and construct knowledge.
FINAL FEEDBACK	Qualitative information in writing on the student's competence development, process, quality of deliverables and attitude.
LEARNING ACTIVITY	An educational activity which aims at competence development and which a student concludes either individually or in a team.
PERSONAL DEVELOPMENT PLAN	A plan that comprises long-term goals for the student's overall competence of designing and short-term goals for the upcoming semester.
SEMESTER	A time measure for planning the program, which equals half an academic year.
SHOWCASE	A visual, interactive and integrative representation of students' overall development.
THEMES	Fields of interests within the design & research area which focus and cluster ID Bachelor and Master projects and create links to other curricular learning activities such as assignments and modules, and are closely connected to research areas and projects within the department.
VERDICT	'Study result' – outcome of the assessor's investigation (cf. assessment).

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# LEGEND



- This symbol indicates that a section addresses only the Bachelor program.



- This symbol indicates that a section addresses only the Master program.



- This symbol refers to additional highlighted information resources in the Showcase app.



- This symbol highlights sections that refer to the remarks and conditions formulated during the previous accreditation.

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