

INTO THE WILD: EDUCATING INTERACTION DESIGNERS

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Abstract

The interaction designer plays an important role in facilitating high-quality interactions and accessible user experiences. Currently, interaction designers have diverse and often interdisciplinary backgrounds, in which may create recruitment challenges for the industry. It is also a likely contributory factor to reported challenges on student recruitment to interaction design (IxD) programs – and consequently the reported industry shortage for IxD skillsets. Thus, we need to better understand the interaction designer’s expertise and skills. Facing this fact, the present study provides analysis of Norwegian higher educational (HE) programs within IxD. We investigate in-depth what characterizes the programs, and describe their current content, focus and organization. Overall, the programs educating interaction designers are quite heterogeneous. One of the main findings is that few programs include adequate universal design expertise, and graduates are as such not necessarily conversant with their legal and ethical responsibilities as IxD professionals. We also find a discrepancy between online program presentation and actual content. The paper concludes that added work is needed to alleviate an inadequate articulation of IxD expertise, graduates skillsets, and better support academic and industry recruitment.

Key words: Interaction design, human-computer interaction, higher education, didactics, case study.

1. INTRODUCTION

Buchanan (2001:112) provides a much-cited definition of interaction design (IxD) as focused on “how human beings relate to other human beings through the mediating influence of products”. Interaction designers typically construct opportunities at the interface level for the tasks and processes that users encounter in software and information systems (Rosenfeld & Morville, 2002). Thus, interaction designers contribute to shaping how the end-user understands where to find information and how different components interrelate. However, “interaction designer” is not a protected title (Fallman, 2008). The range of competences needed by interaction designers remains ambiguous and debated (for example on the necessity of an interaction designer being able to code). Sørum and Pettersen (2016) reveal how this “fuzziness” creates recruitment challenges for the Norwegian industry. Research also indicates that many companies struggle to identify and fully utilize the skillsets of designers, including identifying the role of the designer in cross-disciplinary agile development teams (Kuusinen, 2015; Begnum & Furuheim, 2016; Constantine, 2001; Salah, Paige, & Cairns, 2014).

The Norwegian software industry is currently reporting a serious shortage in the availability of interaction designers (Monteiro, 2015; Matheson, 2017a; Matheson, 2017b, Computerworld, 2017). A report ordered by the Norwegian Ministry of Local Government and Modernisation (KMD) on estimating the need for advanced ICT competence in Norway towards 2030 (DAMVAD, 2014), concludes there are recruitment challenges due to a lacking capacity of the HE sector in delivering enough IT-graduates. They outline an IT-competence shortage from 2015, and increasing towards 2030. Recent reports on competence needs within the finance sector support the prediction, showing an increasing demand and lack of available IT competence (Finance Norway, 2018; 2019). DAMVAD recommends a rapid growth in the graduates within IT-disciplines – and particularly within cross-disciplinary IT programs, where “IT and design” is one of three cross-disciplinary competences highlighted as critical to secure. Abelia, the business association of Norwegian knowledge and

technology-based enterprises, supports these conclusions, with CEO Haugli stating too few are being educated from the HE sector within the key disciplines of IT and design (INNOMAG, 2014).

A survey of 500 enterprises concludes lack of available IT-competence now hinders digitalisation progress in the Norwegian public sector (Computerworld, 2018), and the Norwegian Interaction Design Association (IxDA) describes Norwegian higher education (HE) as a “bottleneck” for the industry IxD shortage challenge (Matheson, 2017a; Matheson, 2017b). The Norwegian HE-sector strives to meet this societal demand for more interaction designers, and has increased the number of relevant study programs. However, some institutions report difficulties with student recruitment to these IxD programs; resulting in vacancies and open supplementary enrollments (NUCAS, 2017).

It appears recruitment challenges are compounded as time progresses, and we see a growing gap between available IxD-competence and industry needs. Even so, an overview of Norwegian HE programs graduating interaction designers is lacking. By investigating the range of available Norwegian IxD programs, this paper aims to contribute the articulation and understanding of IxD in a local setting. We ask: *What are the characteristics of Norwegian HE studies in IxD?* To provide an answer to this question, a qualitative multiple case study has been carried out, including a screening of HE study programs (IxD) in Norway.

The paper is organized as follows: Section 2 describes related research regarding this topic, while Section 3 presents the method used for this study. Section 4 reports on the findings and the discussion is presented in Section 5. The concluding remarks are given in Section 6, along with recommendations for future research.

2. RELATED RESEARCH

This section outlines the field of interaction design (IxD), moving from its roots to the current state of the interaction design profession and its position in Norway.

2.1 On the Interaction Design Profession

It can be argued that though the roots of IxD is from Human-Computer Interaction (HCI), it is now an independent field within the larger context of UX (Saffer, 2008, as cited in Carroll et.al). Churchill, Bowser, and Preece (2013) state: “Human-computer interaction, as a field of inquiry, necessarily evolves in response to changes in the technological landscape. During the past 15 years, the speed of change has been particularly dramatic, with the emergence of personal mobile devices, agent-based technologies, and pervasive and ubiquitous computing. Social networking has also profoundly changed the way people use technology for work and leisure” (p. 44). In addition, increased digitalization of society and services are expected. However, during the last decade, HCI has grown rapidly into new and overlapping user-centered disciplines. These are commonly viewed as all belonging within the area of UX (Saffer, 2010). Since UX also covers physical design, the term “interaction design” is often used to specify a focus on software products (Cooper, Reimann, & Cronin, 2007). According to Fallman (2008), the term includes various digital artifacts and their context of use. Crampton Smith (2007) and Lowgren (2013) describe IxD as “shaping everyday life through digital artifacts” and “shaping digital things for people’s use”. This statue an example of how important and significant the use of technology has become in people's everyday lives, and how technology plays a big role in our lives.

2.2 Industry Challenges for Interaction Designers

Gulliksen, Boivie, Persson, Hektor and Herulf (2004) investigated usability professionals in Sweden and found that management support is vital for employees working with usability. Their impression is that user involvement and usability concern have low priority. Bygstad, Ghinea and Brevik (2008) found a similar disconnection Norway between the recognized importance of usability in software development and the willingness to spend resources on user testing. When Boivie, Gulliksen and Göransson (2006) investigated the role of the usability designer in system development projects in Sweden, they found that fighting for the importance of usability requirements could be a frustrating

and lonely job. More recently, Salah et al. (2014) and Harder and Begnum (2016) also note a lack of managerial awareness of the impact of a user focus on the resulting quality, when integrating agile development with user-centered design.

Agile or agile-like processes are commonly employed with digitalization projects in Norway, and user-centeredness is currently being merged into agile methodology. Several possible process models have been suggested (Miller, 2005; Sy, 2007; Beyer, 2010; Thorkildsen, 2014), but companies still struggle to integrate UX specialists into their agile development practice. Both Begnum and Furuheim (2016) and Kuusined (2015) (in Norway and Denmark, respectively) found that UX tasks on user-centered agile projects were limited to user-interface design. Every design project includes a design team consisting of people with various responsibilities and tasks (Preece, Sharp, & Rogers, 2015), and the end-user is not yet in focus for every contributor in a cross-disciplinary team. Begnum and Furuheim (2016) indicate that many developers have difficulty elaborating on what user-centered design is and that the role of the designer on the team is not clear. As such, it is unclear how designers fit into project teams, and it seems that UX skillsets are under-utilized (Kuusined, 2015; Begnum & Furuheim, 2016; Constantine, 2001; Salah, Paige, & Cairns, 2014). A study by Sørnum and Pettersen (2016) compared the skills and educational backgrounds of interaction designers with those the recruiters look for and found a consistent mismatch between industry expectations and the reality. Further, Sørnum (2017) found that even students in programs covering IxD struggle to define the role of a designer, and the tasks they will be expected to perform within the design industry.

3. METHOD

A qualitative multiple case study design was considered appropriate approach for our study. There is no unified definition of a case study in the literature (Andersen, 1997). Yin (2012) defines a case study as an “empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident” (p. 13). Gerring (2004) defines a case study as “an intensive study of a single unit for understanding a larger class of (similar) units” (p. 342). A multiple case study enables the researcher to explore differences both within and between cases, and to draw comparisons (Yin, 2003, cited in Baxter & Jack, 2008).

Case studies may consist of interviews, document analysis, surveys, and observations (Yin, 2012; Rolland, 2017). We used document analysis as our main methodological tool because we studied online texts about IxD study programs in Norway. Document analysis is a systematic procedure for reviewing or evaluating documents—both printed and electronic material (Bowen, 2009) and provides data-excerpts, quotations, or entire sections that are then organized through content analysis into major themes, categories, and case examples (Labuschagne, 2003). Whereas document analysis mostly serves to complement other research methods, it can be used as a stand-alone method (Bowen, 2009). Wild, McMahon, Darlington, Liu, and Culley (2010), for example, did a diary-study that examined engineers’ information needs and document usage. They used the data to generate new “document use” scenarios and a “proof of concept” test for a related software system (Bowen, 2009). Documents are produced by the respective educational institutions as “sales documents” (Atkinson & Coffey, 2004) to attract students. However, because we compared the study programs’ profiles with an in-depth analysis not only of texts, but also of what the programs offer in terms of courses, we were confident that we would gain a reliable picture of the content.

3.1 Step 1: Case Sampling

In a qualitative study, the sample is typically small, which makes it possible to first study each program (HE) in depth, and then to study them comparatively. Since comparisons will be drawn between multiple cases, it is imperative that the case sampling process allows for a careful selection of cases (Yin, 2003, cited in Baxter & Jack, 2008). The first step in our study was to get an overview of all the study programs in IxD offered at universities or university colleges in Norway. The research team mapped all existing bachelor’s and master’s programs (between March 1st and April 18th, 2017), including those that would be run for the first time from the autumn of 2017.

The sampling was initiated by entering the websites of all HE institutions in Norway and searching for available studies within relevant departments (such as departments in media studies, design, and computer science). Further, in-site search features were used with the search strings “interaction design” and “design” was used for each institution, to make sure we did not overlook programs. Next, we checked the IxD education available in Norway as listed in Wikipedia¹. We then searched for IxD programs at utdanning.no, which is the official Norwegian national education and career portal and includes an overview of education in Norway and about 600 career descriptions². Finally, we searched the yearly list of study programs provided by NUCAS³ (visited May 2nd, 2017).⁴

3.1.1 Initial Screening of Study Programs

There are no commonly agreed upon denominations or study program classifications for IxD studies (NUCAS, 2017). With each potentially relevant program, we thus screened the study program to determine the content and whether this reflected the IxD field. All sampled programs were iteratively analyzed to identify those with a strong component of IxD. Screening was based on program’s name, online presentation and content descriptions. If a program listed constructs characteristic for IxD in these descriptions, such as “design”, “user”, “usability”, “interface”, “web development”, “prototype”, or “testing”, the study program was tentatively included in the sample. Studies perceived as related to the single-discipline of informatics were excluded, e.g. programs involving coding, programming, web and IT development but lacking any design perspective. Likewise, we ignored study programs that were clearly related to specific single-disciplines within design (e.g., interior design) and programs that were specializations within IxD (e.g. service design). The latter exclusion criteria may have been premature, and future study programs in e.g. service design should be considering to be included.

3.2 Step 2: Data Collection

Based on this initial relevance screening, 15 study programs were identified from 10 different HE institutions. Some of the 15 programs have IxD as a core topic within the program, while the others offer IxD as an optional specialization. The decision was made to select the study programs from each HE institution that had the strongest IxD component, to get a sample with the greatest IxD relevance. This was done based on a second relevance screening, in which a closer look was taken at the detailed content and structure of the programs. During the second relevance screening, the 15 identified programs were listed in a combined table and all three researchers validated which programs should be included in the sample and which should be excluded. All three researchers were involved in the mapping of each program. The researchers gained an overview of the study programs by a close reading of their profiles, course descriptions, study aims, and other details about the program. For three programs, content or course descriptions were not stated online. The institutions offering these study tracks were contacted by e-mail and the requested descriptions were sent to us via e-mail.

Against this background, we specified interesting themes that we wanted to explore systematically and in depth in accordance with our research questions. The themes we wanted to explore in detail were organized into seven categories, which enabled us to implement consistent data collection with each of the programs. The seven mapping categories were as following: (1) whether the program was part time or full time, (2) its admission requirements, (3) the study’s self-reported profile, (4) content themes (in the modules and syllabus), (5) focus on universal design, (6) teaching and evaluation methods and (7) focus on reflection (methodological/academic), which could provide a better understanding of (6).

We organized the study programs into categories through content analysis, as suggested by Labuschagne (2003). Each researcher was responsible for certain categories across all the programs, and we mapped these independently from each other. Consistency in data collection through structured categories was important not only because it controlled for validity and both internal and external reliability (Shadish, Cook, & Campbell 2002), but it also made it possible to compare the study

¹ Please refer to <https://no.wikipedia.org/wiki/Interaksjonsdesign>

² Please refer to https://utdanning.no/tema/om_utdanning.no/about_utdanning.no

³ The Norwegian Universities and Colleges Admission Service; (in Norwegian: Samordna opptak)

⁴ Please refer to <https://www.samordnaopptak.no/info/english/>

programs with one another at a later stage of the data analysis. We also included an open category in our mapping labeled “comments” where all researchers could include other interesting points they identified during their individual mapping, which were not covered by the seven categories. Based on the data collection and second relevance screening, three study programs were excluded, as other programs more aligned with IxD was also offered by the same HE institutions.

3.2.1 What Constituted a “Study Program” in Our Sample?

Higher educational programs in Norway usually result in a degree; however, a two-year university college (“college graduate”) IxD study program was also identified and included in our sample. One-year study programs that could be extended into a bachelor (BA) or master’s (MA) degree were omitted from our sample, as these were viewed as parts of the BA and MA programs. Further, some institutions have chosen a 3+2-year track for their students (BA+MA), while others have chosen a 5-year track, ending with an MA degree. We did not identify any 90 ECTS practice-oriented masters in our sample. To more easily compare study tracks, we chose to view bachelor and master’s programs that clearly belonged to the same 3+2 track as one study program (e.g. identical names for the BA and MA programs, recruiting from the BA to the MA, sharing staff and belonging to the same research groups). Two institutions offered such BA and MA as a 3+2-year track, which we combined and analyzed as two “5-year” study programs.

3.3 Step 3: Data Analysis

The data analysis took place in three phases. At the start, the three authors met for a full-day workshop (on April 18, 2017) where data from an initial sample of 11 study programs (of which 10 were included in the final sample) were analyzed in-depth. As the data collection was done independently, the researchers now shared their overall impressions and discussed their findings in a collaborative categorical analysis approach. Each program was first analyzed internally (horizontally) along the seven theme categories. Here, interesting patterns of coherence and discrepancy between the respective programs were investigated to consider the programs’ internal heterogeneity and homogeneity—including the fit between the online self-reported profile presentation and the content as interpreted from the course composition (including optional courses if these were listed), course content descriptions, and course and program learning outcomes.

Next, we analyzed each of the seven categories (vertically) across the programs. This was important, so we could get an overview of how similar or different the IxD study programs were. During the vertical and horizontal analysis, we continuously coded the findings into themes and key characteristics. Thus, our coding of the data emerged as we moved back and forth between the data and our conceptualization of it. More programs were included after NUCAS launched their yearly list of study programs in May 2017. Two of these programs were included in the final sample post screening. These were analyzed collaboratively online after the workshop, across the seven mapping categories and against tentative patterns that emerged from the workshop. The additional programs fitted well with our existing findings and with the axes and archetypes revealed from the workshop. The final sample consisted of 10 study programs offered by 10 different HE institutions in Norway (see Table 1 in the next section).

4. FINDINGS

In Table 1, we provide an overview of the 10 Norwegian study programs (tracks) considered IxD-educations. Four of the HE institutions are Universities and six of them are University Colleges. Five of the HE institutions are located in the capital of Norway, Oslo. Of the remaining five, one is in Halden, one in Grimstad, one in Gjøvik, one in Bergen, and one in Volda. We have chosen to anonymize the institutions and their IxD study programs. From the vertical analysis, we were able to compare and sort the programs relative to each other (moving from open to axial coding). As we did so, the analysis revealed that the programs could be sorted along:

- A. Two overall orientation approaches (Societal and/or User oriented),
- B. Program content focus (along two key axes: Technology vs. Design and Values vs. Industry),

- C. The didactic emphasis on theoretical knowledge and/or practical experience (continuous axis for Theory vs. Realism emphasis),
- D. Which industry the programs were aimed at (Media and/or IT industries).

The following section will outline these findings.

Pseudonym	Study program characteristics	Institution	Admission Requirements
Institution 1	Informatics Degree: 3-year BA, full time.	University College, Private	GSC*
Institution 2	Informatics Degree: 3+2-year BA, full time + MA full/part time.	University, Public	GSC* (BA), C+ average BA with 80+ ECTS in CS** (MA)
Institution 3	Informatics Degree: 2-year MA, full/part time.	University College, Public	BA in Engineering or equivalent, or 80+ ECTS in CS**
Institution 4	Design Degree: 5-year MA, full time.	University College, Public	GSC* + Passed admission test
Institution 5	Media Degree: 3-year BA, full time.	University College, Public	GSC*
Institution 6	Media Degree: 3-year BA, full time.	University, Public	GSC*
Institution 7	Media Degree: 3-year BA, full time.	University College, Public	GSC*
Institution 8	Technology/Media Degree: 3-year BA, full time.	University, Public	GSC*
Institution 9	Design Degree: 3+2-year BA, full time + MA, full/part time.	University, Public	GSC* (BA), BA with 80+ ECTS in CS**/design/media (MA)
Institution 10	Design Degree: 2-year CG, Full time.	University College, Private	GSC* or vocational skills

Table 1: Overview of the IxD Sample (*GSC = general study competency, **CS = Computer Science).

4.1 Overall Orientation (A)

Two overall orientations are identified throughout the programs. These “orientations” are reflected in the underlying arguments presenting and explaining **why** students should be educated on the respective study programs – i.e. the need for the study program. In some program descriptions, **Societal** needs are emphasized. For example, highlighting the industry need for the competence taught, or highlighting the need for discipline-specific societal-related opportunities and challenges. These programs are classified as having a **Societal** orientation.

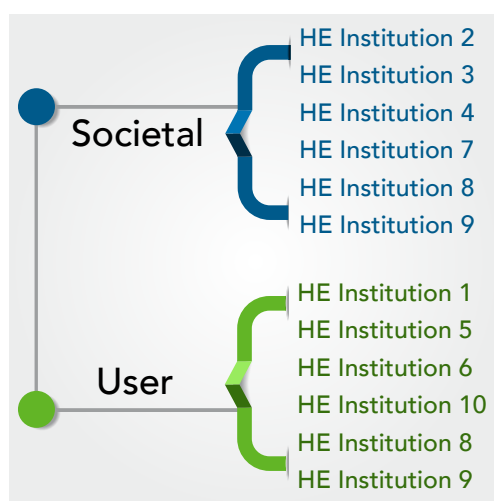


Figure 1. Orientations identified in the programs.

Other programs emphasize human aspects more, e.g., highlighting the need to stay user centered and motivating students to make innovations to meet the needs of end-users. These are classified as having a **User** orientation. Some study program descriptions had arguments for both **Societal** and **User** perspectives. As such, the orientations were not considered mutually exclusive.

Figure 1 visualizes which orientations we identified in the various study programs. Four programs take a Societal orientation, four a User orientation, and two argues for both Societal and User orientations.

4.2 Study Program Content (B)

The programs can be ranked along two axes based on their online presentations and academic content.

4.2.1 Axis 1: Technology versus Design Focus

Some programs have a strong technological focus, and teach IT skills to the interaction designers (i.e. “designers should also code”). These are categorized as **Technology** focused. **Technology** focused programs typically emphasize ability to provide front-end or full-stack expertise. Other programs are more **Design** focused, for example, emphasizing design process skillset and creative knowledge. Media studies focusing on utilizing IxD for communication are classified as more **Design** than **Technology** oriented.

4.2.2 Axis 2: Industry versus Value-based Focus

Industry focus refers to program content that emphasizes industry-relevant practical skills – i.e. matching societal and industry needs and staying current and relevant. Other programs have a clear **Value** focus; referring to programs that focus on components exercising ethical and orientation-based considerations; such as an emphasis on user-centered, socio-technical, or societal aspects.

Figure 2 shows the classification of the study programs in relation to the two axes, as emerging from our vertical analytic impression based on an initial analysis of the online profile presentations. Figure 3 shows final classification, as emerging from a more in-depth combined content and online profile analytical impression – described in the following sections.

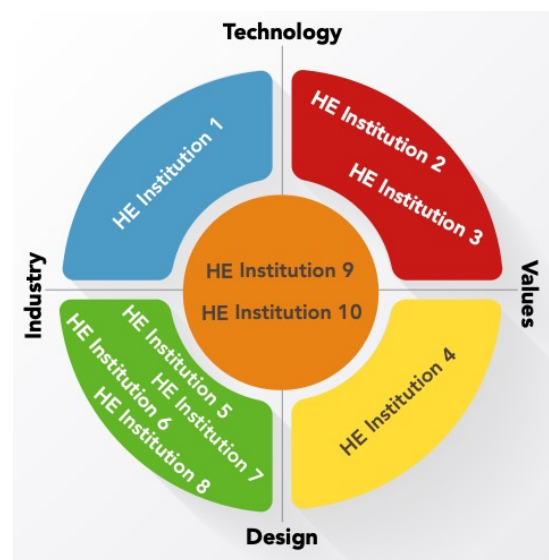
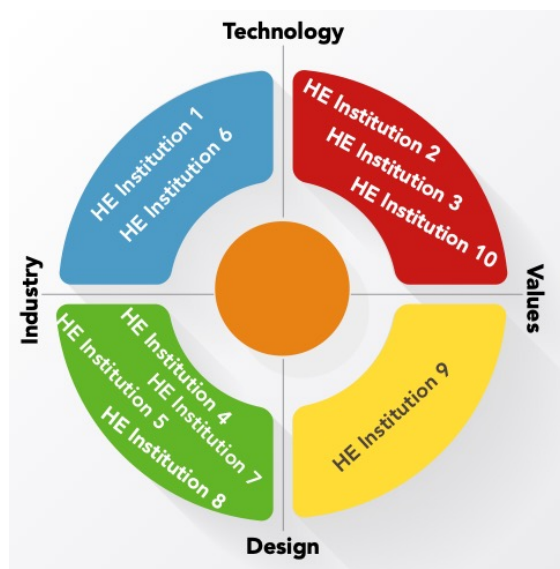


Figure 2. Initial classification of study programs.

Figure 3. Final classification of study programs.

4.2.3 Mismatch: Course Content versus Program Presentation

As part of the horizontal analysis, we investigated whether there was a match between the programs’ online presentations (what they state) and the actual content (what they provide). This systematic in-depth content analysis comparison extended the analyses of (3) the study’s self-reported profile and (4) content themes (in the modules and syllabus). Online profiles (3) were analyzed based on reading

i) the online study descriptions, as well as ii) any other official texts describing the programs posted online by the HE institutions. Actual content (4) was analyzed based on reading i) the course tables, ii) the course descriptions, iii) the topics in the mandatory courses (including courses mandatory for IxD specialization tracks), iv) the information on approaches to teaching and assessment, v) the learning outcomes (what students are expected to achieve in knowledge, skills and general competences) for each course, and vi) the learning outcomes for the study program as a whole. We found that the content of eight of the twelve programs corresponds well with what the institutions state online. However, four study programs differ somewhat in their profile and actual content: partially for HE Institutions 9 and 10, and quite significantly for HE Institutions 4 and 6. When taking the core content components into consideration, the placement of the study programs along the content axes changes.

4.2.4 Lacking: Universal Design

Note that the analysis revealed a lacking focus on universal design in almost all the IxD programs⁵. Three programs (Institutions 4, 6 and 8) completely lacked universal design content, while a further four had a very low universal design focus (Institutions 2, 5, 7, 10). Only the last three institutions taught any practical skillsets, such as teaching web accessibility to the future interaction designers.

4.3 Didactic Approach (C)

The didactic approach describes the way content is taught. Theoretical teaching refers to a focus on traditional academic training, with oral and written skills. We thus interpret lecture-based and classroom settings, writing academic essays and discussing fictional cases as **Theory**-based didactics. Realistic teaching, on the other hand, often involves the industry, which typically provides real cases, supervises work, or evaluates student results. **Realism** thus points to teaching in realistic settings, such as through internships or utilizing real-life scenarios.

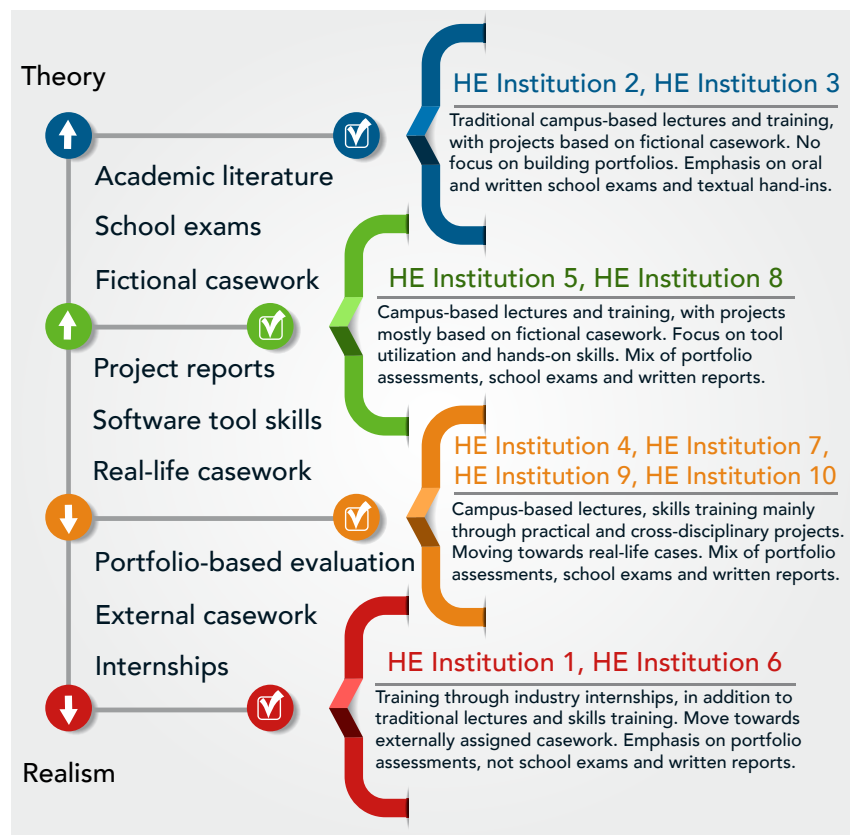


Figure 4. Study program categorization in relation to their didactic approach.

⁵ These findings are published in Begnum, Pettersen & Sørnum (2019). Identifying Five Archetypes of Interaction Design Professionals and Their Universal Design Expertise. *Interacting with Computers*, iwz023, <https://doi.org/10.1093/iwc/iwz023>

The Industry versus Value *content* axis is somewhat related to the Realism versus Theory *didactic* axis. However, while the former refers to the academic content of the study programs, the latter looks at the way in which the content is taught. For some programs, the two overlap, e.g. teaching industry-relevant skills *and* teaching those skills in a realistic manner (Industry + Realism). However, one may focus on industry-relevant skills, but teach these in a traditional classroom setting (Industry + Theory) – or emphasize methodologies or ethics, but teach these through real-life cases (Values + Realism).

Figure 4 presents the study program categorization in relation to their didactic approach. The placement of the IxD programs onto the didactic axis was done by drawing on the analysis of (i) course teaching and evaluation methods, which would denote nurturing practical or abstract skills (e.g., oral exams, portfolio-based exams, and so on) and (ii) the amount of focus on methodological or academic reflection. Additionally, in regard to our findings, we see as following:

○ **Differences between Universities and University Colleges?**

There is a near-perfect overlap between the didactic approaches identified in the Universities compared to the University Colleges. There are four Universities. One University-level institution falls into each of the four didactic approach categories. As such, there are no visible differences between the didactical teaching styles in Universities and University Colleges in Norway.

○ **Differences between Public and Private Institutions?**

The only two private institutions are Institutions 1 and 10, which does not provide enough data for a private versus public comparison on didactics. The answer to the question on didactic differences is no, our analysis indicates no set differences based on the types of institution.

○ **Differences between MA and BA Programs?**

There are four MA programs (Institutions 2, 3, 4 and 9). None of the four are classified as taking the most Realism-focused didactical approach. On the other hand, only two of them has chosen to apply a mostly Theory-oriented approach. This indicates a slight shift toward the theoretical aspects in the MA tracks as compared to the undergraduate tracks, as is to be expected. However, the MA tracks do have quite divergent didactic approaches, so this is not a clear trend. Likewise, there is quite a large spread in the teaching styles in the six undergraduate tracks, ranging from traditional campus-based settings to teaching in real-life settings. In summary, it appears that the strongest Realism focus is found at the BA level, and the strongest Theory focus at the MA level, but most study programs mix the Theory and Realism approaches.

4.4 Target Industry (D)

The analysis further revealed that the study programs reach out to different industries. Four programs only target the IT-industry (Institutions 1, 2, 3, 10); four only target the Media industry (Institutions 5, 6, 7, 8), while two programs are directed at both industries (Institutions 4 and 9).

5. DISCUSSION

In this section, we return to our research question to discuss the potential implications of our findings. Our findings show how Norwegian IxD study programs and tracks vary greatly; both in content and structural organization:

- The length of programs; spanning from two to five year,
- Degrees given; MA, BA or college graduate degrees,
- The depth of IxD expertise given; from elective tracks to core program components,
- The type of IxD expertise; from a technology focus to emphasis on design skills,
- The skillset emphasis; from value-based problem-solving skills to ensuring industry relevance,
- The teaching styles; aspiring to achieve theory-based insights or managing applied realism,
- Contributory focus; whether oriented toward meeting user needs or societal needs,
- The targeted industry; educating professionals for the IT- or media-industries,

5.1 The Norwegian Interaction Designer

The analysis of study program organization, emphasized skillsets, values, content and focus, does not support concluding on an envisioned role for Norwegian IxD graduates, or a straightforward set of skills that constitutes the “interaction designer” –the way professions such as dentistry or photography would be able to do. Instead, our findings make visible the dynamic and plural nature of the field. Nonetheless, we are able to make some assumptions. As indicated by Figure 3, we may tentatively categorize graduates from our sample into five “Norwegian IxD profiles” based on content focus:

- *Industry + Technology*, merging IT-focus with an industry focus, and offering IxD graduates with an IT bachelor degree. This is a less interdisciplinary program, and more targeted to producing front-end developers with some IxD skills.
- *Values + Technology*, merging IT-focus with social values and ideals. We find two study programs in this category; again, more IT-oriented, producing MA and BA graduates in IT with some IxD skills. These programs offer more opportunities for an interdisciplinary degree, depending on the students choices. We hypothesize most of the graduates consider themselves developers, but that others will pursue UX and IxD positions – depending on their BAs.
- *Values + Design* is a design degree – and we hypothesize graduates are likely to take on digital product design, interaction design, and other UX and design positions.
- *Industry + Design* represents four study programs – and is as such the most frequent IxD type. Still, we hypothesize these graduates have a less known IxD profile, as these programs target the media industry. Here, we find different types of “mediators” – graduates that are highly interdisciplinary. These programs mix web and multimedia oriented technological skills, classic user-oriented and creative design methodology, and visual communication, graphic design and content design skillsets. These programs are targeted to the Media industry, suffer from low student recruitment, and thus produce low output.
- In the *Centre*, we find two programs clearly emphasizing IxD. These are interdisciplinary, merging IT and design. Emphasis is on user-centered design of digital services and interfaces. Both give design degrees, and design skills are prioritized over IT-development proficiency.

Note that in our investigating of the local sample of study programs, we do not aim to statically define a “correct” type of interaction designer nor rate the study programs in relation to which are “better” than others. Rather, we present a descriptive study of mapping the status quo.

In most of the programs, the depth of IxD components is limited. Most of the study programs offer IxD as an elective focus area or a study track branch. Of the three programs that give graduates a Design degree, only two study programs have IxD as a core component. In line with the varying depth of the offered IxD components, only two study programs is named “Interaction design” (CG from Institution 10, and BA+MA from Institution 9). The programs with IxD as their core component are perceived as more interdisciplinary – and are e.g. teaching both technology and design related skills. However, there is one major exception – the Norwegian Media studies.

5.2 Communicating Career Opportunities

Among the recommendations in the KMD report for decreasing this shortage, are ensuring HE matches industry needs, and increasing recruitment to cross-disciplinary programs by better communicating career opportunities (DAMVAD, 2014:83). As IxDA states it is the availability, not the quality, of the IxD competence that is the main challenge, and this is backed by other industry sources, we hypothesize that it is *not* a mismatch between the graduated professionals and the industry needs that is the main challenge, but that weak *communication* of IxD expertise may be an underlying factor contributing to recruitment challenges – of students to the programs, and graduates to industry.

Specifically, the Media IxD programs seem to have the potential to increase their throughput, as their recruitment numbers are low. These programs may be less known to the IT-industry compared to the

Design and IT programs. Graduates from all the 4 programs of *Applied Solutions* seem to hold the sought after “IT and design” interdisciplinary and advanced IxD skills that the IT-industry needs. We propose that the interdisciplinary Media degrees (Institutions 5, 6, 7 and 8) should start targeting the IT industry, and inspiring Media IxD graduates to look broader at carrier opportunities within the service and health sector. Perhaps there is here an unknown match here, and our findings can contribute to the IT industry being aware of Media degrees educating IxD graduates.

The potential lack of awareness of new and existing IxD-related study programs in the Norwegian HE sector may be a further complicating factor for student recruitment, as program names and NUCAS system classifications vary greatly. Some studies are categorized as Computer Science/Informatics studies, some as Esthetic/Art studies and some as Media studies. As such, it is hard for students to find the IxD programs offering the sought advanced cross-disciplinary competence. Adjusting how study programs are classified in the system, or the NUCAS system classifications (e.g. adding “Design” studies) could better support end-users in selecting the studies needed on a societal level.

Our analysis both looked at the internal consistency within the programs, and the differences between the programs. Four of the 10 program profiles provided by the institutions did not fully match the offered study program content, which is problematic both for potential students and for the industry. This adds to the challenge of articulating the envisioned professional roles graduates from this could take on – to potential students, and to potential employers of graduates. It is also unnecessary, as the actual content of the analyzed programs are all unique and valuable. One should be able to rely on the program descriptions in study selection as well as recruitment processes. We encourage HE institutions to check that their online “recruitment profile” match the content and didactics of the programs. Further, that the HE institutions emphasize carrier opportunities, e.g. by presenting previous graduates that are now working in industry roles. This, in itself, could aid improved matchmaking in both academic and industry recruitment.

5.3 Lacking Universal Design Skills

Based on our analysis, we find it likely that graduates will go into industry roles such as visual designers, user researchers, UX designers, interaction designers, content producers, front-end or full-stack developers. However, few programs include adequate universal design expertise. In all these professions, following increasingly strengthened universal design legislations and WCAG-requirements are mandated by law – and have been since 2014. However, the programs have a low and lacking focus on universal design. This means graduated IxD professionals are not able to produce legal and ethical digital solutions based on their University and University College degrees, which is quite serious – and something both HE institutions and future employers should be aware of.

5.4 Limitations of the Study

This study is not without its limitations. We believe we have captured all the relevant study programs in Norway, but future research could expand on this: for example, IxD professionals could be interviewed about their skillsets and educational backgrounds. Such triangulations could complement the study, provide more nuanced information and shed light on reasons behind program differences.

Next, only Norwegian education and study programs were included in our study. In-depth analysis is a time-consuming and extensive research approach, prioritizing building rich and deep understanding of a limited data set over a limited and generalizable overview. Thus, an international mapping of all interaction design programs in the world was unfeasible. Dependent on the number of programs detected, looking at the region of Scandinavia (Denmark, Finland, Norway and Sweden) was considered. However, the complexity of the analytical approach and the amount of textual document analysis identified as necessary to answer the research questions restricted the feasibility of an international approach. However, the challenges related to skills utilization and general communication and articulation of the IxD discipline appear international. Although the empirical data for this study were drawn from a Norwegian sample, we believe the contribution will be relevant to an

audience beyond the Scandinavian countries. It may be that industry elsewhere experiences the same recruitment challenges, however as Norway has a limited population and low unemployment rates, competence shortage could be a local challenge. Our investigations could thus be repeated for other local samples in later studies; offering the opportunity for tailoring to local and timely needs as well as textual interpretations by native speaking researcher.

We recognize that numerous scholars claim it is difficult to generalize findings that derive from case studies. This view concerns the difficulty of testing hypotheses with a small N, of only a few entities, in the hypothetic-deductive approach typical of quantitative studies, which seeks to test causal effects by confirming or rejecting already established hypotheses. Inductive-deductive inferences, however, do the opposite by asking questions that produce non-statistical answers rather than confirming or rejecting already established knowledge claims. While quantitative research concerns the systematic investigation of phenomena via statistical and mathematical models, qualitative methodology provides an understanding of why and how elements are interrelated. Thus, a large N enables statistical generalizability – logical and analytical inferences (Andersen, 1997; Yin, 2012). A qualitative methodology, however, provides a certain set of categorical assumptions that need to be approached through analytical logic. Yin (2012) uses the term “analytical generalization” to clarify the contrast with “statistical generalization.” This study uses analytical generalization.

6. CONCLUSION

As digital solutions increasingly become primary service channels, the role of the interaction designer is an important component in facilitating satisfactory and accessible user experiences and interactions. The Norwegian industry is reporting a serious and increasing shortage of available IxD competence, however not all IxD study programs easily recruit students, and as such HE struggles to meet the societal demand. Previous findings indicate students find it hard to understand the IxD-role they would perform, and industry report challenges related to hiring the “correct” type of interaction designer – thus our hypothesis is the “fuzziness” of the IxD skillsets complicates recruitment, by blurring career opportunities and professional roles. We propose improved articulation of the IxD profession could support both student recruitment and industry matchmaking.

This paper presents initial findings from an empirical qualitative multiple case study of relevant HE programs in Norway. Through a systematic sampling and screening process, we identify 10 Norwegian HE programs relevant for producing interaction designers. A comparative and in-depth text analysis maps their heterogeneity, as regards to type of institution, degree achieved, academic focus, content, didactics applied and industries served. Our findings reveal no clear differences between Universities and University Colleges across the analyzed categories, or between undergraduate (CG and BA) and graduate (MA) levels. However, the study shows a wide variety of interaction designers are being educated, and they are graduating with different disciplinary degrees. Our findings as support assumptions set forth in the introduction; that more work is needed make IxD expertise clearer – even when only looking at a local Norwegian sample. We indicate different types of graduated IxD skillsets from our findings, which we consider a first contribution to this end.

We would like to highlight three additional findings. First, there are frequent discrepancies between online presentations of study programs and actual program content. We encourage HE to increase the match between descriptions and content, and ensure they communicate graduate carrier opportunities. This, in itself, could aid in both academic and industry recruitment. Second, we find a potentially not known match between the competence needed in the IT industry and Media programs’ graduates with IxD competence – currently targeting the Media industry. Third, few programs include universal design expertise. IxD graduates are as such not necessarily conversant with legal and ethical accessibility responsibilities, and there is a need to discuss the appropriate universal design competencies for interaction designers. Further work focuses on articulating and communicating IxD in Norway, by identifying “archetypes” of skillsets in the sample – and proposing fitting universal

design skills for these. Future research may also expand on the study – investigating whether national challenges as described in this paper are found internationally, and consider whether recommended accessibility skills and the same “IXD-types” are evident elsewhere and over time.

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