Teaching for Values in Interaction Design:
A Discussion About Assessment

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Abstract. We experience an increased attention in the Human-Computer Interaction (HCI) field towards the social and environmental responsibilities of interaction designers. In line with this increased attention, a need arises to teach students about values in interaction design and consequentially assess their learning. However, there are few academic examples of how to assess whether students know how to deal with values in interaction design or whether they have become responsible interaction designers. In this paper, we aim to start a conversation on assessment of teaching for values in interaction design. We first introduce our own experiences with teaching for values in interaction design, and extend this with an argument for authentic, formative assessment *for* learning, including active participation of students in the design of learning goals and assessment activities.

Keywords: Values, interaction design, HCI, teaching, assessment, higher education.

1 Introduction

Values are inherent in technologies [40], and "technology affects values regardless of whether the designer has any explicit intention to do so" ([29], p. 62). In other words, interaction designers – knowingly and unknowingly – both embed values *into* their designs and affect values *through* their designs [22]. It is, then, important that interaction designers are aware of the role and implications of values in the design of technologies. We therefore believe this should be part of all interaction design and engineering educational programs. This is not yet the case, and academic literature currently lacks a discussion on ways to teach for values in design and assess students' learning in this domain.

While various approaches exist to practicing and researching values in design (see, e.g., [21, 27, 11, 34, 28]), there are only few examples of how to teach students about values in interaction design ([32, 5, 20, 33], for a recent overview see [25]). A number of other papers have reported on teaching design approaches from various related

subfields of HCI, such as tangible and embedded interaction design [30], interaction design and children [18], digital craft [35], interaction design with a focus on sensor-based interaction [9], participatory design [10, 24], ethnography in human-computer interaction [41], and interaction design by research through design [23]. We have also witnessed the call for engaging more in discussion around teaching various strands of design of technologies, such as in child-computer interaction [39] and in participatory design [24], to name a few. However, all these initiatives lack a discussion on *assessment*. Learning goals are listed in a few papers, e.g. [18, 10], and in [2], three key aspects of teaching participatory design are listed. These examples are great starting points for a discussion on assessment, but as of yet, this discussion is missing. With this paper, we aim to start this conversation. We structure our discussion around three questions that, according to Biggs, should be considered when deciding on a suitable mode of assessment [6]:

- *What qualities of learning are we looking for; what performances need to be confirmed in the assessment?*

Biggs states that this question should already be answered in the curriculum objectives and the teaching activities. As such, in Section 2, we introduce our own experience with teaching for values in interaction design and formulating learning goals for this subject. We explain our belief that not only students' knowledge and skills, but also (perhaps more importantly) students' attitudes, contribute to their identities as 'responsible interaction designers', which we consider the ultimate learning outcome of teaching for values in interaction design.

- *Should the assessment be decontextualised or situated?*

We discuss this second question in Section 3. We argue that progression of learning about values in interaction design should be measured in a situated, or authentic, way. In addition, we argue that formative assessment *for* learning is the most appropriate mode of authentic assessment of teaching for values in design.

- *Who should set the criteria for learning, provide the evidence, and assess how well the evidence addresses the objectives?*

This final question is addressed in Section 4. Since conceptions of learning outcomes – in this case, conceptions of what it means to be a 'responsible interaction designer' – can vary between students and teachers, we argue for a collaborative approach to the design of learning goals and assessment activities. We believe we should practice what we preach when teaching for values in interaction design: involving stakeholders (in this case students) in the design process (in this case, the design of learning goals and assessment activities). We also describe and reflect on our first experiences with putting this idea to the test.

2   Teaching for values in interaction design in higher education

In this section, we answer Biggs' first question – *what qualities of learning are we looking for; what performances need to be confirmed in the assessment?*

2.1   General curriculum outline

To answer this question, we first need to outline what characterizes teaching for values in interaction design. To this end, we elaborate on a recent project with the aim of developing teaching and assessment activities in teaching for values in design in higher education. In this project, we developed a pedagogical model to guide the design of teaching activities [43], building upon related work from the various approaches to teaching, practicing and doing research for values in interaction design. The model is built up around three pillars:

- Ethics and Values. This pillar explains the underlying theoretical foundations that students need in order to take ethics and values into account, both in their methods and in their design process, as well as in taking responsibility for their product, system or service.
- Designers and Stakeholders. This pillar addresses methods and processes for students to ethically engage with different stakeholders and their values, acknowledging that they themselves are stakeholders too.
- Technology and Design. This pillar addresses methods and processes that allow students to practically design and evaluate products, systems, and services with values in mind.

For each of these pillars, we developed a number of teaching activities, with progression structured according to the SOLO taxonomy [7, 5]. The teaching activities range from an introductory lecture on values in design, to exercises on stakeholder identification, to envisioning future scenarios in order to understand the systemic consequences of design. Together, the teaching activities aim to equip students with the *knowledge* and *skills* to critically consider human values in action throughout and beyond the design process. In doing so, we hope to foster a critical and reflective *attitude* and facilitate students in reaching the learning outcome of being a responsible interaction designer.

2.2   Knowledge, skills, and attitudes

Knowledge, skills, and attitudes are the three main competency types related to learning [4]. Knowledge refers to the cognitive domain, and includes declarative knowledge (factual information), procedural knowledge (the connection or use of pieces of factual information), and strategic knowledge (knowledge about the task, context, problem-solving processes and oneself). Skills refer to the psycho-motor domain, related to doing or acting in practice. Skills and knowledge tend to go hand in hand. For example, in order to design a product, a designer must *know* how to apply

their design *skills*, such as performing a brainstorm session, to carry out the design process.

Typically, education focuses on conveying knowledge and teaching skills. However, especially in the domain of values in interaction design, we believe it is important to consider attitudes as well. Attitudes refer to affect, related to values and emotions; scholars have proposed varying definitions of attitudes [4]. We agree with the notion that education can be considered a process towards identity formation: students' environment can contribute to attitudes and identity [12, 37]. This is in line with what we believe to be the ultimate goal of teaching for values in interaction design: educating students to become 'responsible interaction designers'. By equipping students with the knowledge and skills related to (the importance of) values in interaction design, we allow them to internalize this knowledge, and aim to instill in them an attitudinal predisposition to consider values in interaction design in their future professional life. These attitudes can then be considered a prerequisite for becoming a responsible interaction designer.

2.2 Formulating learning goals

However, we should be more specific about what it entails for students to 'be a responsible interaction designer' in HCI. To guide the design of a curriculum, more specific learning outcomes, formulated as learning goals, are needed. Learning goals describe the intended knowledge, skills, and attitudes students are expected to have at the end of the educational program, and are formulated from the student's perspective [36]. Learning goals can be used to design teaching activities (as we have done) but can also guide the design of assessment activities. This is why we believe a discussion of assessment is incomplete without a discussion of learning goals.

A major challenge when defining learning goals is to transform terms such as 'understanding' to more specific, observable outcomes. In interaction design, we make use of even more ambiguous terms, such as 'creativity' and 'originality', in addition to 'understanding'. In our case, the learning outcome 'being a responsible interaction designer' is also very much open to interpretation. A significant challenge in the interaction design domain, then, is to articulate learning goals that promote these important cognitive, psycho-motor, and attitudinal attributes but at the same time provide some useful methods of measuring their achievement [13].

To achieve this in our own teaching, we use verbs from different levels of the SOLO taxonomy [7], such as 'identify', 'describe', 'relate', and 'reflect', to formulate learning goals for each individual teaching activity. These 'SOLO learning goals' clarify the depth of understanding of the material that is intended to be achieved by the teaching. In addition, we have formulated seven overarching SOLO learning goals, each related to one of the three pillars of teaching for values in interaction design. The learning goals feature a mixture of low-level, mid-level and high-level outcomes, and are presented in Table 1. We believe that a student who has achieved all of these learning goals and consciously applies their abilities to new interaction design projects is (on their way to becoming) a responsible interaction designer.

Table 1. Learning goals in teaching for values in interaction design in relation to the three pillars.

Pillar	Learning goals
Ethics and Values	Recognize and describe different values. Critically reflect on how values are manifested in digital products, systems or services.
Designers and Stakeholders	Identify and describe direct and indirect stakeholders of a digital product, system or service. Elicit stakeholder values. Identify possible tensions between different stakeholder values and imagine how to mediate these tensions in a digital product, system or service.
Technology and Context	Integrate values into the design process. Analyze and critically reflect on the impact of a design (brief) and its manifested values in context.

To return to Biggs' first question, the learning goals define the "qualities of learning we are looking for, and the performances that need to be confirmed in assessment". As such, these learning goals can subsequently be used to guide the design of assessment activities. Basing the assessment system "on the demonstration of achievement of the learning outcomes by the individual student" ([14], p. 231) is an ingredient of outcome-based education (e.g. constructive alignment, see [6]), an approach to education in which the design of the curriculum is led by learning goals. Because learning goals are formulated from the perspective of the student and refer to their knowledge, skills, and attitudes, it does not suffice to consider only the final material result of learning (e.g., a prototype design). Rather, the learning *process* needs to be taken into account in assessment. This is especially important in teaching for values in interaction design, where the final deliverables (e.g., the way a prototype looks and functions) are arguably less important than the process used to arrive at this material result (e.g., properly considering stakeholders and their values in the design process).

3 Assessment modes in teaching for values in interaction design in higher education

Now that we have explained what teaching for values in interaction design entails, we discuss Biggs' second question, relating to the mode of assessment: *should the assessment be decontextualised or situated?* We argue that situated (authentic), formative assessment *for* learning is the most suitable mode of assessment in teaching for values in interaction design.

3.1 Authentic assessment

Situated assessment assesses whether the student is able to enact their knowledge, skills, and attitudes *in context*. This is highly similar to the more well-known notion of authentic assessment (or performance assessment), a mode of assessment which focuses on the value of students' learning in the 'real world', translating school-based ideas to authentic situations and tasks [3]. This is important in interaction design, as students should be able to apply what they have learnt in real-life design projects, in their career beyond school. We believe it is especially important when teaching for values in interaction design, because contextual factors – most notably, stakeholders and their values – play an important role in this domain. In fact, it seems almost impossible to assess students' ability to work with values in interaction design in a de-contextualised way. Their knowledge, skills, and attitudes are valuable because they can be *applied* to design projects, and as such, assessment should also focus on this application.

3.2 Formative assessment

We add to Biggs' second question [6] by diving deeper into the mode of assessment. Besides being authentic, we believe that assessment in teaching for values in interaction design should be *formative* assessment *for* learning. In formative assessment, the goal is to provide feedback that moves students forward; it "has a pedagogic purpose to help the learner develop through feedback and can take place at any stage of teaching and learning" ([26], p. 34). Formative assessment is typically categorized as assessment *for* learning [8, 42] – in this mode of assessment, the first priority is to promote students' learning [8] and inform students about what they can already do and what they are not able to do [42]. This is opposed to summative assessment, where the focus is on measuring and reporting the level of learning, typically against standardized criteria [15], e.g. in the form of a grade at the end of a course [26], without necessarily providing feedback. Summative assessment is typically categorized as assessment *of* learning: it helps teachers measure students' progress or competence after teaching activities have taken place [8, 26,16]][1].

    We advocate using formative assessment *for* learning in interaction design courses, as providing feedback about students' performance can help them identify their strengths and points of improvement. Especially in teaching for values in interaction design, where the focus is not only on knowledge and skills but also on attitudes, it is far more valuable to perform formative assessment than to perform summative assessment. Assessing students' attitudes and identity in a summative way only is difficult, if not impossible, to do.

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[1] A third, alternative mode of assessment is assessment *as* learning. Its aim is to provide opportunities for students to monitor and reflect on their learning and develop independent learning habits [16]. While this is no doubt valuable for students, we believe that students in higher education will already have developed learning habits that work for them, and are already able to reflect on and monitor their learning

4 An argument for involving students in assessment

In this final section, we discuss the third question posed by Biggs, which focuses on the division of roles: *who should set the criteria for learning, provide the evidence, and assess how well the evidence addresses the objectives?* According to Biggs, all three of these issues could be addressed by the teacher, by the student, by peers, or by all collaboratively [6]. We suggest to use a collaborative approach to setting the criteria for learning (i.e., designing the learning goals), as we believe that our focus on the importance of values in interaction design should extend to the design of education, an argument we will develop in more detail below. The latter part of Bigg's question – who should provide the evidence for learning and assess how well it addresses the objectives – is not one we believe to have a definite answer. Rather, we again argue for a collaborative approach; in this case a collaborative approach to designing the assessment activities and determining the corresponding student and teacher roles.

4.1 Collaborative design of learning goals and assessment activities

Students and teachers may all have their own ideas about the way teaching, learning goals, and assessment should be shaped [13]. Applying this to our own teaching, everyone may have a different interpretation of what it means to be a responsible interaction designer. The values of teachers, and also their conceptions of their role in relation to the subject, differ. Also, students enter university educations in interaction design with significantly different conceptions of both *how* and *what* they should learn [13]. As such, the quality of the learning outcomes is partly determined by what the student believes the subject of study entails. Some design students believe that the professional world requires them to be proficient in the skills associated with their particular field (e.g. programming); other students might see themselves as change agents in society and challenge the very boundaries of the subject [13].

In a discipline where the 'intended learning outcomes' set by teachers may not match the learning outcomes students value most, we believe it would be helpful to take a collaborative approach to the design of learning goals. From an outcome-based education perspective, it follows that assessment should also be approached collaboratively, as this is strongly linked to the learning goals and is considered a major driver in the quality of student learning [13]. Especially when teaching for values in interaction design, we believe it is paramount to give students a say in the design of learning goals and assessment activities. This is because an important element of working with values in interaction design (and, hence, what we teach our students) is to consider stakeholders at every step in the design process. Now, students are the stakeholders of the way *we* design our teaching. If we want to practice what we preach, we should involve them in the process.

Active participation of stakeholders is the basis of Participatory Design [38]. Using a participatory design approach to design our learning goals would mean to introduce the students to a subject that is to be taught, and ask the students what they want to learn in regards to this subject. For values in interaction design, this would mean that students could be asked what they believe a responsible interaction

designer is, and what a responsible interaction designer needs to know and should be able to do. Correspondingly, participatory design of assessment activities involves asking students how they would assess whether they themselves and other students have achieved these learning goals (how do you assess whether someone is a responsible interaction designer?). This also entails using a participatory approach to answer the latter part of Biggs' third question, related to the division of roles: *who should provide the evidence of learning and assess how well it addresses the objectives?* In such a collaborative approach, the teacher can focus on formative, authentic assessment for learning, but discuss with the students how such assessment could be shaped. Through involving students in preparing assessment criteria and activities in this way and sharing the responsibility to carry out the activities, the teacher can empower them and democratize learning. This also provides an opportunity for mutual learning, meaning knowledge generation between two groups of people [17], such as in Muller's conception of a hybrid or 'third space' in participatory design where software designers and users come together and co-develop [31]. Empowerment, democratization and mutual learning are all important values in Participatory Design [38]. Moreover, involving students in the assessment process is a key attribute for students' motivation to learn [19].

In order to get a feeling for what this (to many teachers rather extreme) idea would entail, we have implemented a limited form of it in one of our courses. Our experiences are described in the next section.

4.2 Collaborative design of learning goals and assessment activities

We put our theory to the test by taking a first step towards involving students in the design of learning goals and assessment activities for a recent course. The students were enrolled in a design project course in a master's program in experience economy. They were introduced to ethics and values in interaction design through a lecture and a few exercises. The lecture covered formal and applied ethics, and the role of values in interaction design, design processes and stakeholders. The students were asked to identify what was important to them as individuals, and later as groups, creating both a personal and a shared value manifesto. After this introduction, the students were asked to answer two questions anonymously in a Miro board: 'What do you want to learn about ethics and values in design?' and 'How can we assess that?'.

To the first question, the students answered things such as "how to navigate in bias", and "to make ethical values clear in design and to communicate them to the target group". Examples of answers to the second question were "look for lack of documentation, transparency and bias – meta-reflection on method", and "that one's values and ethical actions must be consistent and a reflection on whether they actually are". The objective for asking these two questions was two-fold. The first goal was to invite the students to have a say and have an impact on their learning. The second goal was to create an opportunity for mutual learning, where the teacher could learn from the students and incorporate that into the design of the continued teaching. An example of such mutual learning was that the teacher came to realize that the students seemed to find ethics easier to relate to than values. In the future, the teacher could

adapt the curriculum based on such insights, and students' answers could be used in the formulation of assessment criteria for formative authentic assessment activities.

The diversity of students' responses in our attempt to involve them in the formulation of learning goals and assessment illustrated that opinions indeed differ on what is important to focus on when learning about ethics and values in interaction design. The teacher could probably use this to determine where agreements and differences lie, and take this as a starting point to design learning goals and teaching activities that are in line with students' conceptions of what it means to be a 'responsible interaction designer'. That being said, to realize teaching for values in design as a collaborative process, students should probably not be given full autonomy. The teacher, as a subject matter expert, will likely know of important topics of which students may not realize the importance beforehand. In the example above, students understood 'ethics' better than 'values', likely because this is a concept they were more familiar with, and as a result, most of their personal learning goals did not mention values. That does not imply values should be given less priority; rather, it signals to the teacher that the concept could be explained in relation to ethics to improve students' understanding.

We recognize that not all teachers of interaction design in higher education will have the opportunity to involve students in designing learning goals or assessment activities. Oftentimes, a curriculum is fairly set in stone before a course begins, and time constraints can prohibit teachers from making changes when the course is already underway. If this is the case, teachers can still take small steps towards involving students in the assessment by applying it on a smaller scale. For example, for small-scale participatory design of learning goals, the teacher can ask students at the start of the course what their expectations and wishes are, and design just one or two teaching activities for later in the course that address these topics. An example of small-scale participatory design of assessment would be to assign students a peer-review session, and let them decide the assessment criteria for their reviews. Finally, even if there is no space to make changes to the current iteration of a course, students can be asked to give feedback about the learning goals and assessment at the end, and a next iteration of the course could be designed with this feedback in mind. For example, students could be asked whether there are things they expected or wanted to learn regarding the course topic, but did not; or even how they believe the learning should have been assessed. In this way, students could be involved in designing the learning goals and criteria for the next course iteration.

Indeed, when consulting with some of our fellow participatory design teachers about their thoughts on how to involve interaction design students in the definition of learning goals and assessment criteria, we received several suggestions to empower students. For example, during supervision they encouraged the students to ask for more (specific) knowledge, often situated in their projects. They also allowed the students in their oral exams to individually choose the subject to present about for 5 minutes, and through that have some say in what they would be assessed on. Furthermore, they offered students an anonymized mailbox where they could pose questions about things that they felt needed more elaboration or suggestions for things they wanted to learn more about. This information was then gathered and brought up during the next teaching occasion. This could be considered a very limited form of involving students in setting the learning goals.

4.3 Challenges of involving student in assessment

We are aware that participatory design of learning goals and assessment activities in interaction design may come with some challenges. For instance, as we experienced ourselves, students may lack familiarity with the subject which can make it difficult for them to define learning goals. We gathered input after an introductory lecture, but perhaps it is better to do so later on in the course. We believe that the appropriate moment to start such a collaborative approach may differ between bachelor and master-level students. Our colleagues also mentioned that since the interaction design projects are so complex, it might be hard for the students to define criteria on a meta level, since they would probably be very connected to the situation and their specific project – at least during the course. For example, instead of saying "recognize and describe different values" (as in Table 1), students may be involved in a recent interaction design project about design for other cultures and therefore only say that they want to "recognize and describe the values of different cultures".

5 Conclusion

Teaching for values in interaction design is currently gaining momentum, and we believe that this can significantly contribute to moving the field of Human-Computer Interaction forward. However, this demands advancement of theory, methodology, and practices in teaching students how to be responsible towards the societal values in designing and digitally transforming society. In particular, we argue that to be true to the values of participatory design, interaction design students should not be considered passive recipients of information, but should be actively involved in the shaping of their own learning by formulating learning goals and discussing how to assess whether these learning goals have been attained. However, in the interaction design literature, we have observed a lack of discussion around assessment practices for such purposes. We hope that this paper will be a conversation starter regarding assessment in teaching for values in interaction design, and that it will inspire teachers to employ (and share their experiences with) participatory design methods for the design of their courses, including the involvement of students in the decisions around learning goals and assessment activities.

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