Making Values Explicit During the Design Process

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When people design products and services, they often do so to help realize specific values. Design is a value-driven activity, although the values often remain implicit and unarticulated. Here we reflect on a design-driven research project in which a series of innovative telecommunication, multimedia, and gaming applications were developed and evaluated in close cooperation with potential users. In our reconstruction, we focus on designers' intended values, on users' aspired values, and on the differences between these values. The authors advocate making these values more explicit and making the discussion of these values more transparent. Building on findings and methods from the field of *value sensitive design*, we recommend improving the match between designers' and users' values.

studies of design practices suggest that designers try to embed—most often implicitly—specific values into the products and services they help to develop [1], [8], [20], [21].

All design is driven by values. To design is to attempt to put specific values into a product or service, in the hope that when the product or service is ready to be used, people will interact with it and will experience these values. However, these values often remain implicit: designers and users rarely articulate and discuss their values explicitly or thoroughly. In the field of *value sensitive design* it has been argued that designers need to reflect on the values they aim to "embody" in the products they are working on [2], [5]. These studies typically focus on "values of ethical importance," such as human welfare, privacy, trust, autonomy, and environmental sustainability [5, pp. 1187–1193]. In reaction,

aspire in their lives, and which they hope to partly realize by using products or services. We assume that people will appreciate products that help realize their aspired values and that they will therefore appreciate products in which the designers' intended values correspond with their aspired values. It may be noted that there may be cases in which designers have good reasons not to follow users' values, for example, if these are obviously morally wrong.

Values may be understood as "varieties of goodness." They describe different ways in which things or states-of-affairs may be good (or bad). Things may be good in one respect and bad in another. For example, a car may be safe but unsustainable. Values are not just preferences. They claim that something is good in a certain respect not just for the person making the claim but more generally. Values can be distinguished from each other in various ways. Van de Poel [20], for example, distinguished between instrumental, economic, moral, cultural, and aesthetic values in engineering design.

Often a distinction is made between intrinsic and instrumental values. Intrinsic values are those that are good in themselves or for their own sake, while instrumental values are valuable because they help to achieve other values. Although the distinction between intrinsic and instrumental value can be problematic [22], we will adopt it here. What makes the distinction especially useful in this context, is that the desirability of intrinsic values is usually less controversial than instrumental values because the former are pursued for their own sake.

Below, we will therefore focus on intrinsic values and adopt a categorization of intrinsic values proposed by Frankena [4]. He drew up a list of 17 intrinsic values on the basis of philosophical literature on values. Out of Frankena's list, the

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Values in Design

Ben Shneiderman [14] urged people who are involved in the development of information and communication technology (ICT) to make explicit the "values that [they] hold dear," so that these can guide development of ICT. He advocated making explicit high-level goals, such as health care, education, safety, communication, and freedom of expression, so that these can guide research and design projects. Similarly, a group of researchers from academia and industry discussed the future of human-computer interaction (HCI) and agreed "on the need to keep human values at HCI's core [and] highlighted the fact that our changing relationship with computers means that determining what these values might be and coming to understand them require greater finesse than ever before" [13]. Moreover,

we believe that it is worthwhile to make explicit and discuss also "less important" values, such as togetherness or enjoyment.

Our goal in this article is to explore ways for designers to articulate and discuss their own values and users' values so that they can create a better match between these sets of values. We will focus on *designers' intended values* and on *users' aspired values*. With designers' intended values, we refer to values that designers bring to the project, which they write about in the project plan or brief, and that they intend to materialize in the product or service on which they work. These values can be specific for each project. Flanagan *et al.* [3], for example, described a project that aimed to develop a game based on the value of gender equity. With users' aspired values, we refer to values that people

following nine values were identified as being relevant to our current study:

1) Pleasures and satisfactions of all or certain kinds *(Enjoyment)*
2) Aesthetic experience *(Aesthetics)*
3) Mutual affection, love, friendship, cooperation *(Cooperation)*
4) Just distribution of goods and evils *(Justice)*
5) Power and experiences of achievement *(Accomplishment)*
6) Self-expression *(Self-expression)*
7) Freedom *(Freedom)*
8) Peace, security *(Security)*
9) Adventure and novelty *(Novelty)*

The words in italics indicate how we will refer to these values in the rest of this article. We will conceive of privacy, which is not mentioned by Frankena as a separate intrinsic value, as a value contributing to the value security.

The TA2 ("Together Anywhere, Together Anytime") Project

TA2 was a design-driven research project in which some forty people from fourteen organizations (ranging from large companies and smaller enterprises to universities and research institutes) developed and evaluated several innovative, telecommunication, multimedia, and gaming applications. The project's goal was "Making communications and engagement easier among groups of people separated in space and time" [18] or, more specifically, to develop and evaluate ICT applications that help groups of people to engage in social communication while they are separated in time or in space. TA2 stands for: "Together Anywhere, Together Anytime." Togetherness was a key value in the project.

The applications that were developed combined high-quality audio and video communication, online gaming and social networking, and sharing multimedia. The (group-to-group) applications were intended as alternatives or supplements to the many applications that are available for (one-to-one) communication between individuals. The TA2 project followed a human-centered design approach [6], [16], [17] and promoted early user involvement—the active and creative participation of potential users in the early phases of a project [7], multidisciplinary teamwork, and an iterative process of research, design, and evaluation.

In our reconstruction, we focus on designers' intended values and on users' aspired values—and on the differences between these sets of values. The reconstruction is based on participant observation; one author participated in TA2 as a project-team member.

Designers' Intended Values

Interestingly, the concept of togetherness was not defined precisely beforehand. Rather, the concept of togetherness was explored and further developed during the project.

Designers' intended values were studied by interpreting the findings from a two-hour workshop in which some thirty project-team members discussed togetherness—the project's key theme. In this workshop, they first wrote their comments on sticky notes, discussed these with each other and clustered them into categories. Interestingly, the project-team members—many of whom have technology-oriented backgrounds, such as computer science or electronics engineering—were able to mention a wide range of values. Not only values that are related to the products in TA2, but also values related to people's daily lives, and not only values related to *using* products, but also related to *being* part of a group, such as group membership, and related to *doing*, such as caring for others.

Their comments included elements of togetherness (shared interests, shared emotions, shared identity, group membership), and examples of togetherness (companionship, fun, competition, cooperation). Their remarks can be mapped upon many of the categories of values listed above: *enjoyment, aesthetic experience, cooperation, accomplishment, self-expression, security,* and *novelty.* Values like *justice* and *freedom* were not spontaneously expressed or discussed.

A further study of designers' intended values was conducted by interpreting the original descriptions of the five demonstrators that were going to be developed in the TA2 project [18], [19].

- Space Explorers: a cooperative game—partly virtual, partly real—which, for example, two families can play (synchronously) when they are in different locations.

- Sixth Age: a series of casual games which, for example, older people can play, so that they can combine playing games and social communication.

- Jump Style: an application for two-way audio and video communication which, for example, teenagers can use to create

> ## Cooperation is a key value for the TA2 project.

and share video clips when practicing Jump Style

- MyVideos: an application for creating and sharing (asynchronously) video compilations of an event, using video clips made by various people at this event.

- Connected Lobby: a TV-based social networking application that helps people to initiate and social communication by sharing status updates or context information.

Designers' intended values were assessed by identifying key terms in these five descriptions and then grouping these into the nine categories of values—see Table 1. It can be observed that *cooperation* is a key value for the TA2 project: all five applications intend to promote cooperation as a way to foster togetherness. Several other values are mentioned in many of the five applications:

- Enjoyment: having fun or experiencing ease-of-use, which is especially relevant for applications that focus on (synchronous) togetherness through shared activities, such as Jump Style, Space Explorers, and Sixth Age.
- Aesthetics: creating or viewing video clips.
- Accomplishment: learning new skills or creating media.
- Self-expression: creating media or sharing information, which is especially relevant for applications that focus on (asynchronous) togetherness through sharing media or information, such as MyVideos or Connected Lobby.

Table I
Values (Rows) that are Mentioned in the TA2 Demonstrators' Descriptions (Columns)

	Space Explorers	Sixth Age	Jump Style	MyVideos	Connected Lobby
Enjoyment	Play; engaging	Play	Have fun	Experience an event; easy-to-use (semi-automatic editing)	Easy to use (semi-automatic sensors)
Aesthetics	Game (partly online); immersive		Video clips; see and hear (audio and video comm.)	Watch video compilations (narratives)	
Cooperation	Play together; cooperate	Social communication; conversations	Dance together; share; communication; cooperation	Shared collection (of video clips); jointly experience (an event)	Share (status updates, context information); motivation to communicate
Justice		Easy-to-use (equipment)			
Accomplishment	Shared goal		Competition; learning	Create and edit (narratives)	
Self-expression		Story telling; create (decks of cards)	Create (video clips)	Create and edit (narrative)	Share (status updates or context information)
Freedom					
Security				Secure; closed group; privacy	Closed group; privacy
Novelty	Novel interaction methods		Creatively; challenges		

Furthermore, it can be noted that some values are specific for only a limited number of applications, such as *security*, which is key for MyVideos and Connected Lobby (sharing personal media or information), or *novelty*, which is key for Jump Style and Space Explorers (creative and innovative ways of interacting with the system). Moreover, it is interesting that justice was referred to only once, in the description of Sixth Age, and that freedom was not explicitly referred to in any of the application's descriptions.

Users' Aspired Values

Users' aspired values were studied by interpreting the findings from interviews with families in the Netherlands, Sweden, the U.K., and Germany (in each country, five families were interviewed). In these interviews, people discussed their daily lives, their experiences in relation to togetherness and their usage of ICT, with a focus on social communication, audio and video communication, playing games, and sharing emotions. In addition, they discussed sketches of the TA2 applications and explored the possible benefits and disadvantages of using these applications.

Four issues emerged in these discussions. First, people argued that for applications that are based on real-time ("synchronous") communication, such as Jump Style, Space Explorers, or Pairs, people still need to plan and coordinate, despite the project's ambition to let people experience togetherness "anytime." Second, they drew attention to how different people may prefer different communication media. For example, younger people may prefer text messaging or instant messaging, whereas older people may prefer using the phone or email. They advocated accessibility for diverse people. Third, privacy and security concerns were

discussed, with a focus on using these applications in the living room (which is experienced as a private space), on using these applications with diverse family members (where you may want to protect the younger ones or the older ones), and how they would like to be in control when systems do things semi-automatically. Fourth, they remarked that these systems and applications should be easy-to-use, so that people can easily integrate using them in their daily lives. These findings drew attention to users' perspectives on values like freedom (suitable

for diverse people), justice (accessible for diverse people), security (living room context, younger and older family members, semi-automatic functions), and enjoyment (ease-of-use).

In addition, users' aspired values were studied by interpreting the findings from a series of focus groups in which the five applications were discussed with five different target groups (early user involvement). In these focus groups, people's current practices, needs and preferences were explored in relation to one of the TA2 applications, and one application—in the form of drawings—was discussed in order to evaluate it from (potential) users' perspectives, and to gather input for further development. Please notice that relatively small numbers of users participated in these focus groups—which were design-oriented, generative and qualitative in nature, rather than

evaluation-oriented, summative and quantitative, which is typical for the early phases of design [17].

The users' remarks and comments are discussed – and confronted with the designers' intended values – in Table 2. In some cases the confrontations occurred during the focus group. In other cases the confrontation occurred after, for example, in a project team meeting in which the focus group's findings were discussed.

Space Explorers

A focus group was conducted with three members of a board

> A friction exists between designers' understanding that togetherness can be best achieved via cooperation, and users' understanding that togetherness can be experienced rather well via competition.

game club, during one of their weekly meetings. Their first reaction was that Space Explorers is a cooperative game, which—in general—they found less appealing than competitive games. They remarked that they can very well experience togetherness while playing a competitive game: the fun of playing board games is in the game *over* the table (in the dynamics between the players), and not necessarily in the game *on* the table (in the game itself). This illustrates a friction between designers' understanding of togetherness and their assumption that this can be best achieved via cooperation, and users' understanding of togetherness and their experience that this can be done rather well via competition.

The board game club members valued their current practice of sitting around one table and, taking that idea rather literally, made a sketch of what they would like:

Table II
Values (Rows) that People Mentioned in the Family Interviews and in Discussions of the TA2 Demonstrators (Columns)

	Family Interviews	Space Explorers	Sixth Age	Jump Style	MyVideos	Connected Lobby
Enjoyment	Ease-of-use	Playing together (game over the table)		Joint activities	Need for control	Need for privacy and control
Aesthetics		"As if one table"; shared, tactile experiences		"Natural" communication		
Cooperation	Need to plan and coordinate	Competition (game on the table)	"As complement, not replacement"	Group-to-group	Need for privacy	Requires effort
Justice	Accessible for diverse people		Broader target group			
Accomplishment						
Self-expression					Need for privacy	
Freedom	Suitable for diverse people			Freedom to explore and invent (vis-à-vis creating a flexible system)		
Security	Living room context; younger and older family members; semi-automatic functions					Need for easy to use
Novelty	Adopt only if added value in daily life					

a set-up in which the video screen (for communication with the people at the other location) and the multi-touch table (for playing the game itself, partly automated) are very close to each other, so that the screens between the two locations seem to disappear and the two tables merge into one virtual table. That way they would be able to experience togetherness between the locations, as if they sit around one table, as they currently do.

Taking this idea further, they remarked that they would miss the tactile experience of touching and feeling the board game's physical objects. This remark helped the project-team members to further develop tactile "mini-games" which can be played at both locations, in order to facilitate shared activities during the game.

Sixth Age
For the evaluation of Sixth Age's series of casual games, a combination of workshops and interviews were organized, involving twenty older people at three activity centers. Older people come to these centers for shared activities like baking, singing, gymnastics and playing games. A recurring theme in these workshops and interviews was that they were not very eager to try out new things, unless they perceived clear benefits. They were, for example, enthusiast about enhancing sociability and about having tools to communicate more often with their children and grandchildren.

Furthermore, they liked the idea of playing games as a trigger—"as an excuse," as one remarked—for initiating communication. At the same time, they

stressed that they would not like to see face-to-face communication replaced by mediated communication. Rather, they would like to see mediated communication as complementary. Their remarks drew attention to their need to socialize, and their fear that they will become isolated.

The project team members working on these applications chose to cooperate with older people who are relatively healthy and socially active, that is, with the ones who visit these activity centers. One could argue that the project should focus also, or even more, on people who are less healthy and more isolated, because these people would benefit even more from a system like this. However, the project team members justified this choice, arguing that it is appropriate to cooperate with this specific group of healthy and active people during the early development, as long as the applications that are developed are also appropriate for a broader target group, including people who are less healthy and more isolated. This approach is one possible way to cope with access and inclusiveness. It is more practical to cooperate with this healthy and active group, but the project's ambition is to make the results accessible to a larger group (including less healthy and more isolated people).

Jump Style

For Jump Style, two focus groups were organized, each with four teenagers. Their first reaction was to compare it to applications they already know, such as instant messaging (MSN) or audio and video conferencing (Skype), and to question the added value of Jump Style. However, during further discussion, they came to appreciate its added value: it offers group-to-group communication (rather than one-to-one); it offers "natural" communication, via audio and video (rather than via text); and it

facilitates shared activities (rather than, e.g., watching television passively).

They also remarked that they value freedom: they would prefer a flexible system that allows for diverse applications, not just this one application for dancing Jump Style. Project-team members explained that the project did not intend to develop one specific application, but that this application was just one demonstration of a generic system. Here we see a friction between users'

and designers' understanding of freedom. Users are looking for freedom to explore and to invent alternative applications, such as doing homework together, whereas project team members intended to facilitate freedom by creating a flexible system and modules, with which they could build different applications.

Another difference in values was about costs. The teenagers anticipated the system to be expensive, based on the large television screen in the drawing, and they speculated that there would be only one system in each household, probably in the living room. This would hamper using it for outdoor activities or for activities without family as witnesses. The teenagers would like to have a cheaper and more portable system which they can have for themselves and take with them.

MyVideos

Two focus groups were conducted, with a total of five parents with children in high school, in which their current practices of making and editing videos were

discussed. They saw the value of such videos for different people: for themselves, as records of their children growing up; for the grandparents, especially when they live further away or abroad; and for their children, now and for later. Many record videos. But only few make the effort of collecting and editing the material into compilations. This is interesting, because the idea of MyVideos is to make this process less cumbersome by allowing people to collect material also

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from others and to have MyVideos make personalized compilations semi-automatically.

A recurring theme in the discussions was people's need for control and for privacy. For example, they valued having control over who can access which parts of their video material. They valued having control over what the system does when it creates compilations semi-automatically. Some of them were unsatisfied with similar semi-automatic features in photo editing applications. Their remarks illustrate a conflict between sharing, ease-of-use, and having control. The designers intended to give them ease-of-use by allowing the system to do things semi-automatically. In addition, some parents anticipated feeling lack of control in comparison to their current ways of working with their own video material in the form of physical tapes or disks, which they can touch physically. In contrast, MyVideos would work with digital files ("somewhere on the Internet"), created and owned by different people. Furthermore,

some parents imagined the risk of videos with their children in it being shared over the Internet in unpleasant ways. Their remarks illustrate a conflict between two values: self-expression and privacy.

Such remarks helped to be more specific about users' values regarding control and privacy—more specific than general concerns regarding control and privacy. Moreover, their remarks draw

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attention to conflicts between values like enjoyment (ease-of-use), cooperation (shared collection), self-expression, and security/privacy.

Connected Lobby

Two focus groups with a total of eight people were organized to evaluate Connected Lobby. Most people appreciated the notion of group-to-group communication: that people in different locations can share snippets of their lives and communicate with each other.

Furthermore, one group expressed concerns about the effort required to provide status updates (e.g., short messages of one's current activity) or context information (e.g., one's current availability): "Yet another application I will have to use and update." Project-team members replied that one does not have to do all of this by hand, since the system can automatically generate status updates or context information, based on logging people's behavior. This raised questions concerning privacy, for example about the visibility to other people of such automatically generated personal updates or information. This drew attention to the importance of taking privacy seriously

and the need to create easy-to-use tools with which people can control their privacy.

Here we see an attempt to balance ease-of-use and control. In order to make the system less cumbersome to use, the designers envisioned the system doing things automatically for you. In response, people remarked that they would like to be in control. To which the designers replied by envisioning easy-to-use tools by which users can control their privacy, while the system does things automatically in the background.

Discussion

In the TA2 project, we reconstructed designers' intended values and users' aspired values. We made explicit and discussed values which were actually at play during design activities, project team meetings, user studies and focus groups, but which would normally remain largely implicit. Let us summarize our main findings:

■ Users introduced values which the designers had not yet explicitly articulated. They, for example, introduced freedom (flexible system) as an aspired value, a value which they would like to see in the system and the application(s).
■ There were several differences between designers' and users' interpretations of the same value. For example, in a Jump Style focus group, users and designers both talked about freedom, but users talked about freedom to explore and invent applications themselves, whereas designers

talked about freely combining building blocks.
■ Users were able to provide concrete examples of how values can play out for them. This should not be surprising, since they are "experts of their experiences" [15] and are able to communicate their experiences, needs, and preferences. For example, in the Space Explorers focus group, the members of the board game club had a lively discussion about playing cooperative and competitive games, and about physical and virtual games. And in the MyVideos and Connected Lobby focus groups, people described in detail their needs and preferences in relation to control and ease-of-use, and privacy and self-expression.
■ There were conflicts between values. For example, in the focus group about Space Explorers, it became clear that the designers' intention of facilitating togetherness by offering a cooperative game ("the game on the table") was different from the users' experiences of togetherness by playing competitive games ("the game over the table"). And in the MyVideos and Connected Lobby focus groups conflicts became clear between experiencing control and ease-of-use, and between privacy and self-expression. Conflicts can thus take (at least) two forms: users and designers can disagree about which values are (most) important, or different values can conflict, in that they cannot be realized simultaneously.
■ Furthermore, it appears that some values received more attention than others in the focus groups. Values like enjoyment, aesthetics, and cooperation were discussed more frequently than values

like justice, accomplishment, freedom, and security. This difference can be explained by the nature of the applications and demonstrators, which focus on social communication and cooperative game play, and which would easily trigger conversation about enjoyment, aesthetics, and cooperation. Accomplishment, freedom, and security, on the other hand, are less likely to be discussed explicitly in focus group sessions like this.

These findings help to identify the added value of making explicit and discussing values early on in the design process:

- Discovering aspired users' values that were not (yet) articulated by the designers can enable designers to take these values into account early on in the project.
- Not taking designers' or users' values at face value, but studying and discussing these values in detail can help designers to explore different interpretations and nuances.
- Users can provide examples of what specific values mean to them practically and how technologies can help them to achieve those values. This can help designers to better understand users' needs and preferences, and to become more specific about their intended values early on in the project, when their ideas are still relatively abstract.
- Early identification of conflicts between values is beneficial because designers and users can then jointly start looking for ways to balance their respective values and to create a better match between these different sets of values.

Although our description of the TA2 design process was produced with hindsight, it nevertheless only took into account the earlier stages of design, before a prototype or product had been developed. The designers' intended values were explored by interpreting descriptions of the applications when there were only drawings. The users' aspired values were explored by interpreting their remarks during interviews and focus groups in which they discussed current practices and several drawings. This suggests that the approach can also be used prescriptively or proactively in the early stages of design.

Making values explicit in design is not entirely new. It is being done, for example, in the "laddering" interview technique [10], in which interviewer and respondent explore and draw a "hierarchical value map" which consists of a number of ladders (or association networks or means-end chains), which represent relations between ("lower") product attributes, product benefits, and ("higher") values in people's lives. Also in *value sensitive design* [5], values are made explicit and are discussed between actors and stakeholders.

We have added to this a focus on the relation between designers' intended values and users' aspired values. We provided an approach for the early stages of design in which no prototype or product is available yet.

Our suggestion to make explicit and discuss values should be seen against the background of the traditions of participatory design [12] and co-design [11]. Our suggestion can also be seen an example of how to create a "third space" [9]: a shared space between designers and users in which they can express and discuss their values and concerns, in which they can cooperate and negotiate these in an iterative process.

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Implications for Design

Although our study was exploratory, we would like to invite design practitioners to try and make explicit and discuss values in their own design projects. Based on our study, we would recommend the following activities:

- Designers and developers can articulate and discuss their own intended values, e.g., by asking themselves which values they are trying to embed into the products they are developing. This will make designers more aware of their own ambitions and agendas.
- Designers or, for example, user researchers can explore and study users' aspired values by conducting observations, interviews or focus group discussions. This will make designers more aware of users' values, and their needs and preferences.
- Designers or, for example, project managers can organize discussions in which designers' values and users' values are discussed. This can help them to discover and take into account users' values (which may not yet be on the designers' radars), to discover different interpretations and meanings of values, to understand the practical implications from

> # This approach can be used prescriptively or proactively in the early stages of design.

users' perspectives, and to balance conflicts between values.

- Designers and other project-team members can engage in iterations of research, design and evaluation, in order to improve the match between designers' values and users' values. In such iterations, project-team members can change or further develop the product, or change or further develop the project's goal, based on discussions with users, which would be in line with the principles of human-centred design [6].

Design is Beset with Values

Through a detailed analysis of the TA2 design project, we have shown that design is beset with values from the start. Often, however such values remain implicit and are not explicitly articulated or discussed in design projects.

In the TA2 project, we were able to identify as much as nine intrinsic values which played a role in the design process. Although these nine values were largely shared between designers and users, we have shown that in some instances designers and users had different interpretations of the same value or disagreed about the relative importance of the values at play. Making such differences explicit helps to improve the design decisions and makes the design process more transparent and better attuned to the values of both designers and users.

All in all, we have illustrated the benefits of making values explicit during a design process and of facilitating discussions of values between designers and users. This can help designers to better understand their own intended values, to learn about users' aspired values, and to create a better match between these sets of values. One can articulate and discuss values in the early stages of a project in order to maximize the benefits of such an approach.

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