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Putting Values in Context; an augmentation of Value Sensitive Design (VSD)

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Abstract: It is increasingly recognized that human values play an essential role in engineering design. Recent literature in the ethics of technology has focused on spelling out the role of values in different engineering fields. As a well-established approach, Value Sensitive Design (VSD) aims to systematically integrate human values into technologies and engineering products. However, there is significant attention to stakeholders in VSD; how contexts may affect what (and then how) stakeholders perceive as values deserve more attention. Furthermore, there is an implicit tendency to universality in the studies of VSD, and it is often implicitly assumed that values have the same meaning in different contexts and cultures. Therefore, while the concept of cultural relativism and its difference to universalism has been taken into account, I aim to criticize current stands toward conceiving values in the VSD literature. I propose paying explicit attention to the contextual sense of values, namely the interpretation, prioritization and perception of values that have their basis in the specific contexts in which they are implemented, for instance, in a specific cultural or religious setting. Building on the proposed categorization of contextual sense of values in which their evolution has shown, I aim to shed light on what these contextual senses entail and how an explicit focus on contextuality could improve VSD. Finally, it will be argued that contextually looking at VSD have two main gains: first, it can lead to engaging more comprehensive ranges of stakeholders in the design phase of technologies, and second, make VSD more flexible in dealing with the different contexts/cultures.

Keywords: Human Values, Contextual Values, Value Sensitive Design, Value-laden Design of Technology

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1. Introduction

Human values play a crucial role in the design and use of engineering technologies and artifacts. They have been investigated in a wide range of technologies such as information systems (Winkler & Spiekermann, 2019), Human-Computer Interaction (HCI) (Friedman, 1999; Friedman et al., 2002), Information and Communication Technology (ICT) (Ahmed, 2013; van den Hoven, 2007), nano-pharmacy (Timmermans et al., 2011), care robots (van Wynsberghe, 2013), energy technologies (Correljé et al., 2015; M. Dignum et al., 2016; Oosterlaken, 2014), AI systems (Umbrello & van de Poel, 2020) and social media and social networks (Cotler & Rizzo, 2010; Zolyomi, 2018). Different approaches have been proposed to investigate the role of values in the design and application of technologies. The most established methods for integrating values in the design and use of technologies are Design for Value (DfV), Values and Design, Value in Design, and Value Sensitive Design (VSD), with VSD typically considered as the most prominent approach (Friedman et al., 2013; Nissenbaum, 2001; van den Hoven, 2007). In the literature on VSD, the formative role of context on how a value is embedded in a certain technology and perceived by its users has received only limited attention. In contrast, context can shape the reception of values and

may affect or even transform the cultural, economic, and societal conceptions of values. Thus, designers, decision-makers, and policymakers should give the contextual interpretation and perception of values more importance in their designing practices/approaches to design. This paper aims to add this contextual focus to the literature on VSD.

In this article, I distinguish between a generic sense of values, as those interpretations or definitions of values that are more or less the same in different contexts, and a contextual sense of values, highlighting the contextual delineation of values that could be different in other contexts. First, let's take a short look at the notion of context. The notion of context may convey different definitions, depending on the studies' topics and realms. For instance, context can address any specifications of time, location (geography), culture, identity, and activity are some notions that can be considered when I address the context (Abowd et al., 1999; Zimmermann et al., 2007). The working definition of context used in this study equates context with culture. I am arguing that the contextual interpretations of values are different from the generic ones. I argue that this paper is not the only (or first) paper that invites the designers/developers of technologies to contextually look at the values. One of the latest considerations of the context in the realm of value-laden design of technologies is the notion of 'changing values' which address the change of priorities, engagements and conceptualizations of the values. I argue that it is a kind of contextually looking at the values when time applies to the notion of context (van de Poel, 2018). It should be mentioned that in the notion of 'changing values', time is not the only aspect of but the most pivotal one.

Regarding the mentioned differences in the interpretation of values, this article introduces a categorization in which the emergence of the contextual sense of values may be understood. For instance, some values may be perceived differently in different contexts of traditions, religion, culture, and customs. With some studies pointing out that there is a tendency to treat values in a universalist sense in the VSD literature, I argue that the VSD literature could benefit from a more carefully focused examination of the role that context plays in how technology-embedded values are implemented and perceived (Umbrello, 2020). It seems that our new augmentation would make the VSD, as a global-known approach, more flexible in dealing with different contexts as well as increasing the adaptability of technologies for different contexts. Lack of such flexibility may lead to misunderstanding of the requirements of contexts in terms of technologies and unsuccessful involvement of emergent technologies in the hosting contexts.

This article aims to contribute to VSD by highlighting the role of contextual interpretation of values in VSD. This paper presents different ways in which values could be interpreted differently or change in the new context (for which they have not been primarily designed). To do so, I will take a close look at the importance of the contextual sense of values and VSD and the potential role of contextual senses of values that they can play in various technologies in sections II and III, respectively. In addition, I will review how values could depend on the context, while section IV presents a list of instances in which values could depend on the context, providing examples of such contextual dependence. The last section of the article is dedicated to the discussion and conclusion.

2. Value Sensitive Design (VSD)

Historically, VSD is the first systematic approach, among other mentioned approaches, to addressing human values in the different steps of technology design. Although it was initially utilized to investigate the human values in Human-Computer Interaction (HCI), it has become popular in investigating values in other technological developments.

VSD studies employ a tripartite methodology, namely, conceptual, empirical, and technical investigations (Davis & Nathan, 2015). The conceptual investigations aim to identify values and stakeholders, including potentially conflicting values and necessary trade-offs. The empirical investigation seeks to capture and analyze human activities in terms of technology values through qualitative and quantitative methods. Finally, the

technical methodology helps designers understand how the existing technology may support or hinder specific values (Friedman et al., 2013).

As many as 17 methods for VSD are mentioned by Friedman & Hendry, which have been proposed by different scholars (2019). Each method may be applied for various purposes. In other words, different aspects of the engagements of technologies and values, such as stakeholders and value tensions, can be investigated by these specific methods. Moreover, some specifications of technologies, for example, communication, are another feature that can be studied via a particular method in VSD (Davis & Nathan, 2015). For instance, Davis and Nathan (2015) have introduced 'Envisioning Criteria and Cards' as a proper method for communication-based technologies.

VSD studies can be divided into two main categories: first, research that investigates the interaction of technologies and values theoretically; second, research that uses VSD to empirically evaluate the status and role of values in technologies. The theoretical studies focus on the basis and conception of values and technologies in VSD. These studies may foster the theoretical foundation of VSD and may assist scholars in finding the proper theoretical approaches toward VSD. For instance, the study in which Jacobs and Hultgren evaluate the necessity of ethical commitment of VSD may be categorized in this group of research (Jacobs & Huldtgren, 2018). The current study is theoretical research in the realm of VSD. Empirical VSD studies investigate the interaction of values, stakeholders, and technologies in a specific technological domain or application. For instance, Dadgar and Joshi (2018) have investigated patients' values in using ICT platforms; their study can be categorized in the empirical category of VSD investigations.

In terms of values, most VSD studies use the generic sense of values which is more or less close to a pervasive and generic definition of values. It means that the scholars consider a (semi) unified meaning for values while the interactions of values and technologies are investigated. For instance, Friedman et al., (2013) define a set of values such as human welfare, privacy, freedom from bias, and autonomy in a generic sense. For example, the value of privacy is defined as: "Refers to a claim, an entitlement, or a right of an individual to determine what information about himself or herself can be communicated to others," and the value of autonomy is defined as: "Refers to people's ability to decide, plan, and act in ways that they believe will help them to achieve their goals" (Friedman et al., 2013, p. 58). On its face, the definitions of the values are close to how dictionaries define them. It should be explained that when I argue for a more contextual view of values, I do not claim that generic definitions of values are useless or that different contexts necessarily require different definitions or interpretations for all of them. To establish the effects of VSD in different cultures and societies, Umbrello (2020) offers a revaluation of moral theory and epistemology. He is enquiring to reinforce the VSD through Moral Imagination Theory (MIT). He argues that "an insufficient account of what constitutes values and moral deliberation" in the literature of VSD can be resolved by theoretical accounts like MIT, in which the engagement of humans into moral theorizing is guaranteed (Umbrello, 2020, p.580).

The importance of a contextual lens on values in VSD has been stressed before. Other scholars of VSD, such as Friedman, Borning, and Muller, have addressed these perceptions of values as an essential part of studies of VSD (Borning & Muller, 2012; Friedman et al., 2013). They argue that most studies of VSD consider values 'universally' while they should be seen 'culturally'. As an explicit instance, Le Dantec, Poole, and Wyche (2009) have proposed a family of methods to investigate the local expressions of values in VSD. Moreover, Umbrello (2020) argues that founders, theorists and practitioners of VSD are affirmed universalism of values. Building on them, I argue that contextual sense toward different values may change the technological designs' details and features. Furthermore, I may capture changes in perception, interpretation, and application of values in the design and use of technologies. Finally, it also can lead to addressing changing value in a specific context.

3. What/Where the Values and Context in the Design Phase are?

Prior to proposing some various definitions of values, let me clarify the notion of value perceptions in this research. First, it should be noted that values are something different from the perception of values. Values entail the universal meanings which are written in the dictionaries and encyclopedias. Yet, I argue that perception of values might be different, individual by individual and culture by culture. Individual perception of values/morality is a psychological/cognitive matter (which locate out of the sphere of this research) (Gantman & van Bavel, 2015). Then, by using the contextual perception of values in this paper, I aim to shed light on the perceived perception of values culturally. In the other words, by value perception I mean what (and how) the values can be pervasively perceived in a specific culture.

Concerning the meaning of values, there are different approaches to the concept of values. The founders of VSD have defined values as "what is important to people in their lives, with a focus on ethics and morality" (Friedman & Hendry, 2019, p.24). Van de Poel & Royakkers (2011, p.72) define values as "lasting convictions or matters that people feel should be strived for in general and not just for themselves to be able to lead a good life or realize a good society." I argue that whether the first or latter definition is accurate, understanding and considering different contextual perceptions of and insights into values in technology design seems mandatory.

Various definitions of context have been mentioned in the introduction section and it is elaborated that context as culture is the working definition of context in this paper. I argue that context can be attributed to, for example, a particular region where people live with similar cultures, traditions, and customs. It means that those people may have their own values or that generic values have a meaning, interpretation, realization and/or prioritization that is context-specific. I will address all mentioned variations as the contextual sense of values here. I argue that as long as designers are designing/developing technological artifacts/products to use in a particular context, their specific values and their interpretation/perception of values should be respected. Besides and building on Umbrello (2020), I want to emphasize the notion of moral imagination. Moral imagination aims to propose an imaginary for moral reasoning. In other words, there is a cognitive perspective regarding moral reasoning, which may lead to the notion of imaginative rationality. Imaginative rationality is something that adjusts one's moral and behavioural deliberations. I argue that both recently mentioned concepts (contextual sense of values and moral imagination) need to be understood by designers/developers of cross-cultural technologies to help them acquire more insight into the contextual sense of values during the relevant design phases.

Doing so may improve the degree and rate of integration of technology in a given context. Moreover, from a more pessimistic point of view, it draws attention to the misuse of technologies for contexts that they were not designed for. These ideas can be seen as one of the outcomes of the fusion of technologies and cultures, something Verbeek has mentioned as a consideration of technology (Verbeek, 2011). So, I argue that designers cannot take a neutral or agnostic stance toward the contextual sense of values once their designed technologies may potentially be used in different contexts. The different contextual senses of value may change the status and applicability of a technology, which, in turn, may impact society. Consider Information Technology (IT) and communication systems and their impact on the values of privacy, autonomy, and democracy. Different senses of the mentioned values are articulated when social media and social network platforms are utilized in different contexts (Deb, 2014).

The extended taxonomy of contextual sense of values and concrete instances will be described in the next section. It may show the importance and applicability of the contextual sense of values.

4. The Dependency of Values on the Context in the Design of Technologies

I argue that values may be perceived differently in different contexts and may lead to varying receptions of technologies. Here, one should be aware of cultural relativism, which might be interwoven with "moral relativism" in some respects (Tilley, 2000). Cultural relativism may be defined as the view that different moral principles (judgments) are valid in different contexts. In other words and according to cultural relativism, moral judgments are culturally relative. However, neither in the value for design approaches nor this paper is this view is taken. Instead, the contextual sense of values proposed in this paper aims to shed light on the different realization, prioritization, and interpretation of values without assuming different moral principles. Instead, I have assumed that moral principles are universal and acceptable across different contexts in the introduced concept.

In addition, it should be noted that whilst cultural relativism can be viewed as the negation of universalism, our critical view of universalism does not mean that I embrace cultural relativism. According to some scholars, universalists argue that culture is irrelevant to moral rules/rights. At the same time, cultural relativists understand it as a concept that has a "sole source" in the culture in which it has developed (Donelly, 1984). The problematic matter here is the notion of "sole sources". I argue that considering cultures as the sole sources of moral rules/rights, as cultural relativists hold, would be debatable. In other words, people should not be encouraged to "merely" accept their moral rules/rights. However, they can take their own (contextual) realization, prioritization and interpretation of values. It is the crucial difference between cultural relativism and our definition of contextual sense of values.

To elaborate the claims, suppose the robot and robotics as one of the novel and revolutionary technologies. Some studies have shown that the differences in context have led to differences in the robots' reception and expectation. In this research, I propose that values may depend on the context in some ways. In doing so, and to elaborate on the mentioned definition of contexts, I aim to introduce a taxonomy that the contextual sense of values may be developed through its items:

1.The values in context X and Y are the same, but their realization is different due to a difference in context, so that we should have a different design (of the same technology) in context Y than context X.

Values are more or less abstract concepts. So, they might be realized in different contexts, in different ways. It leads to different designs of technologies because various technologies embody different values, which can be realized differently across contexts. Such differences might be rooted in traditions, customs, cultural background, or even societies' needs. For example, suppose the value of autonomy. Friedman et al. (2013, p.58) define this value as: "people's ability to decide, plan, and act in ways that they believe will help them to achieve their goals". This value may well have the same conceptual meaning in different contexts, both in developed countries and developing countries. However, I argue that based on socities' background, the realization of these values in the mentioned contexts would be different. For example, the realisation of the value of autonomy in a context where the freedom of access to information is already realized will be markedly different compared to a context where access to information is unavailable due to cultural and/or political reasons. The mentioned difference may affect the design and development process of social media/networks. Since a) people need to have accessibility to information to decide, plan and act awarely and b) one of the essential intentions of design and introducing social media/networks is enhancing peoples' information, considering differences in design and development of social media/networks seems crucial.

As another instance, consider AI systems. AI developers use different datasets to train the AI systems. Different datasets may lead to a better and more reliable trained system in which algorithms work more accurately with better performance. Yet, there is a problem, and that is (social) biases in datasets (V. Dignum, 2019; Floridi et al., 2020). Many scholars of human-AI interactions have declared that datasets have inherent biases

which affect the results and, therefore, the performance of AI systems. The biases or preferences in collecting data and setting up a dataset might impose some invisible impacts on the AI systems due to AI's "black box" character in decision making (V. Dignum, 2019). I argue that if we assume contextual bias based on differences in datasets and developers' insights, using various (contextual) datasets might lead to the different realization of bias across multiple contexts.

2.The values in context X and Y are the same, but their priority or relative importance in context Y is different from context X.

Different contexts might prioritize different values in various ways. It can be rooted in sociocultural, socioeconomic, or even political concerns. For instance, take the value of accountability. In developing countries, accountability has not received attention as much as in developed countries, especially in crucial sectors like education (Kim, 2009; Mbiti, 2016). In other words, social justice, socioeconomic and sociocultural issues, and other issues that might be imposed on the contexts can affect the priority of values among the people. So, we can see that the priority of these values is dependent on the context, not only through the traditions and costumes but also through political and economic situations. I argue that it affects the design of technologies because designers, as direct stakeholders, are supposed to consider the desired values (and intended priorities) of users as other stakeholders. According to the abovementioned circumstance, it is assumed that the design of educational web-based platforms is contextually different.

While previous prioritization of values concerned the different priorities of values in different contexts, we can imagine another sense of different prioritization and importance of values; I call it "different amount of values in implementation". It refers to varying expectations of contexts from a certain technology in accommodating a particular value. For instance, let us take a look at the value of autonomy in robot technologies. The designers should implement a higher level of artificial intelligence in the robots, which may be used in the American context due to a lower perception of autonomy of robots among American people than, for example, Japanese people (Nomura et al., 2008). It means that robots designed for a specific context, here in Japan, should be more autonomous than the robots designed for the US people. It means that the value of autonomy, which is dedicated to the technology instead of the individual, can also be implemented differently in different contexts.

3.The values in context X and Y are the same, but some of these values have a different meaning in context Y than in context X.

This contextual sense of values is the most common one that may make sense to many designers and scholars. As an example, assume the value of privacy in different contexts. This value has a specific interpretation in the context of Iran. Privacy can be divided into four main dimensions: informational, physical, societal, and psychological privacy (Zabihzadeh et al., 2019). In this study and to illustrate the differences in the interpretation of the value of privacy, our focus will be on the informational and physical dimensions. Informational privacy refers to an individual's right to provide personal information to others regarding how, when and to what extent. Physical privacy defines the degree of accessibility of an individual to others. For example, through the personal information I prefer to be protected on the internet is categorized in informational privacy, and individuals' privacy in their homes, papers etc., is defined as physical information. While the physical aspects of privacy in Iran are similar to global ideas about physical privacy, there are disparities in how informational privacy might be viewed.

Iranian may consider "familial privacy" and family-centered living as a vital part of privacy, while western cultures insist on personal privacy (Zabihzadeh et al., 2019). I argue that it refers to differences in the realization of the value of privacy. In Iran, the family is an integral part of society which is rooted in hundreds of years of presence of Islamic thought. So, the impact of this thought reasonably can lead to differences in perception and interpretation of values. As another example and relatively close to the context of Iran, I can mention what Alsheikh, A. Rode and E. Lindley (Alsheikh et al.,

2011) have introduced as privacy in the Arab context. It is totally different from what Friedman, for example, has conceived (Friedman et al., 2013). In the Arab context, privacy is a complicated notion that is somehow overlapped with the concept of "Ikhtilat". Ikhtilat, which has a strong establishment in the Islamic culture, is defined as the regulation in which mixing the sexes should be regulated.

As the mentioned examples showed, designers and developers of technologies should consider the different meanings of values. It is evident that users of technologies use them based on their own meanings of values, not what designers had in their minds.

5. Discussion and Conclusion

Many pieces of evidence can shed light on the importance of contextual sense toward values in technologies, as some of them are shown in previous sections. We can imagine a set of improvements to VSD by taking a contextual sense of values into account in the design procedure.

First, it can lead to engaging a more comprehensive range of stakeholders. I argue that there is a difference between a technology designed based on a contextual sense of values and a technology that takes a neutral stance regarding contexts. First, technology may become more pervasive in a given context than a technology that has not considered any contextual sense of values. I see this ability from the lens of stakeholders. Whether direct or indirect, stakeholders are one of the essential parts of VSD investigation that can be more highlighted through the mentioned approach. Second, engaging more groups of stakeholders may convey two added values for VSD studies: 1. It may lead to more acceptability of technology in a specific context. I argue that a contextual sensed technology can be integrated into a context more easily than technology with a neutral stance toward values. 2. Contextual challenges can uncover the flaws and faults of the perception of values in technology. Contextual examination of technology can reveal the problems and also can hint the researchers to find the solutions.

Second, it can be explained as two different directions regarding the contextual values in VSD. I argue that designers or researchers may encounter the contextual sense of values through two different approaches; 1. As an embedded feature in the design of technologies and artifacts, 2. As flexibility that can be considered in the design of technologies. Their perspectives depend on the technology which is designed. Suppose the artifacts or technology is designed for a specific context and the users are clearly known. In that case, the contextual sense of values should be considered for spelling out design requirements. It should meet all criteria and aspects that van de Poel has introduced in translating values into design requirements (van de Poel, 2013). Otherwise, in case the artifact or technology may not be dedicated to a particular context and maybe be utilized in different contexts, flexibility, which should be added to the design, can work. The flexibility here addresses the adaptability of technologies in various contexts in terms of values. In other words, a flexible technology or artifact would not undermine values in contexts considerably. So, for those technologies and artifacts that are adaptable in different contexts, embedding contextual values into the design or the feature of flexibility would be fruitful.

Finally, the designers and policymakers should be aware of the cultural relativism that might be appeared in the conceptual investigations. Therefore, I aimed to introduce different definitions and realms of the contextual sense of values that should be considered in the design of technologies and the investigations of VSD, whether as flexibility or embedded feature.

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