From *AREA Plus* to *AREAT Plus*: An Extended Framework for Responsible Innovation

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ABSTRACT

The present position paper addresses the question to what extend the Responsible Innovation framework adjusted to the Information and Communication Technology community, namely the *AREA Plus* framework, can be applied to the field of Human-Computer Interaction. An additional component named *transfer* is proposed that aims at fostering the transfer of innovations designed for one target group to another subgroup with similar needs and therefore tries to improve societal equality in the field. This is specifically relevant for User-Centered Design processes, a central approach in Human-Computer Interaction that focuses on specific target groups rather than including a broad variety of users. The *transfer* component extends the *AREA Plus* framework to the proposed *AREAT Plus* framework.

KEYWORDS

HCI, RI, AREA Plus framework, ethics, diversity

Table 1. The component *anticipate*, exemplarily for the *AREA Plus* framework
(from Jirotka and colleagues [6])

	Anticipate
Process	"Is the planned research methodology acceptable?"
Product	"To what extend are we able to anticipate the final product, future uses and impacts?" […]
Purpose	"Why should this research be undertaken?"
People	"Have we included the right stakeholders?"

INTRODUCTUON

In the present position paper, I present thoughts on how to improve Responsible Innovation (RI) applied to the field of Human-Computer Interaction (HCI). I especially aim at addressing the question raised in the workshop proposal: "*How can we evaluate, critique and improve RI applied to HCI and digital technology?*". More specifically, I propose an additional component for the existing RI agenda developed for the Information and Communication Technology (ICT) community, namely the *AREA Plus* framework. The resulting *AREAT Plus* framework is assumed to be more appropriate for the HCI community.

THE *AREA PLUS* FRAMEWORK

The main goal of RI is to foster inclusive, sustainable and socially acceptable research and innovation. In order to put this claim into practice, the UK Engineering and Physical Science Research Council (EPSRC) has developed a framework based on the work of Stilgoe and colleagues [9] that describes four main components of RI: *anticipate* – the impacts that might arise from your research and innovation, *reflect* – on purposes of, motivations for and potential implications of the research, *engage* – with relevant stakeholders and experts, *act* – in order to influence the direction of the research [10]. With EPSCR being an important British Research Council that provides government funds, this so-called *AREA* framework has become highly prominent in Physical Sciences [6]. During the last years, the relevance of RI has also expanded to Life and Computer Sciences [6]. In the field of HCI, there are ongoing discussions on how appropriate ethical guidelines should look like [3]. However, there is criticism that there are only few examples of the successful implementation of these standards into research practice [7]. Therefore, a precise and elaborated RI research agenda for the HCI community would be highly desirable.

Looking at the diversity of the different communities in which RI is of special relevance, the question arises whether the *AREA* framework, developed in the context of Physical Sciences, can be seen as universally valid. Grimpe and colleagues [5] have highlighted difficulties in achieving responsible design according to Stilgoe and colleagues [9] in HCI. Some years later, the same working group showed that the use of the *AREA* framework in its original version is questionable within the ICT community [6]. They interviewed ICT scientists and representatives from professional bodies about their opinion on and the practicability of integrating the *AREA*-components into their designs and developments. The authors concluded that a more detailed version is necessary to account for the discovered concerns and specifically address the special characteristics of the ICT community. For this reason, they developed the *AREA Plus* framework. For each of the four components of the original *AREA* framework, four subcategories were identified: process, product, purpose and people. Due to limited space table 1 presents the resulting matrix of the *AREA Plus* framework with the important guiding questions in each cell exemplarily for the component *anticipate*.

Table 2. *Transfer* as an additional component proposed to extent the *AREA Plus* framework

	Transfer
Process	"What (infrastructure/experts /material/ is required to adapt the product to other subgroups?" "Which methods are appropriate?" "Are methods from other disciplines needed?"
Product	"Which other subgroups could benefit from a similar product?" "How (much) does the product need to be changed in order to fulfill the needs of the subgroup."
Purpose	"How to ensure that the implemented future is desirable for the respective subgroup?"
People	"Who needs to be involved (researchers from other disciplines/ stakeholders to adapt the product to another subgroup?"

TRANSFER: AN ADDITIONAL COMPONENT TO THE *AREA PLUS* FRAMEWORK

Developed for the ICT community, the *AREA Plus* framework also seems to address many problems relevant to the field of HCI. However, in my opinion, the goal of societal equality is not sufficiently addressed through the *AREA Plus* framework in its current version. Therefore, I propose a, in my view, necessary extension of the framework for its application in the field of HCI.

In recent years, approaches like participatory design [1] and inclusive design [2] that aim at including a variety of users gained increasing attention. Another central and widespread approach in HCI is User-Centered Design (UCD) [8]. While UCD involves the users in the whole design process – from assessing requirements over designing and prototyping the solutions to evaluating the outcome -, applying this approach also implies to focus on a specific user group as a primary target group which is addressed in the first place. In order to enhance the UCD process regarding responsibility, I suggest to extend the *AREA Plus* framework with an additional component, namely *transfer*. Most importantly, this component aims at nudging HCI researchers to reflect upon whether their innovation (possibly with adjustments) could fulfill the needs of another subgroup with similar needs and how a transfer from the primary target group to another subgroup could be performed. A first version of the component *transfer* with the accompanying questions is presented in table 2. At best, by having the guiding questions of the *transfer* component in mind, HCI researchers realize that the adjustments required for their innovation to fit another, maybe more specific target group, are smaller than expected. A conceivable example for such a transfer could be an Active Assisted Living (AAL) tool designed for older adults with the aim of reminding them to take their medication on schedule. García-Vázquez [4] for instance presents systems that support strategies relevant to improve the medication compliance in older adults. Transferring this research primarily directed at older adults could also be beneficial for people who suffer from schizophrenia where medication intake is crucial to keep the disorder under control.

In a nutshell, the *transfer* component should raise awareness for the diversity of different people and underline that innovations designed for a specific target group could also be useful for other groups. This ensures to reap full benefits of the innovation in a socially desirable way. Considering the above-mentioned streams within the field of HCI, the relevance of transferring results to diverse groups becomes evident. This underlines that a component that specifically addresses this task should indispensably be a part of a superordinate RI agenda in HCI. The *transfer* component converts the *AREA Plus* framework into the *AREAT Plus* framework.

CONCLUSION

Personally, I consider a careful adjustment of the RI research agenda to the field of HCI as an essential task in the near future. In this context, the proposed *AREAT Plus* framework aims at providing a guideline for transferring innovations to diverse, possibly disadvantaged, user groups,

specifically addressing UCD processes. Furthermore, other topics raised in the workshop "Towards a Responsible Innovation Agenda for HCI" could be discussed in light of the new framework. It could also guide a new interpretation of the "best paper award" at conferences. Instead of only offering a prize for the "best research" which generates the most creative and novel innovations, there could also be an award for the "research best for the world" – of course not to the chagrin of the quality of the research.

My personal motivation for attending the workshop is gaining different perspectives on how HCI and RI can be combined, benefit from or be challenged by one another which will help me to become a responsible innovator myself. During my upcoming PhD, I seek to create responsible contributions to the field of HCI. I am convinced that the workshop is an excellent starting point for this goal. Besides my above described considerations on the workshop questions, I am keen on contributing relevant previous experiences in Clinical and Psychological research and practice to the workshop.

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