

## Designing Robots, Designing Social Practice

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As more and more robots are thought of as solutions to societal needs it seems essential to address important ethical questions to lessen the unforeseen consequences of emerging robots (Lin 2012). Indeed, there seems to be a lack of analytical concepts to grasp how robot technology transforms human activities and professional identities (Hasse 2013: 96) and likewise to comprehend how technology mediates their surroundings (Verbeek 2005). Responding to the mediating effects of robots some scholars call for rules regulating human-robotic interaction (Calo 2014; Darling 2014). Other scholars want to anticipate the effects of technological artifacts by suggesting that designers inscribe ethics into their designs as this is seen as a question of materializing morality (Verbeek 2006: 379; Sullins, 2011).

We appreciate these attempts to mitigate the mediation of automatic systems and the endeavor to build responsible robots, however, we find as the philosopher Don Ihde does, that the use of a technology is “deeply unpredictable and uncontrollable” (Ihde 1993: 37). In fact our extensive empirical fieldwork on the investment in social robotics in the health care sector and in education in the Nordic Countries highlights, that investing in robots is often a case of politicians and managers buying the robots leaving the difficult task of having to conceive how to use them in praxis to professionals (Hasse 2013; Blond & Schiølin 2016). This is particularly distinct when Nordic public institutions try to implement robots designed in Asia where the robots become a site of culture clashes. This emphasizes that the designer cannot control robots and their use, because these robots are co-constructed *in situ* (Alač et al. 2011: 917). The cultural context, as well as the *cultural shaping* (Rammert 2002), of the robots is essential to take into account if we want to understand how end-users appropriate and re-invent technology to adopt it into real life praxis (Hughes 1983; Sørensen 1990; Shove & Pantzar 2005).

Our fieldwork concerning the technological transfer and deployment of South Korean robots in Denmark and Finland stresses the temporal and spatial aspects of the adaptation process. It highlights how the human-robotic interaction can be seen as process of constant re-invention and altering of the robots in order to keep them in use over period of several years (Hasse 2013; Blond & Schiølin 2016). Not only do our empirical findings provide comparative perspectives on the regulation of robots they also suggest that institutions have to be able to handle the multistability (Ihde 1990) of robots by committing themselves to an experimental approach to the integration of robots in society responsibly.

Indeed, if the ideal is to design responsible and understandable robots compatible with the human needs (Fong et al. 2003) then we suggest, that besides from designing the robots the roboticists must also pay attention to the praxis where their designs are to work as the material foundation. In other words the roboticist should be concerned with praxis design (Shove et al. 2009; Korkman et al. 2010).

By acknowledging that designing robots is also designing social practice the roboticist needs to pay attention to the human users, thus keeping the human operators in the loop as so many scholars have stressed the importance of (Norman 1990; Borenstein & Pearson 2012; Mindell 2015). This practice-based approach to robot design seems inevitable if robots should be integrated into society successfully as “the success of new technology depends on how it affects the people in the field of practice” (Woods 1996: 5). But there is likewise an important economic gain of robotic producers recognizing the value of co-creation by participating in user practices (Korkman et al. 2010: 246).

A focal change from technological design to the design of social praxis and the furthering the integration of robots by bringing the roboticists closer to the end-users through comprehensive user studies require extensive modifications of the education of roboticists and engineers and a revision of their philosophy of design as well. These institutional changes should be considered in order to limit unexpected negative consequences of robots implemented in local practices by stressing the importance of designers considering the multiple combinations of humans and robots as these combinations matter (Mindell 2015) and are essential when integrating robots in society.

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