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From Good Ideas to Practical Solutions

The Changing Nature of Participation in Our Evolving Digital Landscape

What are "Good Ideas"?

In August 2017, the IEEE International Symposium on Technology and Society (ISTAS 2017) was held in Sydney, Australia, to encourage contributions on the broad theme of: "From Good Ideas to Practical Solutions." The event, the *Proceedings* of which are available (1), was fruitful in terms of underscoring the importance of "good" design in considering the value of technological solutions, when measured against the potentially undesirable consequences that may ensue as a result of their implementation. This Special Issue is inspired by, and seeks to build on the outcomes of, ISTAS 2017 by bringing to the fore a series of key questions that must be posed, and answered, in the early stages of technology design: How do we develop "good" technological concepts that solve a particular problem or fulfil a defined need? How can these designs be translated into pragmatic technological solutions that are beneficial to individuals and society? How do we detect, plan for, and limit any adverse implications? Are there any additional and perhaps previously unaccounted for considerations, particularly when reflecting on technological developments in fields such as Artificial Intelligence (AI)?

For the purpose of this Special Issue, we commence with a definition of what we perceive to be "good" technological ideas, as: *sound technological designs, developed using participation-based methods, that seek to promote the beneficial uses of technology (through the harnessing of technological potential) while minimizing/potentially eliminating the undesirable effects on individuals and society.* These approaches will ideally lead to the development and deployment of practical solutions that fulfil the need(s) of the intended end-user(s) and/or solve a given problem.

Significance of Participation in Early Design

A core feature of the above definition is the participatory element, which is built on the notion of stakeholders partaking in primary design efforts when a technological solution is initially being conceived. The first article in this Special Issue by Carroll *et al.* highlights the role of users (participant data) in the exploration of design solutions in the cyberspace context. This article follows traditional forms of participation in that emphasis is placed on participant "experiences" as the basis for problem-solving and understanding how individuals can make use of certain design elements for personal navigation online.

However, participation should not necessarily be limited to end users, but may also encompass other actors as is conveyed in the second paper by Abbas *et al.* This article adopts a consultative, stakeholder-inclusive methodology for designing a physical activity application for the early-childhood education sector. It notably describes the requirement to extend participatory design models to include a diverse set of stakeholders, rather than restricting the focus on end users.

Similarly, Pitt *et al.* highlight the significance of "qualitative human values" to socio-technical design. Many governments are using service design models to engage citizens, provide critical and timely content, and also be responsive to citizen needs (participatory design). Challenge yourself by examining the concept of social potential and the counter influences of metrication, commodification, dissolution, indirection, and extraction as discussed

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in "Values, Axial Currencies and Computational Axiology" by Pitt *et al*. We are asked to consider the interdisciplinary complexity of values as they apply to our digital existence. The authors warn of the potential dangers associated with the use of blockchain technology "for implementing electronic forms of social capital," and instead propose the use of axial currencies, developed in a principled way by applying value-sensitive design.

Changes to Modes of Participation

With rapid progress in Artificial Intelligence, the validity of existing participatory design approaches becomes questionable in terms of the nature of participation and the stakeholders involved. We are now encouraged to consider instances of machine learning where patterns are discovered and feedback is used to optimize solutions, whereby embedded participation needs to be examined cautiously. This is indeed the case where there is an overreliance on predictive algorithms, as highlighted in the Leading Edge piece by Bennett Moses. This commentary warns of the individual and societal dangers that emerge with the lack of context when AI algorithms are utilized. We argue that context can be primarily improved from human "experience" through consultative forms of engagement. By extension, policy makers and educators will have an important role in developing algorithmic literacy for decision makers.

While conventional approaches still apply in the AI realm, a primary objective of this Special Issue is to encourage us to be open to new ways of considering existing norms, as participatory thinking is broadened to include non-human actors. For instance, in the article by Chmielewski on the design of ethical Autonomous Weapons Systems (AWS), we are presented with unique philosophical insights, based on three distinctive non-Western ethical perspectives that are yet to be explored in this context. The paper offers comprehensive recommendations relating to AWS design, stakeholder involvement, and the need for stringent risk assessment processes, which can subsequently be factored into engineering-based design methodologies to result in ethically aligned AWS.

The Leading Edge commentary by Arkin questions whether robotic deception is ethically defensible, citing military applications as an example in which it can be justified, depending on whether one holds deontological versus utilitarian ethical beliefs. Arkin examines the issue of trust and the dangers associated with secondary uses of robotic systems, which we perceive as an issue that requires attention early in the design process.

Participation, Design, and Failure

The legitimacy of traditional participatory methods is also tested when considering the concept of design iteration. Typically, design iteration allows for the identification of positive impacts and negative impacts. The surfacing of negative or undesired solutions needs to be recognized and celebrated, which aligns with the articles by Carroll *et al*. and Abbas *et al*. When non-optimal options are identified early in the development process, it provides focus for design improvement. Early identification of issues means that they can be tackled and resolved before high fidelity designs or program coding/architectures are implemented.

A significant area for discussion is failure and iteration in relation to AI, and whether we should "celebrate" failure when it comes to AWS (see Chmielewski article) and autonomous vehicle designs, for instance. This is pertinent in cases where designs are deemed mature for a real-world implementation, as shown in recent examples relating to autonomous vehicle accidents [2], [3] that have resulted in injury/loss of life.

The Future?

This Special Issue acknowledges the practical and diverse approaches to participatory and co-design, which are often situation-dependent and allow for good technological ideas to be transformed into working designs, prototypes, and deployable solutions. It also calls for further assessment of participatory design in the age of AI and artificial "beings," as we can no longer rely on the rigorous testing of operational designs or prototypes. Rather, innovative participatory models should be developed and tested, based on lessons learned from established participatory design efforts.

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