Towards a Future of Increasing End-User Development: Creating Empowered or Over-Burdened End Users?

Monica Maceli

Pratt Institute, School of Information & Library Science
144 West 14th Street, New York, NY 10011 USA
mmaceli@pratt.edu

Abstract. An increasing number of technology users are participating in end-user development (EUD) activities, oriented towards crafting and customizing their technology in use. Embedded within a larger culture of participation, these activities open up exciting possibilities for end user empowerment and creativity, but new challenges have emerged as a result. End users are now threatened by participation overload, as activities once driven by personal motivation alone shift away from optional and become a potentially burdensome duty. This position paper suggests several research questions oriented towards understanding and managing participation overload, as well as reports ongoing research work exploring these important issues; these topics are vital to the future of EUD and core to the concepts of the Cultures of Participation in the Digital Age workshop.

Keywords: culture of participation · end-user development · participation overload · Cultures of Participation in the Digital Age

1 Introduction

As the theme of this workshop emphasizes, the increase in co-creation tools and the growing *culture of participation* surrounding information technology has yielded many benefits to both individuals and society, changing our norms, assumptions, and expectations around technology use. As with the earlier paradigm shifts in personal technology that have preceded this stage (e.g. desktop personal computing gave way to mobile and ubiquitous computing) associated tradeoffs have emerged in parallel, across the technological and social dimensions. Both good and bad, these dramatic changes have set the stage for challenges and unintended consequences, as well as highlighted our shifting relationship with technology. Historically, technology has served to automate and augment our abilities, but these capabilities were often only available to the technological elite. In today's world, a computer with capabilities that were unimaginable several decades ago can be carried in one's pocket and the rise of ubiquitous computing and the Internet-of-things has expanded the place and very identity of computing devices.

In such a complex landscape, many technologies seek to meet the needs of their users with little customization or effort required; "ease of use" remains a strong selling point for end users. Widely popular areas of research and practice, such as user experience and human-computer interaction, ensure that user interfaces are intuitive, low-effort, and accessible to users. Indeed the historic focus of fields such usability and human-computer interaction were to *minimize* cognitive and physical effort on the part of the end user, such that systems become "invisible" in use.

In contrast, during largely the same period, a culture emphasizing *self-service* and *DIY* (do-it-yourself) activities emerged and was realized in everything from grocery store self-checkout lines to Arduino microcontrollers. This broad democratization of technology had numerous direct benefits to end users and developers alike, and facilitated end users moving beyond the role of simple user of technology. End users that wished to build, craft, mash, and create now had viable information technology to support these activities, on a much broader scale.

And herein we see the long-standing promise of *end-user-development (EUD)* – to provide those users that wish greater control and creativity the tools and ability to do so. As best said by Ivan Illich, these *convivial tools* would "give each person who uses them the greatest opportunity to enrich the environment with the fruits of his or her vision" [8]. In the current state of technology, we have achieved immense progress towards this utopian vision of technological tools and the roles they play in our lives. Hardware, software, information, and access have been radically restructured and opened to new levels of growth and participation. As Benkler identified, new and exciting information production models have emerged in this increasingly ubiquitously networked environment [2]. Ideas of end-user development that were simply not possible a few decades ago have become a reality.

However, along the way, the line between empowered and over-burdened has become blurred and easily crossed for end-users, with troubling tradeoffs beginning to rear their heads. Jaron Lanier [9] identifies potential troubling unintended consequences in a world in which end users increasingly contribute their information, ideas, and time to information systems, particularly social networks, without compensation. These concerns and others indicate that the move towards increasing end user participation, in whatever fashion, arrive in tandem with serious social, economic, and political consequences. This position paper explores related research questions of interest to the Cultures of Participation in the Digital Age (CoPDA) workshop and the field of EUD more generally.

1.1 Motivation

As the research questions associated with the CoPDA workshop suggest, many new issues and concerns have come to light as EUD activities became increasingly possible (and perhaps even required in certain circumstances). The concept of *participation overload* in the context of information technology is one that would not even have been feasible several decades ago; the tools and opportunities for end users to participate in design, development, and customization activities were limited. Fischer [6] identified *participation overload* as a serious concern when an increasing

number of individuals are called on to participate in end-user development activities, particularly those that are not personally meaningful.

Today's end user, with little more than an Internet connection, has available to them a unending wealth of software, tools, educational materials, examples, documentation, and forums in support of nearly any end-user development activity they may choose to undertake. For such users, one might consider the EUD movement to be a resounding success. Of more concern are those end users pressured towards this "self-service" model of information technology, with relatively little internal motivation and thus a great susceptibility to participation overload. For end users in a world where customization and crafting have become the norm, we must also provide meaningful experiences for those wishing to simply play the role of user, without a need to move towards performing the role of end-user developer to achieve their goals.

2 Research Questions

This position paper seeks to explore the concept of participation overload as a consequence of increased engagement in EUD activities, posed in the context of this workshop by the guiding question of:

- *As end users contribute more of their time and engagement, do participation and collaboration overload pose serious problems to EUD activities? If so, how can these issues be avoided or minimized?* These questions suggests a need to fundamentally reevaluate what EUD *activities* are commonly taking place, who are the *participants* contributing to these activities, and what are their *motivations and attitudes* towards such work.

In pursuit of this larger research question, many sub-questions are suggested to the EUD research community that are worthy of future (and continuing) study:

- *What is an appropriate balance between those playing the role of user and of end-user developer at any given time?* In any given system supporting end-user development activities, at any moment in time, some users will gravitate towards playing the role of end user while others will shift towards end-user developer. This question seeks to build an understanding of the most efficient or viable proportion of end users to end-user developers. This also builds our understanding of an appropriate design for an end-user development tool or system, including a means of identifying what level of participation may be or become burdensome.
- *What attitude shifts towards technology use arise when EUD activities move towards participation overload?* Identifying the point where participation overload becomes an issue, as well as the surrounding change in attitude towards such systems, is core to understanding and supporting users in whichever role they feel most comfortable in playing at that moment.

- *How can the creators of EUD tools be sensitive to participation overload and design to minimize such situations?* Relating closely to the preceding research question, designers of EUD tools must carefully approach the design process and question long-standing assumptions about who will participate in EUD and what their motivations might be. They might also consider how such burdens can be distributed across a wider community and thus minimized on an individual level.

3 Current Research

Several of these concepts and research questions are in the process of being explored through ongoing research, described further below. In addition to being highly relevant to the workshop's topic, they are important to the continuing study and evolution of EUD as a field.

In the context of participation overload, several projects are currently underway with relevance to this growing area of study. First, preliminary research exploring attitudes towards technology in relation to EUD activities, focuses on a group uniquely vulnerable to such participation overload, that of library and information science (LIS) professionals and students in training. As detailed in a paper reporting initial research findings [10], current LIS professionals are increasingly involved in classically studied end-user-development activities. This often includes activities such as creating mash-up web applications, using APIs, creating maker-spaces, working with linked data, and using or modifying open source software [e.g. 3, 5]. These professionals may have little formal background in computer science or programming [4] and incoming students in this area often lack direct interest in developing technology, though their future roles increasingly involve a broad range of information technology skills and knowledge [e.g. 11]. The future goals of this study include assessing end-user development tools to build an understanding of how the design of such tools can shape end user attitudes towards technology and willingness to engage in EUD activities more generally. The intention is then to incorporate research findings and tools into educational practices for training such students.

Secondly, the explosion of growth and innovation in the area of web design and development has yielded a diverse set of tools for participating in end-user development activities relating to web-based software. Surveying such tools can provide a useful baseline to the EUD community in understanding the types of activities end-user developers are currently participating in, of particular importance given the rapid change in this technological landscape. Much EUD literature has historically focused on the desktop computing environment (e.g. in word processing or spreadsheet tools), with new research necessarily moving towards addressing web-based and ubiquitous computing tools (particularly in the context of the *Internet-of-things*). This study also has potential to contribute to understanding participation overload, by more clearly defining the volume and nature of activities end-user developers are currently undertaking and the context and motivations of these activities.

4   Workshop: Cultures of Participation in the Digital Age

The Cultures of Participation in the Digital Age (CoPDA 2015) workshop provides an ideal environment within which to explore the above research questions (and revisit them over time), as well as foster further research collaborations around ongoing projects. Additionally, the larger context of such end-user development activities also requires inquiry and reflection over time; this workshop would serve as a useful starting point for such considerations. The concept of end-user development, and the assumed relationships to and with technology, has been discussed in literature for many decades (e.g. from Alexander's [1] ideas of a culture of participation to Henderson and Kyng's [7] early writings on tailorability). In a time when many users engage with systems in a participatory manner, we may be reaching a tipping phase in the evolution of the field of EUD. The fundamental assumptions that EUD activities are ones that are actively chosen by the user to engage with may be false. A grudging participation in EUD activities may be indistinguishable from enthused creative EUD activities, from the standpoint of the researcher or tool designer. Furthermore, these contributions have value, to both individuals and society, but may be increasingly commodified in troubling ways [e.g. 9]. As researchers and practitioners, we must reorient our understanding of the role and purpose of end-user development in today's participation-infused technology landscape to fully support our users.

References

1. Alexander, C.: Notes on the synthesis of form. Harvard University Press, Cambridge, MA (1964)
2. Benkler, Y.: The Wealth of Networks. Yale University Press, New Haven (2006)
3. Breeding, M.: Library technology: The next generation. Computers in Libraries. 33, 8, 16-18 (2013)
4. Emanuel, J.: Digital native librarians, technology skills, and their relationship with technology. Information Technology & Libraries. 32, 3, 20-33 (2013)
5. Engard, N. (Ed.): More library mashups : exploring new ways to deliver library data. Information Today, Inc., Medford, New Jersey (2014)
6. Fischer, G.: End-user development: from creating technologies to transforming cultures. In: Dittrich, Y., Burnett, M., Mørch, A., Redmiles, D. (eds.) End-User Development, pp. 217–222. Springer, Berlin, (2013)
7. Henderson, A., & Kyng, M. (1991). There's No Place Like Home: Continuing Design in Use. In J. Greenbaum & M. Kyng (Eds.), Design At Work: Cooperative Design of Computer Systems (pp. 219-240). Hillsdale, NJ: L. Erlbaum Associates.
8. Illich, I.: Tools for Conviviality. Harper & Row Publishers, New York (1973)
9. Lanier, J.: Who Owns the Future? Simon & Schuster, New York (2013).
10. Maceli, M.: Instilling a Culture of Participation: Technology-Related Skills and Attitudes of Aspiring Information Professionals. 5th International Symposium on End-User Development, (in press)
11. Mathews, J. M. & Pardue, H. (2009). The presence of IT skill sets in librarian position announcements. College and Research Libraries, 70(3), 250-57.