Cultivating a Culture of Participation for the Co-Evolution of Users and Systems

Federico Cabitza[1], Daniela Fogli[2], Antonio Piccinno[3]

[1]Dipartimento di Informatica, Università degli Studi di Milano-Bicocca, Milano, Italy
`cabitza@disco.unimib.it`
[2]Dipartimento di Ingegneria dell'Informazione, Università degli Studi di Brescia, Brescia, Italy
`daniela.fogli@unibs.it`
[3]Dipartimento di Informatica, Università degli Studi di Bari "Aldo Moro", Bari, Italy
`antonio.piccinno@uniba.it`

Abstract. User diversity and co-evolution of users and systems are two important phenomena usually observed in the design and use of IT artifacts. In the last years, End-User Development (EUD) has been proposed to tap in these phenomena, by providing mechanisms that support people, who are not software professionals, to modify, adapt, and even create IT artifacts according to their specific and evolving needs. However, to motivate and sustain these people, a culture of participation is necessary, as well as proper meta-design activities that may promote and maintain it. This paper focuses on the theme of cultures of participation in EUD settings; to this aim, it presents four main roles, including that of maieuta-designer, as the "social counterpart" of the meta-designer. Then, it describes how the maieuta-designer is in charge of carrying out all those activities that are necessary to cultivate a culture of participation, by means of proper tools that are briefly introduced in the paper.

Keywords: End-User Development, cultures of participation, co-evolution, meta-designer, maieuta-designer.

1   Introduction

IT artifacts are usually designed as products (commodities) rather than as ad-hoc projects, that is for end users that do not form a uniform population, but that belong to different communities. This happens for example in CRM systems, electronic patient records, and CAD systems, just to name a few. Moreover, each end-user community is often characterized by user diversity, due to users' different physical and/or cognitive abilities, experiences, responsibilities, and work contexts. As a consequence, IT artifacts should be designed to be very flexible, in order to be easily adapted to the specific needs of the user communities and, hopefully, to be personalized by the users to better fit their evolving needs. In fact, end users are a "moving target", since they evolve by using software systems, and, to satisfy new users' needs, designers must make systems evolve. This phenomenon is called co-evolution of users and systems and it denotes the

variety of situations where users evolve by using software systems, and, to satisfy new users' needs, designers must make systems evolve [1].

End-User Development (EUD) has been proposed as one possible solution to cope with user diversity and co-evolution, since it encompasses techniques that allow end users to modify and extend their own IT artifacts without necessarily the intervention of the software developers. However, this requires to "cultivate" a culture of participation, in order to motivate and sustain end users in their contribution to system evolution so as to avoid the risk of participation inequality [2] and replicate the current gap between IT professionals and end users at the shop floor level. The meta-design paradigm aims to make "users to become co-designers at use time" [3], but yet it seems to have neglected some important aspects that might make it more operative in real settings, like its relationship with activities promoting a culture of participation. Therefore, in this paper, we would like to investigate how to extend the original proposal of meta-design with mechanisms that are more specifically aimed at cultivating a culture of participation and thus enabling a suitable environment for the sustainable co-evolution of users and their systems.

2   Ecology of Participants in Co-Evolution of Users and Systems

In EUD literature, two main roles are usually highlighted, that of *end user* and that of *meta-designer.* Traditionally, the end user is considered a passive user of an interactive system and consumer of its products and services. However, end users are increasingly more required to act as active contributors at use time, thus becoming "producers" of contents and functionalities, like in Wikipedia, Youtube, Scratch, SketchUp, and many others [4]. Such an "active" end user is called in literature in different ways: "power user" [5], "local developer", "gardener" [6], "end-user developer" [7], "bricolant bricoleur" [8]. To disentangle this variability of names, we have proposed to refer to such a figure with the term *domain developer* [9]. This term has been chosen because this person is always an expert of the domain in which s/he works and her/his main goal is more the development of the capabilities available in her/his setting, than just software code (software is never an end in itself, but always a means). Thus, the domain developer subsumes all those roles denoting people in charge of carrying out software development activities (namely, 'actual' EUD activities) without being professional software developers. In some cases, end users and domain developers are roles played by the same person, but in the majority of situations they are played by different people, who may also belong to different communities, like in multi-tiered proxy design problems [7].

The role of meta-designer, on the other hand, is intended for all professionals who are in charge of creating the socio-technical conditions for empowering end users to engage in continuous system development [10]. In other words, a meta-designer "creates open systems at design time that can be modified by their users acting as co-designers, requiring and supporting more complex interactions at use time" [4]. Given
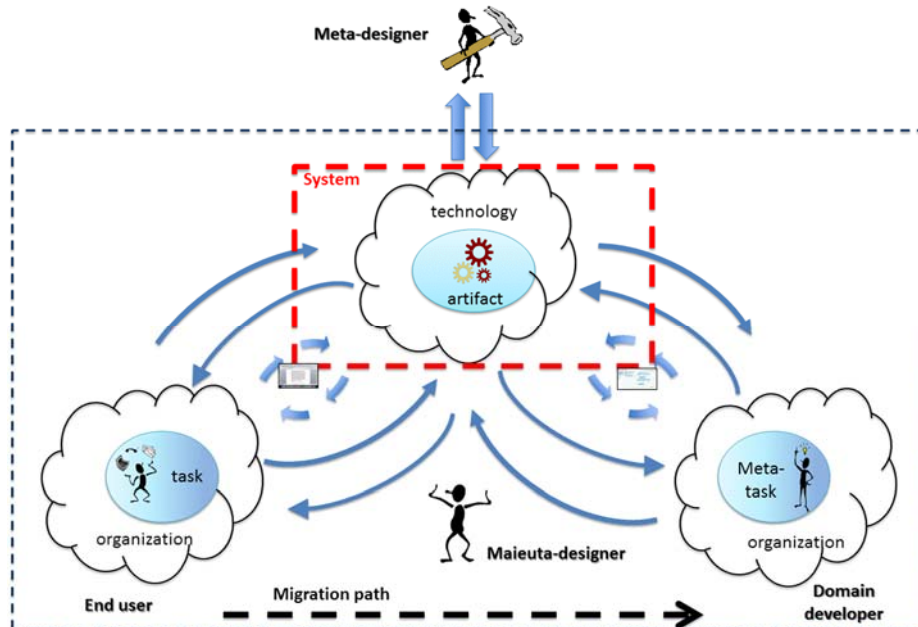
Fig. 1. The four roles in the ICE2 Model.

these definitions, which do not completely clarify the activities a meta-designer should actually perform, we propose to consider also the role of maiueta-designer[1]. Like the meta-designer, also the maieuta-designer can be considered as a role in charge of designing the EUD-enabling environment by which domain developers can build and adapt the artifacts to be used by end users. The role of the maieuta-designer encompasses activities that are involved in the task of supporting the meta-task of the domain developers, namely creating the socio-technical preconditions for: a) having the domain experts appropriate the design culture and technical notions necessary for the meta-task of artifact development and, b) involving as many end-users as possible in the process of continuous refinement of the artifact, by improving participation and "produsage" [11]. For this reason we call such a designer a "maieuta", partly in analogy with the Socratic method of getting people acquire notions, motivations and self-confidence to undertake challenging tasks, and partly in clear assonance with the term meta-designer, of which it is a specialization more oriented to the social aspects of EUD practice than to the technical ones [8].

These four roles – end user, domain developer, meta-designer and maieuta-designer – interact with each other and with the IT artifact and EUD tools and each contributes to the co-evolution phenomenon. Figure 1 presents an extended version of the interaction and co-evolution (ICE2) model proposed in [7], which encompasses all the four roles. Between end user and domain developer there is actually a continuum of roles

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[1] The pronunciation is just like that of meta-designer, but with a *ju* in the middle: ˈmɛtə designer vs. meɪˈjuːtə designer.

that constitutes a rich ecology of participants [4] with different skills towards development, responsibility, appropriation and contribution in the whole eco-system. The meta-designer is focused on designing and providing the most effective EUD tools that may sustain the co-evolution between end users, domain developers and IT artifacts [7]. The maieuta-designer, on the other hand, is supposed to facilitate the migration from the role of end user to that of domain developer along the continuum of roles or at least to enable and empower end users to appropriate and contribute to their IT artifacts, so that they can commit themselves in improving the artifacts as a way to make them more effective and their work more efficient. Whenever an end user is not capable of, or not interested in, "evolving" into the role of domain developer, the maieuta-designer might favor her/his participation in system evolution, e.g., by simply driving her/him to report perceived shortcomings and system faults, and suggesting due modifications and appreciated improvements. The following section provides some further hints on how this task could be performed.

3   Helping End Users Help Themselves

As it has been outlined above, the concept of maieuta-designer requires identifying someone that could make the community gathering around an EUD platform and its IT artifacts progressively more independent of the IT professionals themselves. To some extent, s/he is who guarantees the long-term sustainability of the EUD project. Therefore, this can be an IT professional initially, although endowed with a set of skills that extend the typical IT curriculum (see [8] for a preliminary list of them), but the person acting this role must also think of how to pass "the baton" to one or more "insiders" of the community of end users at due time. These latter ones should be endorsed by the sponsors of the IT project and the organization's top managers, and be chosen on a voluntarily basis also according to their ability and will to encourage colleagues in taking part in the development process. The term "designer" is not out-of-place here, as one of her/his tasks should be to "design" (or better yet co-design) initiatives in which to promote the EUD project, disseminate the underlying values and concepts (i.e., empowerment, co-production, appropriation, co-evolution, produsage, equipotentiality [11], etc.), enroll the more expert ones and enthusiasts and give due visibility of their contributions, and devise simple mechanisms to foster participation and build a real culture of participation. This can be done in many ways: for instance by applying blended gamification, within a competition among colleagues, possibly associated with some reward or compensation policy, e.g., a mechanism by which "the more contributions produced, the higher the rank achieved". Moreover, it can be done by setting up a social media associated with the IT project e.g., a Forum, a Blog, a Wiki, or something that integrates all of these simpler components, in which to ask for content and contributions and moderate communication within this ad-hoc means. In so doing, such a Web resource would flank the EUD platform as an additional "resource for action" [12] and a virtual meeting place where to coordinate tasks upon the EUD artifacts and document/discuss the related procedures, FAQs and use instructions.

Since a maieutic approach is mainly characterized by the fact that it "brings others conceive 'thoughts or ideas'" with questioning [13] (p.35), that is by helping others actively understand by themselves how they could make a worthy contribution to the project, we conclude this contribution by also proposing a tentative list of items. Each item is a question, or better yet a topic, that the maieuta-designer could ask to (or speak about with) their colleagues. This can be done in either small polls and surveys administered through the social media reported above, or in informal but yet scheduled meetings with the members of a specific team at a time, or even in totally informal and extemporous talks had at the coffee break or similar situations.

- "Have you found using the system easy to use so far?"
- "Have you found any error or something you've considered a fault of the system while using it lately?"
- "Have you applied some effective solution or workaround to overcome a shortcoming related to the system lately?"
- "Have you realized to have made errors in the process of either entering or retrieving information from the system?"
- "Do you think the system is requiring you to fill in too many data that are not really necessary to proceed in your tasks?"
- "Since when you've been using the new system, do you think your work load has increased, reduced or it is just the same?"
- "Have you lately experienced problems in the handing over of tasks or in the workflow (like unusual delays, common resources been blocked by other teams and the like)"
- "Do you still use paper and office applications that you believe the new system will (or should) substitute sooner or later?"
- "Do you think that communication within your team, or with the other teams, has changed lately, and if this is the case, it has been either for the worse or for the better?"
- "Since the introduction of the new system, do you think that new people or roles have gained more visibility and power within your organization, at the expense of others?"
- "What's the main obstacle that prevents you from participating more actively in the IT project (like time, skills, the colleagues already involved, a sense of pointlessness, ...)?"
- ..."and what could really convince you to join it, if anything (e.g., explicit acknowledgment by the top management, economic rewards, non-monetary compensations, benefits, social status, ...)?"

The list mentioned above is provided with no aim of comprehensiveness, but just as a first contribution within a research strand that could address more seriously how to contribute in fostering a culture of participation within organizational communities, especially in the context of a digitization project undergone under the EUD and metadesign tenets. Our point is that there is a need to detect motivated people within these organizations, and not only give to the domain developers a set of tools (i.e., the EUD

environments), but also (and above all) precise responsibilities and roles (i.e., the ma-ieuta-designers), and to these latter ones a set of possible actions to undertake and initiatives to foster so that these roles can contribute in building a real culture of participation within their organization and all the actors involved enjoy such a culture within the wider process of co-evolution.

4   References

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