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Understanding the everyday designer in organisations

Ciaran O'Leary

Fredrick Mtenzi

Claire McAvinia

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Ciarán O'Leary(✉), Fred Mtenzi, and Claire McAvinia

Dublin Institute of Technology, Dublin, Ireland
{ciaran.oleary,fredrick.mtenzi,claire.mcavinia}@dit.ie

Abstract. This paper builds upon the existing concept of an *everyday designer* as a non-expert designer who carries out design activities using available resources in a given environment. It does so by examining the design activities undertaken by non-expert, informal, designers in organisations who make use of the formal and informal technology already in use in organisations while designing to direct, influence, change or transform the practices of people in the organisation. These people represent a cohort of designers who are given little attention in the literature on information systems, despite their central role in the formation of practice and enactment of technology in organisations. The paper describes the experiences of 18 everyday designers in an academic setting using three concepts: *everyday designer in an organisation*, *empathy through design* and *experiencing an awareness gap*. These concepts were constructed through the analysis of in-depth interviews with the participants. The paper concludes with a call for tool support for everyday designers in organisations to enable them to better understand the audience for whom they are designing and the role technology plays in the organisation.

Keywords: Design · Everyday design · Academic practice

1 Introduction

This paper builds upon the concept of an *everyday designer* as a non-expert designer who carries out design activities using available resources in a given environment [1–3]. This concept, previously applied to activities of daily living in the home, is used in this case to examine the activities of a diverse cohort of non-expert designers in an academic environment who undertake design activities for a given audience using the available technology. This role, which contrasts with expert designers on one side and end-users on the other side, is largely ignored in the Information Systems literature despite the fact that the design they undertake has a significant influence on the practices which are enacted in the organisation.

The everyday designer in this context is not usually a designer *of* technology. Rather, the everyday designer is usually a designer *with* technology. The outcome of their design efforts is a *practice*, sometimes a *new* practice, sometimes a *changed* practice, sometimes a *transformed* practice. A practice is a socially and materially constituted behaviour which is replicated over space and time. It is comprised of multiple social and material elements, among which technology has received increased attention in recent decades. So-called *posthumanist* conceptions of practice

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such as *actor-network theory* (ANT) [4, 5], *structuration theory*, [6, 7] *human-machine configurations* [8], *mangle of practice* [9], *technology-in-practice* [10] and *sociomaterial practices* [11–13] have looked beyond the human role in forming and configuring practice to analyse simultaneously the material or technological elements which form and configure practice.

Everyday designers have an opportunity to make use of technology as they carry out design, but this requires that they understand to some degree the technology which is already in use in the organisation, the ways that technology is used in the organisation, and the diversity which exists in the use of technology among individuals and groups in the organisation. Unlike expert designers (e.g. software engineers, interaction designers, information system designers), everyday designers tend not to be trained in design and consequently are unlikely to engage in the types of user and contextual research activities that are undertaken systematically by such experts. In the absence of rigorous research activities, everyday designers must find other ways to understand the people for whom they are designing and the social and material context within which they work.

This paper reports on a study which took place involving 18 non-expert designers in an academic environment, specifically focusing on the early stages of design where user and contextual research is typically undertaken [14, 15]. The research question (RQ) addressed by the study was as follows: *How do the non-expert designers participating in the study learn about the people for whom they design and the role technology plays in their practices?*

The aim of the study was to investigate the ways in which the participants developed their awareness, knowledge and mental models of the people for whom they are designing and the way in which those people use technology in their daily practices. The people for whom the participants were designing were academic staff (lecturers, professors) who were using technology in their own practices for, *inter alia*, *teaching*, *research*, *personal organisation*, *communication*, and *collaboration*. The roles occupied by the participants included *course leaders*, *group leaders*, *learning development*, *staff training*, *quality assurance*, *student administration* and *information services*. These non-expert designers work with academic staff on an ongoing basis (to varying degrees) to direct, influence, change, or transform practices such as *communication with students*, *sharing of knowledge*, *course development*, *technology enhanced learning*, and *collaboration among team members*.

The participants were purposefully selected based on their role in the organisation and their daily activities. They were interviewed in-depth, and their interviews were analysed using qualitative methods typically employed in grounded theory studies. The analysis resulted in the development of three core concepts: *everyday designer in an organisation*, *empathy through design* and *experiencing an awareness gap*. The first of these concepts captures the way in which the non-expert designer develops their identity as a designer or a problem solver and the way in which they appreciate their role in the organisation. The second concept, *empathy through design*, describes ways in which the everyday designer learns about the organisation, its technology and its people while they carry out design activities. This process results in diverse and incomplete mental models among everyday designers, in the context under investigation. The third concept,

experiencing an awareness gap, shows how these everyday designers themselves experience a limit to their own knowledge of the organisation, its technology and its people. This gap restricts how the everyday designer can use technology in their design activities because in many cases the everyday designer is unsure of how technologies such as email, Internet, mobile technology, authoring tools, cloud environments and institutional systems are used in diverse ways by their audience - academic staff.

The study concludes with a recommendation for tools to support everyday designers in organisations to develop their knowledge and awareness of the people for whom they are designing and the way in which technology plays a role in the practices of those people. There is a gap in the provision of such tools because there has not traditionally been widespread recognition of everyday designers as designers, and consequently there has not been a need for design tools to support their activities. This outcome is important for the Design Science Research in Information Systems and Information Technology community because it directs focus towards a new cohort of designers and asks researchers to consider how their design roles impact on the enactment of technology in organisations. It is argued elsewhere that despite some notable exceptions [16], the Design Science Research (DSR) community does not pay close enough attention to the people responsible for enacting technology [17] This means that the DSR community lags behind the Human Computer Interaction [18] community and others which have positioned the human at the centre of the design process and developed ways to recognise and respond to diversity in the user population [19, 20]. The research described here seeks to address this issue by giving recognition to the *everyday designer in organisations* and calling for support for their design activity.

2 Related Literature

Wakkary [1] introduces the concept of an *everyday designer* as a type of non-expert designer who extends designs into new uses. The concept is focussed largely on the appropriation of resources in the home and the creative activities undertaken by individuals as part of their activities of daily living [2, 3]. This conception of design is similar to Orlikowski's *technology-in-practice* model in that it centres on the appropriation or enactment of technology by the end user. The use of the term *everyday* implies action by non-experts and on a small scale. This has a clear parallel with activities undertaken outside the home in organisations, where the *creative resources* available to the designer include the formal and informal technologies [24] available in that organisation.

Recognition of the everyday designer in an organisation as a designer requires a liberal interpretation of the term *design*. Such an interpretation aligns with the description put forth by Herb Simon in *The Sciences of the Artificial* [25], now widely recognised as the foundation document for Design Science Research in general. In that book, Simon challenged the view that design is exclusively an activity carried out by experts, arguing instead that "*everyone designs who devises courses of action aimed at changing existing situations into preferred ones*". Famed product designer Don Norman supports this view, arguing that "*We are all designers. We manipulate the environment, the better to serve our needs*" [26]. Ezio Manzini [27] argues from a social innovation perspective

(interestingly, the theme of this conference) that the greatest challenges faced by society can only be addressed by *diffuse design*, whereby competent, non-expert designers are enabled to design solutions on a grand scale. Expert designers, in his view, must take on meta-level responsibilities where they commence the initiatives and provide the design tools that support diffuse design. These include the tools required to understand the goals and practices of the people for whom design is taking place and the nature of the sociotechnical worlds which they occupy.

The everyday designer is engaged in practice-oriented design rather than the design of technology. A practice, it is argued, cannot be designed directly but its components can be designed or configured to influence its dynamics. There are many views on the components of practice, with posthumanist accounts [4–13] recognising the contribution of material to the dynamics of practice. Reckwitz's description of practice incorporating reference to *things and their use* is widely cited:

> *"A routinized type of behaviour which consists of several elements interconnected to one other: forms of bodily activities, forms of mental activities, things and their use, a background knowledge in the form of understanding, know-how, states of emotions and motivational knowledge*" [28].

Things and their use represent the most accessible components of practice for designers. Kuijer [29], citing Shove [30] in discussing the role of the artifact designer in the creation of practice, argues that "*the idea that 'material artefacts configure (rather than simply meet) what consumers and users experience as needs and desires' implies that 'those who give them shape and form are perhaps uniquely implicated in the transformation and persistence of social practice'*". Bjorn and Ostelund [31], in discussing sociomaterial practices, argue similarly that "*the sociomaterial designer can design an artifact but cannot design sociomaterial practices. Sociomaterial practices emerge in practice, and therefore, cannot be designed*". The configuration of practice through material or technology has influenced design in information systems [13], human-computer interaction [32], and computer supported collaborative work [33, 34], but usually from the perspective of the expert designer (which the everyday designer is not) or participatory design [35] (which requires the active involvement of an expert designer). The role of the non-expert everyday designer is not dealt with in these fields.

The non-expert designers in this study occupy roles in an academic setting. They seek to direct, influence, change or transform what academic staff do in their daily practices, and they seek to use the technologies in use by academic staff to do so. They seek, for example, to use the Institutional Virtual Learning Environment to impact on teaching practices, or mobile devices to impact on collaboration practices, or cloud storage to impact on personal organisation practices. They do not design the technology itself but they do seek to design how it's configured, enacted or used by others.

3 Research Setting

This research is undertaken in a large Higher Education Institute (HEI) in Ireland. The Institute (*de facto* university) has approximately 20,000 students and 2,000 staff. Approximately 1,000 of the staff are academic staff, the remainder are non-academic

staff who support the academic mission. The Institute is located on seven main sites across its host city with no central campus. It is due to merge with two other Institutes located in the suburban area outside the city. It has a comprehensive provision across the sciences, engineering, business and arts. While the Institute is primarily a teaching focussed institution, it has a significant research profile with many of its staff active in research centres and groups.

The HEI has invested heavily in the use of a Virtual Learning Environment (VLE) for the support of teaching, learning and assessment activity, which has been broadly but not universally adopted among academic staff. Staff make diverse use of social media and informal tools in their daily activity. Email is by some distance the most popularly used technology, though even that technology is enacted in a wide variety of ways by academic staff. Other than email, it is difficult to identify specific technologies which form a core part of the practices of all academic staff.

The everyday designers who were selected for this study occupy a range of different roles. All are involved in design which is intended to impact on the practices of academic staff, including teaching practice, research practice, personal organisation practice, collaboration practice and communication practice. Figure 1 below lists the 18 participants in this study.

Role	**Count**
Learning Technologist	4
Information Services	3
Learning Development	2
Course Leader	2
Staff Trainer	2
Human Resources	1
Internal Communication	1
Quality Assurance Officer	1
Research Group Leader	1
Student Administration	1
Total	**18**

Fig. 1. Profile of 18 every designers who participated in study

4 Methodology

Qualitative methods typically employed for grounded theory studies were employed for this research. Grounded theory seeks to make sense of a research setting and understand what "*research participant's lives are like*", culminating in an "*abstract theoretical understanding of the studied experience*" [36]. Several versions of grounded theory co-exist due largely to a series of conflicts among the key practitioners [37] since the method was first introduced by Glaser and Strauss [38] in the 1960 s. Kathy Charmaz's version of grounded theory [36] is positioned as an interpretive, social contructivist approach which sees the role of the researcher as *constructing* rather than *discovering* the theory.

This is the approach adopted for this work, in recognition of the fact that the concepts presented were developed due to the researcher's interpretation of the processes observed and made evident through the interviews carried out.

The objective of this research is to describe the experience of the participants as designers, specifically focusing on how they gain an understanding of the people for whom they are designing and their use of technology. Aspects of the Charmaz approach adopted for this work include, open and focused coding of interview transcripts, constant comparison of emerging theory with data, development of concepts and categories and purposive, theoretical sampling. Charmaz sees *memoing* as a vital part of the theory development process, whereby the researcher writes about the emerging concepts and categories in the theory and in doing so develops the theoretical analysis and understanding of the research setting. This was extensively used for the conceptual development of this work.

Data was collected for this research through the use of semi-structured, ethnographic interviews [39]. Interviews serve as a useful method for this type of study because they enable the researcher to narrow the scope and focus of the study as the key concepts emerge. The first stage of our research involved the collection of data from three course team leaders. It became apparent from the analysis of these interviews that their design for colleagues is largely impacted by the design which is undertaken elsewhere among non-academic staff. This led to interviewing of four learning technologists who are directly involved with the Institutional Virtual Learning Environment (VLE). As some key theoretical categories were emerging, data was collected from Heads of Learning Development, staff training and academic quality assurance. Additional data was then collected for comparison from staff involved in design with technology, including information services and student administration (timetabling system). A representative of human resources was interviewed to explore certain concepts.

The outcome of this approach is set of three concepts which describe the experience of the participants in this setting: *everyday design in an organisation*, *empathy through design*, and *experiencing an awareness gap*. Each of these three concepts are described using conceptual diagrams and a brief description (due to available space) in the next three sections.

5 Everyday Designer in an Organisation

The everyday designers in the setting under investigation who participated in the study broadly divide between those involved in *tech-centric* roles and *non-tech-centric* roles. Regardless of role, everyday designers largely do not see themselves as *designers of technology*, In fact, some identify as technophobes. One participant, Michael (a pseudonym, like all other names used in this paper), in a learning support role, identified "*ways of doing it beyond technology*" – identifying himself as someone for whom technology may not play a part in design. Another who uses technology as part of design, Joan, nonetheless commented that "*technology isn't the end in itself*". There is significant variation in technical competence and engagement among the cohort of everyday designers who participated in this study, as fits with even a superficial understanding of

their roles, leading to different emphases on the social, material and technical elements of practice in their design processes (see Fig. 2).

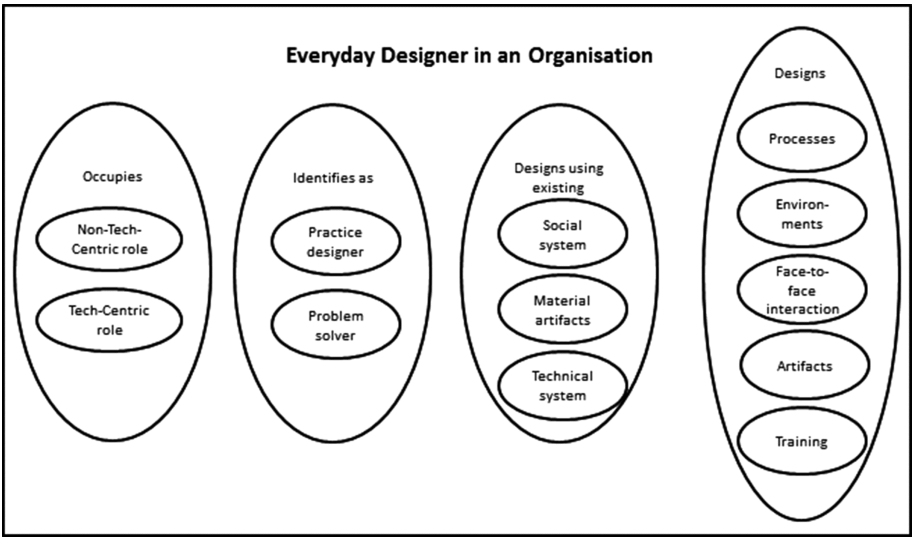

Fig. 2. The *everyday designer in an organisation* concept diagram

The degree to which everyday designers identify as practice designers is variable. For some everyday designers this dominates their understanding of their role – for example those involved in learning development and staff development roles. One participant, Rose – a quality assurance officer, described her objective as "*trying to encourage other staff members to adopt approaches that have worked for different people and to encourage sharing of best practice as well*". A similar point was captured by Eoin, from Information Services, who commented that "*So yes, I'd be trying to change the practices of staff and how they share content with each other and their students*". This contrasted with participants in the study who identified more as *problem solvers*. Dave, also from Information Services, described his activity as "*a lot of the times it is just solving problems rather than being a designer as such*", yet further analysis of this interview revealed circumstances where he sought to control or enhance the practices of academics with respect to their use of technology. In this example, he describes how he makes a decision regarding the practices academic staff enact when controlling their own technology:

> *"So, in that case you kind of, you gauge their level of IT skills and then our knowledge and then you generally give them administrative rights and say, you know, 'You can download this resource, this tool and then install it yourself.'"*

This is easily classed as a different type of design than, say, Gerard, who describes how his objective is to change the mindset of academic staff regarding their role in curriculum design and design of the learning experience:

"So it's trying to get them to see well you're designing your whole learning experience for your students and how do you want that learning experience to be designed, that's kind of a challenge."

The everyday designer may identify as either a *practice designer* or a *problem solver*. In either case, however, the objective is to impact on practice. The opportunity to do so can be undertaken through design of *social*, *material* or *technical* (as a sub-set of material) elements of practice. Indeed, some who had previously largely been involved in design of technical elements of practice observed how their role had evolved to engage with the social elements.

Susan, a learning technologist commented that her role had evolved in such a way that she was no longer involved in the development of artifacts which lecturers use in the classroom, but instead she and her colleagues were engaging with social elements of practice by "*changing our focus then more into supporting lectures doing these kinds of things*". This theme of meta-design through social engagement recurred among other everyday designers, who saw themselves as designing an environment within which academic staff are better enabled to achieve their goals. Gerard, in a learning development role, described his role as one of "*consultant*", whose objective was to change the mindset of academic staff. Michael, who has an objective of developing academic staff's engagement with learning technology describes how he and his colleagues "*still have been quite open to the notion of the organic growth of technology and individual*", and see their role as providing a "*structure*" within which that takes place.

The everyday designers in this study seek to design practice with some focussing largely on the design of social elements and others on the design of material or technical elements. In order to enhance the use of technology in design, everyday designers need to gain a greater understanding of the role technology plays in the practices of academics. The informal process through which they currently achieve this, as discussed in the next section, is captured by the concept *empathy through design*.

6 Empathy Through Design

Users, even users in identical roles, are diverse. They often have different needs, goals, abilities, attitudes, aptitudes, fears, and relationships [20]. They often occupy quite different technical and material environments, even while in the same organisation, in particular in cases where they enact their personal choice of technologies in their practices. The interaction design community has adopted extensive user research methods in their own design processes in an attempt to capture diversity among the possible user community. The everyday designers in this study do *not* engage in extensive user research but instead acquire knowledge about their user population and their use of technology in practice through design. The concept *empathy through design* emerged from the analysis of the interviews with participants in this study, reflecting a co-construction process whereby everyday designers learn about their user population and construct mental models of their user population while designing either in real-time or asynchronously for them.

Figure 3 shows a separation between the *seeing* and *responding* processes engaged by everyday designers regarding the use of technology in the user population. *Seeing* captures the ways in which everyday designers see differences between people in their user audience. *Responding* captures the ways in which everyday designers incorporate what they see into the technical dimension of their design processes.

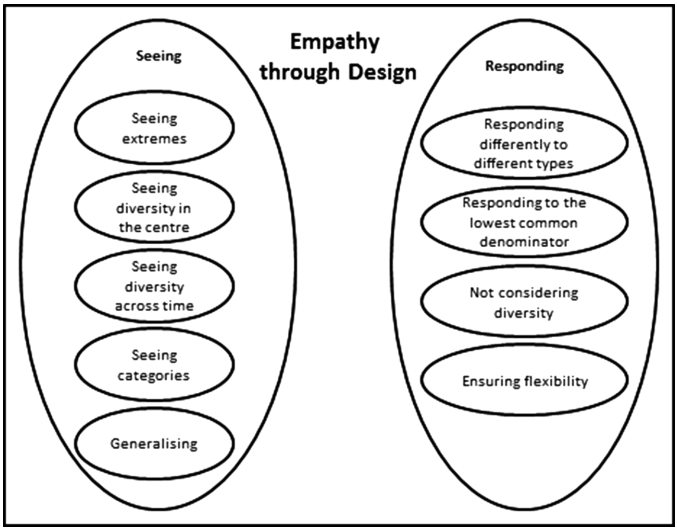

Fig. 3. The *EMPATHY through design* concept diagram

While it is typical for everyday designers to *see extremes*, everyday designers often also see *diversity in the centre*. Everyday designers have a relatively consistent understanding of novices and experts, with both terms or close synonyms being widely used in describing the user population. In describing one scenario involving users requesting control over their computer, Dave commented:

> *"But I have found that dealing with novice users, they don't tend to ask for it, it is really the people who are IT savvy, you know?"*

When asked to describe further what his understanding of a novice user is, he commented:

> *"Your email, your Word, your Excel, they log on to their PC and they access those tools and they wouldn't typically use anything outside of that."*

The sense of advanced users being people who can exercise greater autonomy both with their personal technology and the Institutional systems, is captured in the following response from Roberta, a learning technologist, in discussing the Institutional Virtual Learning Environment:

> *"Biggest difference I would find is that you'll have people who actually know what the tools are, so they come to you with a specific question about the tool itself and how they can use a tool."*

There is a shared sense of what to expect from novice and expert users, without necessarily knowing the specifics of their practices and their enactment of technology. The population in the centre, however, is less straightforward to characterise. John, a staff trainer, commented that:

"I think it is very hard to define an average user in terms of their skills."

and that while the extremes represent points on a spectrum where other users cover "*everything in between*". Dave provided a specific sense of what he considers the evolution from novice to mid-range user to be, in terms of the development of the technical suite of tools used:

"They start broadening the amount of software that is on their system and there would be cloud applications, all these plug-ins and tools and they will start using them…"

The observation of diversity across time and the changing of classifications of users is a common theme, as is a tendency to generalise about academic staff, with reference to "*the vast majority*" by Gerard, for example. Age is widely used as a means to categorise people with assumptions of ability, motivation and interest associated differently with different age groups. Academic discipline is similarly referred to by certain everyday designers in terms of their mental model of academic staff.

The most common response to the mental models developed by everyday designers for academic staff is to *design for the lowest common denominator*. Paul, from student administration, gives a sense of what this means for his approach to design:

"That would be my lowest common denominator and then the people who aren't technologically savvy they have to be brought into it."

Paul recognises the need to design for the lowest common denominator as a limiting factor in design, and regrets that design targets this group to the cost of others:

"Do you know what unfortunately when you're designing the written type of material or the online material I think you're gearing it or you're aiming it towards the lower skilled end as a common denominator."

Another approach, most common in real-time design situations – for example, where a solution to a problem is designed while interacting with the person, is to tailor the response to the individual. This approach requires little in terms of a mental model because the response is tailored to the individual, but such an approach is not possible in non-real-time situations involving, say, the design of artifacts such as training materials. In certain cases, everyday designers seek to adopt a flexible strategy in the design of artifacts, responding to different groups, as described here by John:

"And the approach then is either dealing with it on a one-to-one basis or giving that alternative on an online course, you know, 'click here if you think you know how to', 'click here for the quick way' and 'click here if you need some more instruction.'"

The final strategy, as described by a Mary from the human resources team regarding the system and processes they develop, is to ignore diversity and engage with a generalised, often stereotyped understanding of the user population:

"I think we tend to work around what suits, maybe not us as HR, but what suits the situation or what suits the process that we are trying to develop. Because systems have limitations. But if the

system requires things to be done in a certain way we just need people to do things in a certain way."

Empathy through design describes five different ways in which the everyday designers in this study capture diversity among academic staff regarding their use of technology, and four ways in which this impacts upon their design for academic staff, using technology. The everyday designers' approach to designing using technology for academic staff is, however, limited by the degree to which their design experience has exposed them to knowledge of academic staff and their use of technology. The third core concept, related to this, which emerged from the analysis of interviews and which we explore in the next section is *experiencing an awareness gap*.

7 Experiencing an Awareness Gap

The everyday designers in this study do not carry out user research but instead develop their understanding of the user population by designing for them. This provides rich, authentic, experiential knowledge to the everyday designer, but it also limits their capacity to develop an awareness of the full range of users (see Fig. 4).

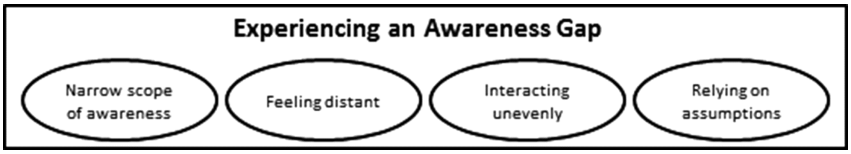

Fig. 4. The *experiencing an awareness gap* concept diagram

A number of reasons for this awareness gap emerged from the exploration of interview data. First among these reasons was the *narrow scope of awareness*. This refers to the knowledge which everyday designers generate of practices which are only directly relevant to the scope within which design is taking place. This may seem appropriate, but it means that designers for *teaching practices* are unaware of the practices engaged in by academic staff in areas such as *research*, *personal organisation*, *collaboration* and so on. This represents a missed opportunity for designers who may otherwise be enabled to leverage a successful practice from a different area to impact on the area within which they're designing. For example, consider Eoin's comment:

"I would be a bit grey in terms of how academics communicate with their students via email. It's not something I would know too much about."

A second reason for everyday designers feeling an awareness gap is due to their feeling distant from the people for whom they are designing. Margaret, whose objective it is to design for the enhancement of teaching practices referred to this distance:

"I'm not great with technology myself but I don't have any judgement in my mind, because actually I don't know the staff well enough in general."

John also referred to the disconnect between those who are responsible for design for academic staff, including software designers, and the academics themselves:

"There is a huge disconnect between the designers of these software systems and the end user who expects an intuitive type of interaction with these things and they're just not that way, they're not designed that way."

A third reason for experiencing a gap is due to the uneven, non-systematic interaction with academic staff. This, obviously, is a consequence of everyday designers often interacting with those who are in most need of support, because direct support tends to play a large role in everyday design practice. Ruth, a learning technologist, commented on how the responsibility was on the staff to make contact:

"No, they ring up and you try to solve the problem over the phone. Others will email you in; they mightn't have a contact number, so they just send them in, the help for them."

Finally, everyday designers may experience an awareness gap because they rely on assumptions about academic staff. Mary commented on how interaction with academic staff was not necessarily a requirement in order to design processes for them:

"We don't actually interact with academic staff to ask them what would suit you, we just implement really"

The everyday designers in this study experience a gap between their awareness of how technology is being used, and how technology is actually being used. This is a gap that can be filled in a number of ways, one of which is through the provision of tools, the initial requirements for which are provided in the next section.

8 Tool Requirements

The Information Systems research community has been very fortunate in recent decades to benefit from high quality organisational ethnographies and case studies of the use of technology in organisations. These studies, however, have not been appropriately diluted and communicated to the people who will most benefit from the practical knowledge discovered. This paper presents a view that these people are the everyday designers in organisations – the people who seek to use the organisation's technology to direct, influence, change or transform the practices of others.

Based on the study conducted and the three concepts developed, a set of 10 requirements are presented for tools which will enable non-expert, everyday designers to gain an enhanced understanding of the people in their organisation and the way that technology is enacted in their practices.

Tool Requirement 1. Tools should be ***accessible*** *to everyday designers, enabling them to easily engage with the tool.*

The everyday designer in an organisation is a non-expert designer, in many cases not even identifying as a designer. He/she will often occupy non-technical roles and engage in design which they consider to be mundane. Tool users should not require

knowledge of skills levels of an expert in order to use these design tools, since it is unlikely that they will seek to acquire these skills.

Tool Requirement 2. Tools should provide everyday designers with ***comprehensive*** *information about the organisation, including relevant aspects of the social, material and technical environment.*

The everyday designer in an organisation is a designer of practices, not a designer of technology. A practice is constituted of multiple elements, including social, material and technical elements. The context provided by these elements are important to ensure that the everyday designer understands how and why practices take place within the organisation, including practices involving the enactment of technologies.

Tool Requirement 3. Tools should be ***reusable*** *for multiple projects, not requiring significant redevelopment or reconfiguration for new projects.*

Design projects often commence with the development and configuration of tools to match the requirements for the project. This configuration can occupy a significant amount of time and often require expertise on behalf of the designer. In the absence of such expertise, tools for everyday design should be reusable with minimal changes across multiple, small scale and diverse projects.

Tool Requirement 4. Tools should be ***reflective*** *of the diversity in the organisation, exposing everyday designers to types of people they may not otherwise be aware of.*

Everyday designers may have a limited knowledge of the people in the organisation and may be unaware of the true diversity that exists among people in terms of their use of technology, their goals and their other practices. Tools for everyday design should ensure that everyday designers are enabled to learn about this diversity.

Tool Requirement 5. Tools should enable ***empathetic*** *engagement between the everyday designer and the people in the organisation.*

Empathy is a key requirement for effective design, enabling designers to predict the effect of the design on future practice. Emapthy can be acquired by direct engagement with people, but can also be acquired through artificial means, as demonstrated by empathy with artificial characters in the entertainment sector. Everyday designers should be enabled to empathise with the diverse people in the organisation.

Tool Requirement 6. Tools should be ***practical****, exposing everyday designers to practices they may not otherwise have been aware of.*

Everyday designers in an organisation can make use of existing practices such as existing enactments of technology for the formation of new practices. Everyday designers should be enabled to identify with appropriate practices with which to work for the creation of new practices.

*Tool Requirement 7. Tools should be **operable**, enabling everyday designers to act upon the knowledge gained about diversity, people and practices in their design activities.*

Once everyday designers gain exposure to the diversity, people and practices in their organisation, they must be enabled to carry out design activities which makes use of the knowledge gained.

*Tool Requirement 8. Tools should be **stimulating**, encouraging creativity in design among everyday designers.*

Everyday designers should be enabled to engage creatively with the environment for which they are designing, exploiting the various resources available in the environment as creative resources for the creation of future practice.

*Tool Requirement 9. Tools should be **credible**, ensuring that everyday designers believe that the information regarding diversity, people and practices is accurate.*

The development of the tool is an activity undertaken by an expert designer, following user research and inquiry into the environment. The process engaged in by the expert designer for the development of the tool, and the output from that process, should be credible to the everyday designer such that they believe the tool to present an accurate representation of the organisation's diversity, people and practices.

*Tool Requirement 10. Tools should be **extensible**, ensuring that they can evolve over time as people and practices change in the organisation.*

It should be possible for the tool, incorporating the representation of the organisation, to evolve as the organisation, its people and its practices evolve.

Tools, in this context, are practical, usable artifacts which incorporate a representation of the organisation, its people and its practices (including the enactment of technology in the organisation). Various methods exist for the development of representations of people and practices [14, 15, 40] and for the presentation of such representation in artifactual form [41–44], albeit not specifically in the context of non-expert, everyday design. The requirements set out here seek to fill that gap and lead to the development of new tools to support the everyday designer in organisations.

9 Summary

Everyday design is an important concept for the Design Science Research in Information Systems and Information Technology community. The everyday designer shares some attributes with expert designers (involvement in design, intention to impact on practice) while also lacking other attributes (design training and expertise, identity as designer). Similarly, end users share some attributes with everyday designers (use systems developed by others) while lacking other attributes (directly impacting of practices of others). Everyday designers seek to use the formal and informal technologies in the organisation to impact upon practice, but may do so without knowledge of the diverse ways in which

technology is used in the organisation and the ways in which technology could be used to direct, influence, change or transform practice. This research recommends the development of tools to address this gap.

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