Resilience in Usability Consultancy Practice: The Case for a Positive Resonance Model

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Abstract. Usability evaluation methods (UEMs) play a central role in usability consultancy practice. Their adoption and adaptation plays an important part in making systems more resilient. There is a knowledge gap in how practitioners adopt and adapt UEMs. Wixon (2003) goes as far as to say that the current literature fails the practitioner. Work reported here builds on qualitative research on usability practice. The conceptual framework of resilience engineering can help bridge this gap. However, resilience engineering is typically focused on avoiding accidents at the lower end of performance: e.g. when system resources are too stretched or when system variability leads to failure. We argue that a better way of conceptualizing UEM use is for the maximization of impact on design at the high end of performance. Here practitioners adopt and adapt methods to resonate with the project, people and practices of the host company under constrained resources. This reasoning leads us to introduce and apply a positive resonance model to capture this perspective.

1 INTRODUCTION

Usability practice has a broad scope: encapsulating ergonomics and human factors work. Common to these practices is the motivation to make systems safer and more usable. A central part of this work is the employment of usability evaluation methods (UEMs) to test how safe and usable systems are, so results can be considered in the design process. Two related problems motivate our work. 1) Wixon (2003) argues that the literature fails the practitioner as academia evaluates UEMs on how many problems they find, while practitioners value methods by what can be done with constrained resources to maximize the beneficial impact on the product. 2) UEMs developed in academia are rarely adopted in practice (Bellotti, 1988; O'Neill, 1998). By understanding UEM adoption and adaptation by practitioners, in their terms, we hope to determine how the literature and UEM development can become more appropriate to practice.

Identifying what is important for the adoption and adaptation of UEMs from practitioners' perspectives has led us to analyse the wider context of usability practice. Furniss *et al.* (in press) report an earlier stage of this project that moved away from valuing methods for the number of problems found towards building a picture of the context in which UEM adoption and adaptation is embedded. Results were reported under four main themes: the methods and processes within the design and business context; the relationships between roles and people involved in the work; issues of communication and coordination of resources and information; and the psychology and expertise of

those involved. The analysis concluded that usability practice is usefully conceptualized from a system level where the goal is to coordinate resources to add value to design.

In this paper, we illustrate how resilience engineering concepts are reflected in the data and introduce the case for a positive resonance model. This builds on the work of Hollnagel (2004) who introduced the concept of how functional parts of a system can be considered to resonate together. This begins to address the need for a system level perspective of usability consultancy practice to understand UEM adoption and adaptation, which will contribute to the development of more resilient systems.

2 METHOD

The work reported here is an ongoing qualitative analysis based on interviewing usability practitioners about their work (the guiding topics of the semi-structured interviews can be found in Table 1). Usability practice in two contrasting contexts are being compared: website design, and safety-critical system development. Fourteen practitioners have been interviewed thus far (10 from the website design context and 4 from safety-critical systems development).

Table 1. Semi-structured interview topics used for usability practitioner interviews

Topic	Description
Background	Background of the person being interviewed. This aims to introduce the interviewee slowly and find out about their experience and perspective.
Work Organization	This includes how work is organized, the structure of the organization, whether there are teams, project lifecycle involvement, and what job challenges are faced.
Business: Client Relationships	This includes communicating with clients, both in attracting clients and handing work off to them. How do people communicate and what challenges do they face?
Practitioner skills	What do practitioners do, why are some better than others and how do they get better in their role? This could give an indication about what is important in their work.
Tools and techniques	What methods are used, how are they used, when are they used, what is valued in a good technique?

Grounded Theory (Strauss & Corbin, 1998) was used for the interviews and analysis: here the interviewees' perspective is put to the fore and theory is developed and tested through iterative interviews, transcribing, coding and analyzing by recognizing patterns in the data. The data builds from the practitioners' perspective and addresses the banality of their normal performances, both recognized as important by Dekker (2005). Resilience engineering presented itself as a potential lever for understanding the data since its conceptual ideas could be 'seen' in the data i.e. the theory captured and crystallized emerging insights.

3 RESILIENCE ENGINEERING LINKS

Five resilience engineering themes have been identified in the ongoing analysis of our data on usability consultancy practice. Each theme is discussed with relation to theory, supporting data and discussion.

1) Efficiency-thoroughness trade-off (ETTO). Theory: Hollnagel (2004, p. 152) and Dekker (2005, p. 144) both quote NASA's "Faster, Better, Cheaper" organizational philosophy to illustrate the problem of multiple competing goals in a system. **Support:** This is evident in usability consultancy practice. For example, one interviewee recognized that a previous company would overwork her to win contracts so she left. She is now in a company that project manages more fairly without staff having to stretch and stretch. It is also evident that usability practitioners want to use more UEMs but are restricted by client budgets and willingness. **Discussion:** This places the project design phase in a position of great importance as this is when options are discussed, plans made, and resources negotiated.

2) Loose coupling. Theory: Grote (2006, p. 116) states that "a core requirement for resilience is to achieve an adequate balance between stability and flexibility in the functioning of an organization." **Support:** This is evident in the labeling of techniques and methods that add stability to a design project, and where their practice can be adapted to suit the context. For example, Heuristic Evaluations (Nielsen, 1994) were reported to be used in an ad hoc manner to support design recommendations, explicitly used to evaluate and compare websites, implicitly used like an expert evaluation, and actual heuristics were sometimes adapted from "Nielsen's ten heuristics." **Discussion:** The loose coupling evident in labeling simplifies communication of project elements and structure to clients. According to our interviewees, novices (e.g. clients) are less able to cope with the details of potential project variances. Labels and prescriptions help overcome this.

3) Adaptability and Flexibility. Theory: This theme is reflected in Sundström and Hollnagel's (2006, p. 253) definition of resilience: to "adjust effectively to the multifaceted impact of internal and external events over a significant time period." **Support:** This was evident because practitioners would often say "it depends…" when questioned about their choice of methods. This alludes to the important contextual factors in UEM adoption and adaptation. **Discussion:** Furniss *et al.* (in press) state that usability consultancy can usefully be considered as a 'plug and play technology'. This is because services are flexible and adapt to the requirements of the project and the client. UEM adoption and adaptation is a negotiation between internal and external pressures.

4) Survivability and Different Dimensions of Resilience. Theory: A theme from the 2nd Resilience Engineering Symposium was that different dimensions of resilience should be considered e.g. survivability of an organization is a balance between not only resilience in safety, but also in economics so it can carry on as a business. **Support**: Respondent quotation: "one of the realities for commercial usability is that products that survive for a long time in a market place have to fulfil both the customers' needs and the business's[…]." **Discussion:** Survivability should consider the safety, usability, and business case. Too much of a focus on one of these could lead to a detriment of the system overall.

5) Local Rationality. Theory: Dekker (2005, p. 60) argues that context is central to the "local rationality principle (people's behaviour is rational when viewed from the inside of their situations)." **Support**: Valuing UEMs in practice has been found to rely on other factors other than the number of problems that can be found. **Discussion:** In a sense Wixon's (2003) argument concerning the lack of relevance of academic literature to practitioners is due to a lack of proper consideration of the practitioners' local rationality. This research aims to provide insight into the local rationality of usability practitioners in their adoption and adaptation of UEMs, and it is proposed that to do this adequately we need a positive resonance model.

4 THE CASE FOR A POSITIVE RESONANCE MODEL

Resonance plays a central part in the systemic Functional Resonance Accident Model (FRAM) (Hollnagel, 2004). An example of resonance common to most people's experiences is a playground swing (Hollnagel, 2004, p. 160). Children soon learn that they have to apply energy at the right moment in the swing to carry the energy through and amplify the swing. In this sense the applied energy 'resonates' with the swing. Children might also decrease the amplitude of the swing by applying energy against its natural frequency of oscillation. Hollnagel (2004, p. 165) then discusses stochastic resonance, which can be described as noise in a system that can be quite unpredictable and enhance or decrease signals depending on its variance; and functional resonance (Hollnagel, 2004, p. 170) which "does not depend on an unknown source but is a consequence of the functional couplings in the system." The FRAM model takes a systemic view of accident prevention by examining the functional resonance between different parts of a system, and looking for critical variances of that system that might resonate in unwanted ways. In this conception of functional resonance, the safe functioning of a system should lie within a certain threshold so it does not become uncontrollable. Some resonance may be beneficial in that the system can learn and adapt from the variance. Generally, however, if functional parts of the system have variance that resonate together then the activity can go over the threshold and the system can fail. Such resonance is therefore generally unwanted.

The conception of a plug and play usability component that adapts to fit the host company, people and project suggests that consultancy practices should aim to positively resonate with them. They should apply their resources at the time and place that maximizes the push on the project. By doing this usability consultancies have better survivability and resilience, and have a greater impact on making systems resilient themselves.

5 SUMMARY

We have created an interpretive bridge between the qualitative analysis of usability practitioners and the resilience engineering literature. This relates to Dekker's (2005, p. 192) statement that "Validation emerges from the literature (what others have said about

the same and similar contexts) and from interpretation (how theory and evidence make sense of this particular context)." We have shown how resilience engineering concepts are reflected in our data and proposed a positive resonance model. This captures the way usability consultancy services adapt and fit the host company, people and project to maximize their impact under constrained resources, therefore being more resilient themselves and creating a greater potential to make systems more resilient.

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