

# Chapter 8

## Workshop on the Integration of User-Centred Design and Agile Development: Approach, Findings and Themes

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**Abstract** This chapter reports on a workshop held at NordiCHI 2014 on the integration of user-centred design (UCD) and Agile Software Development (Agile). The workshop brought together academic researchers and industrial practitioners to discuss challenges, success stories and future trends when working with UCD and Agile. Eight papers were accepted, of which seven reported the results of empirical studies and one presented a theoretical comparison. The workshop day was inspired by Agile methods. It was time-boxed, incremental, interactive, collaborative, used a visual workspace and a team-based approach. Post-it notes capturing features from paper presentations and discussions were written and displayed on the walls throughout the day. These were divided into two groups, one for ‘interesting points’ and the other for ‘challenges and obstacles’. At the end of the day the two groups of post-it notes were themed using an affinity diagram approach. Eight higher-level themes were identified by the authors during a post-workshop analysis. These were: People and roles, Teams and communication, Culture, Methods and practices, Time and synchronisation, Artefacts and tools, Research and problems, and Miscellaneous. Six themes were applicable to both affinity diagrams, the ‘Culture’ theme was only found in the ‘challenges and obstacles’ set and the ‘Research and problems’ theme was only found in the ‘interesting points’ set. Key elements of the themes were about practices, people, culture and time. The workshop illustrates the importance of industry-based empirical research to investigate challenges and innovate solutions for the ever-changing landscape of software development.

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## 8.1 Introduction

User-Centred Design (UCD) and Agile Software Development (Agile) come from strong but distinct disciplines that have their own cultures, histories and practices. Although they share common links, each discipline has developed in different ways and has grown out of very distinct communities. Agile approaches do not specifically mention UCD, and industry practitioners often face difficulties in integrating UCD processes into the very short development iterations that are commonly used by Agile teams. The integration of the two approaches presents practitioners and researchers with many opportunities for innovation, research and discussion.

In this chapter we present a summary of the outcome of the Workshop on Integrating User-Centred Design and Agile Development: Approaches and Challenges, held at NordiCHI in 2014. The workshop addressed a range of issues around the integration including: challenges and success stories from practice; values and perspectives underpinning UCD and Agile in theory; theories and methods relevant for doing research on Agile and UCD; and also future research trends.

## 8.2 Background

Agile approaches such as Scrum, Extreme Programming (XP) and Dynamic Systems Development Method (DSDM), are increasingly widely used in industry [1, 2]. Agile approaches focus on individuals and interactions, delivering working software, customer collaboration and responding to change [3]. UCD enables designers and developers to consider user perspectives when developing software. UCD is reflected in a number of approaches such as the ISO standard 9241–210:2010 for Human-Centred Design [4], contextual inquiry [5], participatory design [6], value sensitive design [7, 8], rapid contextual design [9], and human-centred design [10, 11]. Examples of UCD activities include creating personas to communicate user research, doing field studies to observe users, and usability evaluations for gathering user feedback.

An implicit assumption for many who have adopted Agile has been that it addresses user perspectives better than traditional approaches [12]. However, research has shown that this is not always the case and that the context in which Agile approaches are adopted impacts user involvement [13, 14]. There are a number of challenges for integrating UCD and Agile, including culture, resource allocation, work dynamics, modularisation, documentation, testing and time allocation [15, 16]. A number of research studies have tried to uncover and analyse the conditions under which Agile and UCD work together in order to find

solutions to some of these challenges. Much of this work is based on empirical studies [13, 17–19], but some is based on reasoning and model-building [20]. Four systematic reviews have provided overviews of the literature in this area: in 2010 Sohaib and Kahn [21] included 35 papers in their rather unstructured literature review; in 2011 da Silva et al. [16] reviewed 58 papers, in 2014 Salah et al. [15] reviewed 71 papers, and in 2015 Bhrel et al. [22] reviewed 83 papers. These show that there has been a considerable body of research in this area.

However, challenges remain for practitioners. The rate of Agile adoption has quickened over recent years [1], and it is now considered a mainstream approach. This has resulted in Agile being used in a variety of software development application areas such as embedded systems, large enterprise systems and open source software projects, amongst others. This expansion has resulted in practitioners facing a wide set of challenges such as issues to do with organisation, culture, team management, sustainability and scaling [23].

### 8.3 Workshop Approach

The two goals of the workshop were (1) to identify challenges and success stories when working with UCD and Agile and (2) to identify future trends for research into Agile and UCD. With these goals in mind, the workshop was designed in order to maximise opportunities for engagement, discussion and learning. We gave it an agile flavour by making it time-boxed, incremental, interactive, collaborative, using a visual workspace and a team-based approach. We therefore spent the bulk of the day considering each paper in turn and integrated presentations and discussions.

Eight papers were accepted and presented at the workshop and 14 participants took part (Table 8.1). Paper 1 described open source development for social innovation, paper 2 was about Agile being used by an SME (Small and Medium-sized Enterprise) in the finance domain, paper 3 was about medical device development, paper 4 discussed Agile in medium to large companies, paper 5 was an empirical study completed in the domain of enterprise systems development, paper 6 was based on work done by an industrial research and development lab, paper 7 discussed a one-off development project, and paper 8 compared Agile and Lean in terms of their compatibility with UX design principles.

The day started with introductions. Following this we ran a series of time-boxed half hour sessions during which each paper was presented for 15 min and then discussed for 15 min. The presentations consisted of a 10-min talk followed by 5 min for questions. We set up the room so that participants were grouped around three tables. After the presentation the groups sitting at each table discussed the paper for 10 min, following which each group gave feedback to the whole room and we had a short whole group discussion. During the presentation and discussion participants wrote down any interesting elements on pink post-it notes, and any challenges or obstacles on yellow post-it notes. These were posted onto the back

**Table 8.1** Workshop papers

	Title	Authors and affiliations	Topic
1	Catch Me If You Can: Reconciling Agile and UCD	Silvia Bordin, Maria Menendez, Antonella De Angeli University of Trento, Italy	The integration of UCD and Agile within an open source social innovation project
2	Customer Feedback and UCD in Agile Software Development	Oliver Stickel, Sebastian Draxler, Gunnar Stevens University of Siegen, Germany	Integrating customer feedback and UCD into Agile in a German SME
3	Fast, Faster Agile	Tina Øvad, Lars Bo Larsen, Aalborg University, Denmark	Development of a UCD toolbox to support software developers doing UCD work themselves, in a medical devices domain
4	Integration of UCD and Agile Development: Action Research Can Help	Carmelo Ardito, Paolo Buono, Danilo Caivano, Maria F. Costabile, Rosa Lanzilotti University of Bari, Italy	An Action Research approach to identifying and removing obstacles Agile and UCD integration
5	Beyond the “One Sprint Ahead” Approach: Organizing User Experience Work in Agile Software Development Adapting Scrum for UCD	Kati Kuusinen, Tampere University of Technology, Finland	Problems in Agile UX integration and guidance on rearranging the upfront design phase for UX specialists using a collaborative approach.
6	Adapting Scrum for UCD focused projects: An industry experience perspective	Karin Nilsson Helander, Thijmen de Gooijer, Maria Ralph ABB Corporate Research	Insights into adapting Scrum for UCD focused projects in industry.
7	Attending Experiential Qualities in System Development	Rikard Lindell Mälardalen University, Sweden	Interaction design and programming as craft, and the merging of design and development processes
8	User Experience (UX) Design: Agile or Lean?	Effie Law, Marta Lárusdóttir Leicester University and Reykjavik University	A comparison of Agile and Lean to ascertain which is more compatible with UX principles

wall of the workshop room before the start of the next discussion (Fig. 8.1). Before the next presentation two members of each group moved to different tables so that over the course of the day the discussion groups gradually changed. After all the papers had been discussed the workshop participants divided into two groups. One group analysed the yellow post-it notes and the other analysed the pink post-it notes (Fig. 8.2), using an affinity diagram approach [5, 24]. At the end of the day the affinity diagrams were removed from the wall and typed up.

Several months after the workshop we (the workshop organisers) added three new groups to the ‘interesting points’ affinity diagram due to the large number of



**Fig. 8.1** ‘Challenges and obstacles’ (*pink*) and ‘Interesting points’ (*yellow*) collected during the workshop



**Fig. 8.2** Affinity theming the ‘interesting points’ post-its during the final session

‘miscellaneous’ items. We also moved some items to different groups. We discussed and grouped the affinity categories into higher-level themes for the purposes of drawing out broader topics from the workshop.

## 8.4 Results

We collected 120 ‘challenges and obstacles’ on pink post-it notes and 125 ‘interesting points’ on yellow post-it notes during the workshop discussions. Although one of the workshop aims was to collect challenges and success stories on the pink post-it notes, on the day everyone focused on challenges and not success stories. During affinity grouping the ‘challenges and obstacles’ were divided into 17 groups (Table 8.2) and the ‘interesting points’ were divided into 16 groups (Table 8.3).

We identified eight higher-level themes from the affinity groups during the post-workshop analysis: People and roles (34 post-its); Teams and communication (49); Culture (8); Methods and practice (91); Time and synchronisation (23); Artefacts and tools (16); Research and problems (11); and Miscellaneous (13). Six higher-level themes were applicable to both affinity diagrams. The ‘challenges and obstacles’ set had a ‘Culture’ theme, which was not shared with the other set; the ‘interesting points’ set had a ‘Research and problems’ theme that was not shared.

## 8.5 Discussion

The papers presented at the workshop show the diversity of Agile UCD research, with notable similarities and differences in elements of the work. Of the eight papers, six reported empirical studies (papers 1, 2, 3, 4, 6, 7), one reported findings from empirical work as well as a theoretical model (paper 5), and one was purely theoretical, exploring the differences between Agile UX and Lean UX (paper 8). One of the notable commonalities between the papers was the predominance of Scrum. Out of the eight papers, five were about Scrum (papers 1, 2, 3, 4, 6). Of the three papers that did not focus on Scrum, paper 4 discussed Agile in general, paper 7 discussed Kanban, and paper 8 compared Agile and Lean. The prevalence of Scrum in the papers reflects its popularity as the Agile approach of choice in industry [1].

The papers presented at the workshop highlighted how many challenges remain in this field. Although many familiar issues were discussed – synchronising UCD with software development activities, big-design-upfront, cultural differences between designers and developers, getting the right people on teams – the day focussed on how these challenges are evolving as Agile matures and becomes more mainstream. A notable feature of the work presented was how Agile is now being used in a wide variety of domains.

The workshop approach was inspired by Agile methods. Hence it was time-boxed, incremental, interactive, collaborative, used a visual workspace and a team-based approach. The 30-min time-boxes or sprints helped to shape the working day by giving an equal amount of time to each paper. The approach was incremental in that for each time-box we completed all the elements required for that paper – presentation, questions, discussion and data collection – before moving on to the next session. The equal amount of time given to each sprint gave the day a certain

**Table 8.2** ‘Challenges and obstacles’ affinity groups and themes

<b>Themes</b> (No. of post-its collected)	<b>Affinity Groups</b> (No. of post-its collected)	<b>Example post-it</b> (Paper no., see Table 1)
<b>Challenges and Obstacles</b>		
People and roles (16)	Product owner (8)	<i>Getting access to POs is a challenge (6)</i>
	Roles (8)	<i>User roles: client, end-user (1)</i>
Teams and Communication (33)	Team (7)	<i>Inexperienced team (1)</i>
	Power and relationships (6)	<i>Who’s got the power? Software developer or UX designer? (1,3)</i>
	Communication (5)	<i>Lots of electronic communication rather than f2f (2)</i>
	Feedback (8)	<i>Micro design cycles might require constant access to users (for testing etc.) which might be difficult to achieve (or impossible) (5)</i>
Culture (8)	Teaching and learning (7)	<i>How to get ‘call for tenders’ to understand UCD/UX (4)</i>
	Culture/awareness (8)	<i>Agile comes from software developer culture not UCD culture – less ownership of Agile amongst the UX community (5)</i>
Methods and practices (32)	Methods (10)	<i>Do more prescriptive methods help practitioners (by suggesting good practice) or stifle them (by giving too much detail)? (8)</i>
	Theory and Practice (12)	<i>Adopting a methodology requires adapting it to the peculiarities of the company (3)</i>
	Filtering (10)	<i>Filtering the users perspective to get the ‘right’ product (2)</i>
Time and synchronisation (15)	Time/tempo (10)	<i>Figuring out when to do user research/testing in order to be able to prioritise and estimate time properly (6)</i>
	Synchronising (5)	<i>Synchronisation of implementation, design and test (5)</i>
Artefacts and Tools (12)	Documentation (5)	<i>Documentation practice vs. open source ethics (1)</i>
	Design artefacts (4)	<i>Chunking big idea into manageable and meaningful small units (7)</i>
	Tools/toolboxes (3)	<i>IT that supports the process did not work properly (2)</i>
Miscellaneous (4)	Miscellaneous (4)	<i>The intrinsic difficulty of programming effectively and beautifully (and of designing something beautiful and effective) (7)</i>

**Table 8.3** ‘Interesting points’ affinity groups and themes

<b>Themes</b> (No. of post-its collected)	<b>Affinity Groups</b> (No. of post-its collected)	<b>Example post-it</b> (Paper no., see Table 1)
<b>Interesting points</b>		
People and roles (18)	User involvement (7)	<i>Users: Informant v customer (1)</i>
	Roles (11)	<i>Programmers are creative as well as designers (7)</i>
Teams and communication (16)	Team (5)	<i>Change from beneath (4)</i>
	UX team (2)	<i>UX team using Scrum for themselves (6)</i>
	Pairwise work (5)	<i>Informal approaches worked well – Pair designing; no documentation; ad-hoc intervention (1)</i>
Methods and practices (59)	Internal communication (4)	<i>Communication in open-source project – different needs (1)</i>
	Methods (17)	<i>Clashes in viewpoint are ok (2)</i>
	Organising UCD (10)	<i>Making a working UX design or software in every sprint (5)</i>
	User feedback (12)	<i>Different media to collect user feedback (2)</i>
Time and synchronisation (8)	Developers doing UCD (20)	<i>Teaching developers about UCD techniques (3)</i>
	Time (8)	<i>UX changes over time – temporal aspects (8)</i>
Artefacts and tools (4)	Tools (2)	<i>Git Hub seen as restrictive? (1)</i>
	Documentation (2)	<i>Different sized post-it notes (6)</i>
Research and problems (11)	Research (3)	<i>Agile research for Agile practice (4)</i>
	Problems with agility (8)	<i>Is programming supported as a craft in Scrum/Kanban (8)</i>
Miscellaneous (9)	Miscellaneous (9)	<i>Philosophical reflections on creative products, combining technical, art and design perspective (7)</i>

sense of rhythm – similar to the flow encouraged by Kanban. Work in progress was limited by the focus on one paper at a time, but there was still some multi-tasking. Participants had to write ‘challenges and obstacles’ and ‘interesting points’ on post-it notes throughout each session, take part in the group discussion and pull out salient points for the whole group session – so every participant was actively involved in each part of the process. The whole day was interactive in a variety of ways. We had presentations, small group discussions, whole group discussions, one-to-one introductions and group-based activities. Participants were grouped around three tables for small group discussions after each presentation, but before the next sprint two people moved from each group to different tables. Changing the groups between each session meant that the groups always had a different dynamic and over the course of the day each participant had a chance to talk to everyone else in the workshop. A visual workspace was maintained throughout the day by sticking



post-it note comments onto the back wall at the end of each sprint (Fig. 8.1). The final affinity theming session was completed using the front and back the walls of the room, challenges and obstacles were themed on the front wall by half of the group, interesting points on the back wall by the other half of the group (Fig. 8.2). Standing up to do the theming also introduced some welcome activity at the end of the day.

During affinity theming 17 themes were identified for ‘challenges and obstacles’ and 16 for ‘interesting points’. The affinity group with the most post-its in ‘challenges and obstacles’ was the ‘theory and practice’ group with 12 post-its. This grouping identified a range of obstacles for integrating Agile and UX ranging from broad comments such as *‘Perhaps different Scrum/UX models work in different contexts’* to very specific comments about specific practices *‘Biased views of the developer; to evaluate their own creation is not impartial’*. Other large groups, with 10 post-its, were ‘methods’, ‘filtering’, and ‘time/tempo’. The smallest groups, with 3 post-its, were ‘tools/toolboxes’ and ‘synchronising’. This indicates that much of the focus of the challenges was on fitting the big picture of theory and methods into the lower level detail of day-to-day practices, and innovating new practices that ameliorate the challenges while maintaining an Agile ethos. Some of the challenge areas were familiar such as ‘culture/awareness’; ‘roles’; ‘time/tempo’; ‘synchronising’, ‘design artefacts’. Others indicated that new areas are opening up such as ‘filtering’, ‘feedback’, ‘teaching and learning’, ‘power and relationships’. There was discussion about practices such as collecting continuous customer feedback and the need to filter that feedback in order to make a meaningful contribution to UCD. Other discussions opened up interesting challenges around Agile teams learning UCD techniques, and addressing and understanding power dynamics.

The largest affinity group in ‘interesting points’ was the ‘developers doing UCD’ group with 20 post-its. This grouping identified points from papers 1, 3, 4, 5 and 7, and it included points about individuals *‘Developers want to do UX work’*; team working *‘Pair designing as a phenomenon is interesting; UX person plus programmer’* and organisational set-ups *‘Two types of companies; central group for UCD – large corporations; small corporations with no resources to have a UCD team’*. The second largest group was ‘methods’ with 17 post-its. The ‘methods’ group was also one of the largest groups in ‘challenges and obstacles’. The smallest groups, with 2 post-its, were ‘UX team’, ‘tools’ and ‘documentation’. However, compared to the ‘challenges and obstacles’ more of the affinity groups for the ‘interesting points’ focussed on particular elements of practice such as ‘user involvement’, ‘pairwise work’, ‘internal communication’ and ‘user feedback’. There were many similarities between the themes identified for the two groups of post-its: ‘roles’, ‘team’, ‘methods’, were identical and ‘internal communication’, ‘user feedback’, ‘time’ and ‘tools’ had similar corresponding groups. There was more variation in the ‘interesting points’ post-its than the ‘challenges and obstacles’. In the former group some of the post-its presented challenges, i.e. *‘How do (UX) issues relate to a Scrum backlog?’*, others were philosophical musings, i.e. *‘Is Scrum orthodoxy important?’*, and yet others were expressions of approval, i.e. *‘Involving*

*developers is a very good idea!!*'. The 'miscellaneous' grouping was quite large. This was to be expected, as we wanted to elicit diverse thoughts on the presentations.

We identified eight broad themes (column one in Tables 8.2 and 8.3) after the workshop. These were, in size order: Methods and practice (91 post-its), Teams and communication (49), People and roles (34), Time and synchronisation (23), Artefacts and tools (16), Miscellaneous (13), Research and problems (11), and Culture (8). Interestingly the themes cross both sets of post-it notes, and hence provide a higher-level view of the discussion topics during the day. The largest theme was 'Methods and practice'; this reflects the broad focus of the studies presented on the day, which was about integrating UCD into the structure of Agile approaches, and the practices that make that possible. Second came the two people-centred themes, 'Teams and communication' and 'People and roles'. The position of these themes near the top of the agenda shows that the people-focus of Agile is also essential for UCD and a key element to solving the problems of integration. The other themes identify important aspects of the topic, from 'Culture' and 'Time and synchronisation', both core elements of the design/develop conundrum; to 'Artefacts and tools', the focus of some novel solutions; to Miscellaneous and 'Research and problems', indications of the need for further work.

## 8.6 Conclusions

The workshop provided an excellent opportunity for researchers and practitioners from a wide variety of backgrounds to meet and discuss the issue of integrating Agile and UCD. The presentations, discussions and identification of issues and themes helped participants to successfully achieve the two workshop aims (1) to identify challenges and success stories when working with UCD and Agile and (2) to identify future trends for research into Agile and UCD. Using an Agile-inspired approach made the workshop engaging and fun, as well as enabling participants to identify key findings through the collection of data and the creation of an affinity diagram. The research papers presented at the workshop showed both depth and breadth, and were firmly grounded in empirical studies. Although familiar themes were raised, the findings from this workshop show that the ever-changing landscape of software development work provides new challenges and innovative solutions for designers and developers alike.

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