

Agile UX: Integrating good UX development practices in Agile

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Abstract—This paper explores a framework for the integration of User Experience (UX) in Agile within the South African context. For this study, grounded theory was applied as a suitable qualitative method to determine how the integration of UX into Agile is carried out in practice. The data was collected using semi-structured interviews with professionals working in an Agile/UX environment in South Africa. Further data was collected using questionnaires in order to promote validity and reliability with more information from more participants. The themes that emerged from the study shows that there is an increasing need for UX in software development amongst Agile teams. The findings were used to design a framework to facilitate the integration of UX into Agile.

Keywords—User Experience, UX, User Centred Designs, Agile, Agile UX, Usability.

I. INTRODUCTION

In today's software development industry, more and more organizations are using Agile as a framework for development of software. In 2001, seventeen individuals drafted the Agile Manifesto and created the Agile Alliance which encompassed four key values: Individuals and interactions over process and tools; Working software over comprehensive documentation; Customer collaboration over contract negotiation; Responding to change over following a plan [1]. The group also described twelve principles which place emphasis on frequent customer collaboration and continuous software delivery. However, the method lacks the integration of User Experience (UX) and previous studies advocate that User Centered Designs are not adequately catered for in the development cycles.

Studies conducted by Kuusinen, Mikkonen [2] suggest that practicing Agile methods alone does not ensure that UX requirements are met. As a result, this has sparked an interest in combining Agile methods with UX practices and there is a clear need for further studies to be conducted. According to Treder [3], in the kingdom of buzzwords, "Agile UX" can be described as the update of the Agile methodology with UX design methods, with the goal of unifying Agile developers and UX designers in the process of product development. With the advent of "Agile UX", more and more UX practitioners are dipping their toes into Agile waters hence it has become a topic that continues to evolve [2, 4].

There is a need to conduct research on a larger scale, across many organizations that have varying development methodologies to get a better understanding of the challenges that plague the process of integrating UX with Agile [5]. This study aimed to investigate this further within the South

African context. As stated by Fox [6], one of the problems of integrating UX with Agile is that these two methodologies traditionally use different approaches on how resources are allocated in a project. Agile methods concentrate on quick delivery of working software with minimal upfront design, whereas UX tends to allocate more time and resources for research and user testing before development commences.

This paper documents the similarities of Agile and UX, the good practices and known difficulties from published literature, the research methodology, data collection and potential framework for integrating UX in Agile based on the study conducted within the South African context.

II. INTEGRATING UX IN AGILE

A. Similarities

At first glance, Agile and UX seems to be the ideal match. The authors in [6], [7], [8] suggest that there are a host of similarities such as:

- *Iterative Development*: Agile and UX rely on iterative development whereby feedback is used to refactor coding in development which is an iterative process [6].
- *Emphasis on the User*: Schwaber [7] advocates that user participation is encouraged during the development process. For example, in Scrum the user evaluates the product during sprint reviews as they are present during the reviews. In comparison, UX also requires early and continual focus on the user.
- *Team Coherence*: According to Beck [8], team coherence is important in Agile as one of the key purposes of planning in the "Pre-game" in Scrum is to bring the team together. In comparison, UX also requires the team to always keep the user in mind when developing a product.

B. Known difficulties identified in the literature

There are known difficulties in literature from previous studies and the most prevalent ones are as follows:

- *Sprints are too short*: As per the Agile Manifesto, the methodology strives to be responsive to change, thus discouraging upfront planning [1]. Agile also focuses on delivery after every sprint. This has resulted in a lack of time for UX activities such as design planning, user research, workflows of users

and holistic coherent designs. Moreover, UX developers wait on designs and due to the lack of time in sprints, designs are completed in a hurry which inadvertently has a negative impact on the quality of the design [9-11]

- *Difficulty in prioritizing UX activities:* Prioritizing of UX or usability activities into sprints was reported by Miller [12] and Sy [13] as being challenging as developers focus on developing functionality features rather than UX features. Although UX related tasks can be included in the backlog, it usually does not get prioritized to be added to the current sprint [14].
- *Difficulty in performing UX testing:* A number of challenges relating to usability testing within Agile were identified:
 - *Method of UX testing* becomes challenging as it is difficult to schedule usability testing and evaluation with end users due to the short, iterative nature of Agile. Most Agile teams resolve this challenge by either peer testing or excluding usability testing, which results in the quality of the design being compromised [9, 15].
 - *Access to users for UX testing* poses as a problem as access to the right people at the right time is a challenge within the Agile time frame. There is a need to plan in advance for users' involvement in testing, which contradicts the Agile key value of *responding to change over following a plan* [15].
 - *Shorter time to iterate design* results in feedback being acquired from UX testing. However, it is not always used. Moreover, UX testing can also take longer than anticipated which results in delays of reporting feedback from testing. Subsequently many features can be developed whilst testing is being conducted, which results in many recommendations from testing becoming obsolete [12, 13].
- *Customer versus User:* This relates to the ambiguity of who the "customer" is and who the "user" is in an Agile project. The customer's role varies in terms of the commercial nature of the project and due to this ambiguity, design and collaboration efforts do not include user involvement which also puts into question whether Agile also focuses on the user [16]. Ambler [17] also argues that gathering requirements from only the customer with no end-user being involved is a misconception which results in failure to collect the user's needs.
- *Lack of documentation:* Key value 2 in the Agile Manifesto promotes working software over comprehensive documentation. Previous studies by Budwig, Jeong [18] suggest that the lack of documentation in Agile leads to confusion with regards to UX deliverables. In addition, for integration to work, a number of pertinent integration issues need to be documented such as the design rationale, source requirements and current designs [18].

C. Good practices for resolving the difficulties identified in the literature

The authors in [8], [19], [17] and [6] suggest that despite the challenges identified, there are indeed strengths and many advantages of combining UX in Agile. Here are some of the good practices to follow for the difficulties identified in the previous section:

- *Sprints are too short:* The lack of time during sprints can be addressed via upfront design. This upfront design can be run as a separate pre-development process in Agile projects to gather requirements from users in terms of user goals, context of use and to get a holistic systems view before development begins [20]. Another solution concluded by [11] is to desynchronize some of the UX work, hence UX can be done one or two sprints ahead of the current development iteration.
- *Difficulty in prioritizing UX activities:* This difficulty can be addressed by using the following:
 - Assigning the responsibility to the UX designer or UX practitioner [12, 13, 18].
 - Having a separate UX product backlog [18]
 - Singh [14] proposes UScrum and user personas, which includes a UX product owner in addition to the product owner found in Scrum.
 - Having a separate UX Scrum team to prioritize UX activities [18].
- *Difficulty in performing UX testing:*
 - *The method of UX testing* can be addressed by using discount usability engineering techniques, which include heuristic evaluations [6]. According to Federoff and Courage [9] the RITE method can be used for testing whereby issues are identified and fixed in the shortest possible time. The authors in [6], Chamberlain, Sharp [21], [22] note that low fidelity prototyping can be used to conduct usability test, allowing for creation of prototypes quickly and allowing for change over the course of the design.
 - *Scheduling of UX testing* can be done when Agile development tests are done, for example during demonstration sessions in Scrum. The demonstration sessions provide an opportunity for usability feedback on the design [19].
 - *Access to users for UX testing* can be maintained by either planning in advance for user inclusion in testing [10] or using an existing pool of users to act as development or design partners and conduct testing [9].
 - *Shorter time to iterate design* can be handled by dedicating cycles for user feedback and incorporating it into the development cycle ([23])
- *Customer versus User:* The term "customer" is unpacked as follows by Convertino and Frishberg [24]:
 - The customer is represented as the purchasing officer, or person that makes a buying decision.

Hence, in this case the customer is the product chooser.

- The customer is the end user for consumer-facing products. In this case the user is not involved in the process of choosing a product, nor do they have input in the product the organisation chooses.

End users should be involved throughout the lifecycle of the project not only to validate what has been developed but to also ensure that stakeholders represent the user community accurately [17].

- *Lack of documentation:* A range of artefacts can be applied to integrating UX requirements into Agile. According to twenty seven relevant studies conducted by Schön, Thomaschewski [25], user stories were the most prevalent type of artefacts used (56%). This was followed by prototypes (41%) and use cases (26%).

III. RESEARCH METHODOLOGY

The context for this research was considering organizations where there were Agile UX projects. From the literature there is differentiation between the type of organizations and the way in which UX and Agile is integrated. The research was open to organizations that used Agile and user centered designs for ensuring that the software had a good user experience. The researcher did not select participants based on the size of the organization, however almost all the participants for this study were from medium to large organizations. Only one participant was employed in a small company, and he advised that they adopted a more “hands on deck approach”, and external influences hinder the Agile process. The roles are often blended in this organization hence they are not truly Agile.

The objectives of this study were:

1. To study how UX developers collaborate with members of the Agile team in the software development process.
2. To understand how UX is perceived by software development organisations, in order to identify the extent to which organisations have been successful in reflecting the end user’s requirements in their applications or products.
3. To evaluate the existing Agile UX software development process in the South African context and confirm if approaches from previous studies applies to the South African context.
4. To propose a generic framework for integration of UX in Agile and to provide further recommendations for efficient integration of UX in Agile.

A qualitative design was chosen for the study, with the research method being the “Grounded Theory” method. As per Lawrence and Tar [26], grounded theory is iterative, requiring a steady movement between concept and data, as well as comparative, requiring a constant comparison across

types of evidence to control the conceptual level and scope of the emerging theory.

The Strauss and Corbin version of grounded theory was employed for this study as it is supportive of setting the research question in advance of commencing with the study rather than allowing for it to emerge from coding [27]. Another reason was that the researcher aimed to discover new themes and also confirm that the studies conducted abroad applied within the South African context. The Strauss and Corbin version of grounded theory proposes the use of a coding paradigm that alerts the researcher to manifestations of ‘process’ and ‘change’ in the data [27].

The target population for this study were key employees within UX and Agile development in South Africa. The participants were I.T. professionals working in an Agile/UX environment. The research relied on two methods of data collection - semi-structured interviews and online questionnaires. The questionnaires were used to validate results from the interviews and were sent to different participants from the same sample used for the interviews in order to promote validity and reliability with more information from more participants. The sample size was 10 for the interviews and 30 for the questionnaires. Considering the population of this study, the researcher used a large enough sample in order to adequately attain saturation. Research by Hussain, Slany [22] advocate that the grounded theory method allows for the discovery of theory from the data (i.e. voices and experience of Agile and UX practitioners from interviews or other forms of data).

The researcher firstly conducted 10 semi-structured interviews to collect data, the participants are referred to as P1...P10 in the rest of this paper. The interviews were conducted either face-to-face, or using Skype/Zoom. The interviewees were selected through networking with Agile/UX groups. The researcher found that there was a lack of UX practitioners within the South African context which was noted as a limitation in this study. Through networking, the following Agile and UX groups were used as they had the most members and had diverse roles in Agile and UX:

Durban Agile User Group:

This group is for individuals with a keen interest in Agile project and development practices and techniques. There are currently 328 members. The group hosts monthly meetings which are centred on skills and experiences working in Agile projects [28].

International Institute of Business Analysis – South Africa:

This group is for individuals with a keen interest in Business Analysis, Agile Business Analysis, and Systems Analysis. There are currently 441 members. The group hosts monthly meetings to build the South African analysis community by learning and sharing experiences with all attendees [29].

Interaction Design Foundation (IDF) Durban Group:

The IDF Group is for individuals who are involved in UX design and development, including aspects relating to branding, design, usability and function. There are currently 26 members. The group is hosted on LinkedIn, where members share personal experiences in order to learn and

connect. “When the world becomes smaller, learning and connecting become easier. [30]”

The interviews were transcribed, and analysed.

The table below shows the details of the participants for the interviews:

TABLE 1: Interview participants

Participant	Role(s)	Experience	Company Size
P1	BA Manager	10 years	Large
P2	Scrum Master	4 years	Large
P3	Software Developer	9 years	Small
P4	Senior Software Development Manager	5 years	Medium
P5	Agile Coach	7 years	Medium
P6	Quality Assurance Manager	6 years	Large
P7	UX Analyst	3 years	Large
P8	Scrum Master	6 years	Large
P9	Business Analyst	4 years	Large
P10	Back Office Team Lead	4 years	Medium

The interviews comprised of five predefined questions which were broad in nature, which were as follows:

1. Can you tell me about your job role, background in terms of employment, the type of projects you work on?
2. What are the processes and activities when developing the software?
3. Can you describe how UX activities are integrated into the software development cycles?
4. How has the integration of UX in Agile affected the software development process?
5. Are the following Agile values followed during integration of UX in the project?

Each of the five questions progressively resulted in sub-questions being asked which were based on the response received.

The interviews were followed by an online questionnaire to validate some of the relationships that were identified.

IV. RESULTS FROM THE RESEARCH

All the data collected from the interviews and the questionnaires were analyzed using the grounded theory method. The Strauss and Corbin version of grounded theory involves 3 phases of coding activities, with the goal of producing a theory to explain a situation of interest [31].

In the first phase of coding, *open coding*, the keywords identified were *representative of the user, accessibility, user requirements and testing*.

The second phase, *axial coding*, was used in identifying relationships. Phrases and words identified in the axial coding

phase included *getting involved, UX vision, user throughout, roles, fitting and collaboration*.

The final phase of coding is *selective coding*. This stage involved using the core categories in the axial coding stage as well as all the data to define high level concepts that form the themes of the research.

Theme 1: Agile UX Integration Practices

The first theme, produced from insights gathered from the interviews and questionnaires, relates to “Agile UX Integration Practices”. Some of the core categories identified were: *the participants’ understanding of Agile, adapting to change, methodology used, fitting UX into Agile, roles and responsibilities, difficulties faced when integrating UX in Agile and Customer versus User role*. By looking at the responses to the question “*What does Agile mean to you?*” it was apparent that Agile is more a way of working, or as P4 explicitly stated “Agile is something we are, Scrum is something we do.” All participants agreed that developers had difficulty communicating in a Waterfall environment, however the developers flourished in an Agile team as it was a safe environment to communicate their opinion due to shared knowledge and collaboration. Although Agile is perceived as a way of working, the issue lies with living it and applying it. Most of the participants had extensive experience of Agile (greater than 3 years), hence, a sound knowledge of the methodology and its practices. Scrum was the most widely used methodology, with all companies using it. One of the pros highlighted in using Scrum, was the flexibility and the ability to **respond to change**. “Agile to me is really a way of being responsive to circumstances. It is about the ability to adjust your direction quite quickly without it costing you a fortune - turning on a dime for a dime” [P5].

To some participants, the **flexibility** to frequently change user requirements is also seen as a challenge: “In most instances too much user involvement complicates and slows down the process. Users themselves don’t know what they want” [P6]. Current practices involve too much **UX work done upfront**, whereby the analysis, design, and high fidelity prototypes are done upfront – “UX specialists tend to work very traditionally, instead of being Lean or Agile UX” [P5]. Instead of the “big design upfront” approach, Agile places emphasis on collaboration and communication. One of the commonly used practices for upfront work was the “**sprint zero**” approach - this was used by 60% of the companies. One of the companies reported that sprint zero was also used for user research as it is the ideal opportunity to create the UX vision amongst the team by involving the user from the beginning of the project.

In other cases, little or no UX work was done. Upfront **user research** is important. However, based on the results of this study, only 30% of the companies perform user research. Most of the participants pointed out that the role of the user was minimal or in some cases a representative of the end-user was used. Being more involved and closer to the team is beneficial – all participants agree that bringing in UX impacts everybody in a positive perspective – it “allows for identifying

issues early and fixing them early” [P6] and “the developers also have a guideline in terms of what the vision is of what needs to be developed” [P10]. Although most participants were aware that there were obstacles in Agile, none of them were negative about it. They believed that UX can be flexible enough to fit into Agile.

Theme 2: UX Vision

The second theme that emerged from the research related to the UX vision. Some of the core categories identified were: *UX design techniques, losing the big picture, creating a UX vision, including the end user, lack of UX person, role of documentation and synchronizing UX in Agile.* In order for good UX, an in-depth understanding of the user and the user’s requirements is necessary, which ultimately speaks to the experience that the user will have when using the software. [P6] states that “UX should be brought in early, by identifying the users and roles that will be using the software, and using that thinking to inform the UX and the software as a whole.” Practitioners should also share this UX vision, as well as the impediments that are experienced along the way. [P7] states that the UX vision needs to be articulated to the team and one of the ways that it is currently done in her team is through a UX education series. “This series aims to educate the organization on what the difference is between *UX* and *UI* as well as topics on *Usability, User Research* and *Design Thinking*. People don’t know what *UX* is and part of this initiative is to educate them” [P7].

Participants preferred using light weight and flexible tools such as wireframes, sketches, storyboards, prototypes and user stories to communicate the UX vision. All agreed that the whole team should understand the UX vision, through training and keeping the team aligned by including the user. This research identified the following strategies that are being used in the South African context to include the end users:

- Sprint zero – the concept of the sprint zero is a ramp up phase before development begins. Some of the participants also use this phase to conduct user research, and to get the teams aligned in terms of what is required from them in the next phase.
- One sprint ahead – this approach is similar to the ones presented in the literature by Sy [13], and 80% of the participants advised that this approach was used by their teams. The participants highlighted that UX work is done a sprint ahead to feed into the current development sprint.
- User presence throughout - only one participant [P4] advised that the end-user is involved from the start of the project. The company has mature Agile teams, having practiced Agile for the past 11 years. “If I had to compare our user involvement to 4 years ago, it has improved. Previously software would be released to production and there would still be comebacks as certain elements were not tested, or bugs were not picked up in UAT...” [P4].

V. PROPOSED FRAMEWORK FOR INTEGRATING UX IN AGILE

A framework for integration of UX in Agile has been proposed in Figure 1 below. Keeping in mind the strategies

currently being used by organizations in South Africa, the model aims to facilitate more robust integration between Agile and UX.

The model follows the Scrum framework as it was the most widely used Agile method in all organizations.

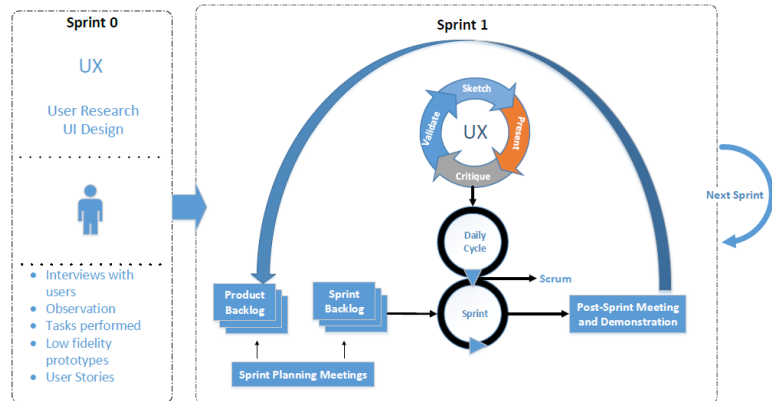


Figure 1: Framework to facilitate integration of UX in Agile

An element of upfront UX work is required, which includes user research and UI design and this is depicted as *Sprint 0* in the figure above. This only happens once in the lifecycle of the project. This pre-sprint phase was common to the majority of the participants in this research as well as in the literature, and most of the participants remarked that this stage of the project lasted for two weeks.

After the pre-sprint phase is completed, it is passed to the Agile development team to initiate the first official sprint of the project, which follows all the ceremonies of Scrum (i.e. product backlog, sprint backlog, daily cycles, sprint, post sprint meeting and demo etc.) In addition to the traditional Scrum ceremonies, a lean version of UX has been embedded in the sprint. In order for UX to work, the traditional way of thinking needs to be adjusted and a Lean or Agile UX mindset needs to be adopted. The UX cycle in *Sprint 1* comprises of the following tasks:

- *Validate* – allows for the Agile UX team to check and validate the UX work that was carried out in *Sprint 0*. As the project progresses, this phase is important to ensure that the team does not lose the “big picture”.
- *Sketch* – allows for the UX practitioners to “sketch” the UX requirements for the sprint. Feedback from the validation process will be factored into this process.
- *Present* – the sketches are presented to the broader team for feedback.
- *Critique* – the team critique the sketches, and this is re-factored into the sketches.

The *Sketch, Present* and *Critique* processes are iterative as it allows for UX work to also be done for the next sprint.

This allows for the pattern of working at least one sprint ahead of the current development, however this is factored into the current sprint.

The rest of *Sprint 1* follows the normal Scrum ceremonies and resembles Highsmith’s diagram for Scrum [32]. The key

features of the proposed model is to tackle issues relating to user research, and to align all team members with the UX vision of the project. The additional UX layer, on top of the existing sprint layer, ensures that the team works in parallel and there is less design wastage.

The proposed framework will be evaluated using principles from design science with expert evaluation. According to Sein, Henfridsson [33], action design research provides guidance in the research process by combining building, intervention and evaluation.

VI. CONCLUSION

This study provided insight in terms of integrating UX in Agile with the aim of presenting good UX development practices and a proposed framework. The similarities and known difficulties identified in the literature were presented. The literature review guided this study with regards to questions to be asked, as well as comparison to current practices within the South African context.

A qualitative design was used for the study, with the research method being the Grounded Theory method. The participants for the study were IT professionals working in an Agile UX environment. Semi-structured interviews and questionnaires were used to gather data, which was analyzed and coded in order to identify key relationships and themes. Two themes that emerged from the study was *Agile UX Integration Practices* and *UX Vision*, which was used to create a framework for integrating UX in Agile.

The proposed model recommends upfront lean UX work to be carried out in Sprint 0. This requires active involvement from the user in order to create the UX vision for the project. Sprint 1 has an additional UX layer on top of the traditional sprint layer which allows for the team to work in parallel and also ensures that the team members are aligned in terms of what needs to be done in the sprint. Whilst it may be too early to determine if this model will assist in bridging the UX and Agile gap, it will be evaluated using principles from design science with expert evaluation.

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