Agile-User Experience Design: With or Without a Usability Expert in the Team?

Lou Schwartz
Public Research Centre Henri Tudor
Luxembourg, Luxembourg
lou.schwartz@tudor.lu

Abstract— **In the past decade, numerous experiments of Agile-User Experience Design (also called Agile-UX) have been carried out. Through these experiments it remains unclear who should be in charge of the usability in an Agile-UX project development. After a review of the literature about the involvement of usability expert(s) in Agile-UX, this paper repeats two experiments which explore the necessity to involve usability experts in the team. The first experiment is based on the statement that developers should be able to manage the User-Centred Design (UCD) and conduct the related methods without the intervention of a usability expert, in order to respect agile practices. The second one is based on the statement that integration of a usability expert in project teams ensures better implementation of UCD and better results. Results of both experiments are discussed to validate research hypotheses for future work.**

Keywords- Agile-UX; team composition; use case

I. INTRODUCTION

Agile-UX is a project management principle for software development based on the Agile values and principles in respect to User-Centred Design (UCD) and supported by UCD good practices and methods. Nowadays, no official definition of Agile-UX exists, but a lot of experiments demonstrate its value [2][3][4][5][7][8] [9][10][12]. In the literature, Agile-UX is implemented with the involvement of usability expert(s) in the Agile process and the use of methods from UCD. But, in Agile principles, intervention of experts is not encouraged [5]: dissemination of skills is preferred to the intervention of experts. We test both approaches through two qualitative experiments. The first one fully respects the principles of Agile project management: developers should be able to manage themselves, UCD and conduct the related methods without the intervention of a usability expert. The second option integrates a usability expert in the project team to ensure better implementation of UCD and better results. Results of both experiments are discussed to elicit future research questions for future work.

After a review of the literature on the involvement of usability experts in an Agile-UX development process in Section II, the paper will present two qualitative experiments in order to validate the relevancy of our hypotheses in Section III. Then the suitability of our hypotheses will be discussed in regard to the experiments' results in Section IV.

II. USABILITY EXPERT(S) INVOLVEMENT IN AGILE-UX

Though numerous experiments of Agile-UX, the question of "who is in charge of UCD" often comes [2][3][4] [5][6][7][9][10][12]. Different options are exposed, but they are often the same, which we can regroup in 4 categories as explained below.

A. One usability expert

Only a couple of experiments advocate the integration of only one person in charge of UCD in Agile-UX ([4] project 1 & 3, [5] project PV, [9]). Often in this case, the UCD designer is also the product owner (project 1[4]) or developer (project 3 [4]).

B. A parallel team of several usability experts

In most cases, a parallel team of several usability experts is dedicated to the project ([2][3], Project 2 [4], [6][7][12]).

But, they organise the exchanges and work between developers and designers differently. In Agile methods, it is possible to dedicate a spike (an iteration to focus on a particular problem like test a new technology) to usability exploration. But, it is not a good solution to maintain a constant pace [7]. Some projects also involved occasionally UCD experts on some particular points (projects MG & PV in [5]); this is close to an organisation by spikes. But, for McInerney [5], it is important that the usability expert is available "on call" at all times, which may be impossible if the usability expert works on several projects simultaneously. Some other projects integrate usability in the iteration without real planning (see [P3.290] in [4]).

Sy [12] proposed a parallel tracks organisation of work: designers work with one or two iterations ahead of developers. To implement this proposition, several usability experts are needed, because of the amount of work and to respect best practices, which recommends that it should not be the same person who designs and evaluates the developed software.

C. UCD expert as product owner

In regards to the UCD expert's responsibilities and product owner's responsibilities, it is sometimes preferable to merge both roles (Project 1 [4], Project TB [5], for Beck in [6][10][12]). The product owner has the following responsibilities:

- Define the features of the product, decides on release date and content [11]. In this case, a UCD expert will be based on the gathered data of the users, on context and on tasks in order to define the user stories to develop [10].
- Be responsible for the profitability of the product (ROI) [11]: for this, the usability expert goes by the

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context studies and the exchange with the organisation on the needs and the attempted profitability.

- Prioritize features according to market value [11]: this prioritization is done thanks to the exchanges with users and developers [10].
- Can change features and priorities every 30 days [11]: UCD expert accepts changes and modifies designs when it is necessary. He can modify user stories and prioritization according to new analysis.
- Accept or reject work results [11]: through the users' tests, expert validations and participation to the acceptance tests writing.
- Negotiate with all stakeholders [10].
- Communicate with the users and train the users [10].

Furthermore, some observations show that the product owner is often submerged by the marketing and sales concerns. He often does not have the skills to manage a user-centered design, and, as a consequence, he may lose focus on a user experience vision [10].

Sometimes, two product owners are appointed: one as the usability product owner and the other as the conventional product owner [10]. In this case, they commonly specify the needs and prioritize the work to do. This is an answer to some observations concluding that usability tasks are often not a priority because working software is still preferred to usable software and usable software is more expensive in terms of efforts and time.

D. Team member(s) as responsible of the UCD process

The last possibility explored is to take on the responsibility of the UCD process. It is also the more closed one of the Agile vision: do not involve a usability expert, but give this responsibility to one or more team members (Project 3 [4] & in part Project PV [5]).

In all these experiments, usability experts are involved in the Agile-UX projects. But in Agile principles, intervention of experts is not encouraged [5]. This can raise the following question: is it necessary to involve usability expert(s) in the team or is involving team members with some knowledge on usability sufficient? This is what we tested in the implemented experiments.

III. EXPERIMENTS

After the literature review and several exchanges with Agile professionals, we focused on the question of the usability expert involved in the team. We propose the following statements to test:

- S1: without usability expert, if the project team has sensitivity and some knowledge in HCI, Agile-UX works.
- S2: with usability expert involved in the project team, usability of the produced product is better than in S1.
- S3: the dynamic of the project team is better when a usability expert is involved.

We retrospectively and qualitatively question these statements through two experiments. We focus only on the usability of the final product, laying aside any potential cost overhead induced by the involvement of a UCD expert.

A. Context of the experiments

The method used consists of a retrospective and qualitative analysis of two experiments that tested two versions: the first, without a usability expert in the team (S1, S3), the second one, with one UCD expert in the team (S2, S3). The observations made will help us to better define the issues related to "who should play the role of the usability expert in Agile-UX?"

Both experiments are instantiations of Agile-UX and aim to develop a mobile application prototype, in order to demonstrate the interest of mobile touch-based applications for construction site-related activities.

The implemented prototype allows taking photos localized by Global Positioning System (GPS) on a construction site. The user can highlight parts of a photo (e.g., add an arrow to the default on a wall) and add textual or vocal notes about the entire photo or about the highlighted parts on the photo. The user can also register some construction sites by indicating their localisation on a map. Then the photos are automatically attached to a construction site according to their localisation. The user can also find his photos in his calendar since the photos are automatically attached to events in his Google® calendar based on the shooting date. Finally the user can share a set of photos with additional comments.

Two phases of development were planned to experiment two different implementations of Agile-UX. We have chosen Scrum as Agile method for both.

B. Case #1 – Agile-UX without UCD expert

1) Statement and composition of the team: In the first experiment, the team was composed of a full-time developer, a Scrum master (part-time), and a business expert (part-time) who plays the role of product owner, researcher and architect, with knowledge of architects' practices in France and Luxembourg.

All members of the team are sensitive to and have some knowledge in Human Computer Interaction (HCI). We have voluntary not involved a usability expert to test this configuration, which is the more suitable with the principles defined in Agile. Indeed, in Agile teams, everyone should be able to work on each part of the software development. So, after a while, team members should have sufficient knowledge and skills to relieve other team members of their tasks including, in case of Agile-UX, on usability tasks.

2) Implementation of the UCD: The first experiment lasted six months with iterations' duration of one week. We implemented Agile-UX on 22 iterations. The developer implemented only three usability methods: wireframing, users' tests, and satisfaction questionnaire.

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3) Methods used

- Brainstorming sessions to build the product backlog including business experts and technical experts
- Wireframing with Microsoft Power Point®
- Two user tests:
  - Real situation of use, one user, one week
  - 6 architects, 6 scenarios, observation tests

4) Team dynamics and satisfaction: During this experiment, the developer played the role of designer, developer and evaluator of the application. As the developer had to play these three roles, he had the feeling to progress slowly. Moreover, it is not easy to evaluate own work and to always question it.

The skills in HCI of all team members allowed avoiding some usability mistakes. But, as the tests results showed, a lot of usability issues were identified by users. Regarding these experiment results, Agile-UX works without a usability expert and with a project having some sensitivity and knowledge in HCI. This justifies our first statement S1.

It should be noted that the team was in constant contact with the product owner thanks to his presence at each specification meeting, each demonstration meeting, and during some stand up meetings. The product owner was also available to answer any team member's questions.

C. Case #2 - Agile-UX involving a usability expert

1) Statement and composition of the team: During the second experiment, the team was composed of a full-time usability expert, a full-time developer, a business expert (part-time) as product owner, and a Scrum master (part-time). The business expert and the Scrum master are the same as in the first experiment. The developer has neither particular sensitivity nor knowledge in HCI.

The focus is to develop, for the same mobile application, interoperability aspects with a collaboration platform dedicated to the construction sector, photo tagging and a search engine based on photo metadata.

2) Organisation of work and process: This development lasted six months with iterations' duration of two weeks. The developer began one month before the usability expert, because of calendar constraints, to first work on technical requirements. For independent reasons, the usability expert quit the project before the end of the six months. We only really worked two and half months with the complete team. The process followed was the parallel tracks proposed by Sy [12].

3) Methods used

- Brainstorming sessions to build the first version of the product backlog including business experts and technical experts
- Personas, that help to improve the product backlog
- Wireframing
- Expert review based on ergonomics criteria after each release
- User tests with four users: two who know the application, two novices
- Focus groups to evaluate wireframing.

4) Team dynamics and satisfaction: During this experiment, the usability expert played the role of designer and evaluator of the application. The whole team had the feeling to quickly progress and to go deeper in the functionalities proposed but also in the quality of the application. Furthermore, more methods of UCD were used and they were adapted differently. The test results showed a lower number of usability issues identified by users thanks to the integration of the usability expert and they are less critical. That justifies our second statement S2: Agile-UX provides better results with the involvement of a usability expert.

Moreover, we observe the natural instauration of a "pair designing" [8]: when developer was implementing wireframes, he sometimes asked the usability expert to join him and to explain and validate developed interfaces during the implementation; when the usability expert designed wireframes, she sometimes asked the developer to join her and to validate feasibility of wireframes during their design. Even if the developer had no skill in HCI at the beginning, he learnt the good practices throughout the project and quickly integrated them.

Furthermore, the team was in constant contact with the product owner by his presence during the specification meeting at the beginning of the iterations', the demonstration meeting at the end of the iterations', during some stand up meetings and his availability throughout the project to answer all emerging questions.

IV. DISCUSSION

Since the results are only based on two experiments, hypotheses cannot be formally validated. Then, in the following section, only the suitability of the hypotheses for future research will be discussed.

S1 and S2 are justified by the satisfaction of users, which is "correct" in the first experiment and which is better in the second one (see Table I and Table II).

TABLE I. USERS' TESTS RESULTS IN THE BOTH EXPERIMENTS

		Number of problems meet	
		Use case 1	***Use case 2***
By importance of the problems (importance = number of testers who met the problem * seriousness of the problem)	1	5	2
	2	2	1
	3	3	1
	4	0	1
	6	1	1
	8	0	1
	10	1	0
	12	1	0
	15	1	0
	20	1	0
	TOTAL	15	7

TABLE II. USERS' SATISFACTION RESULTS

Percentage of users' satisfaction	Use case 1	Use case 2
Average	75,42 %	81.25%
Min	62.5 %	75%
Max	90 %	92.5%

TABLE III. COMPARATIVE TABLE OF THE BOTH EXPERIMENTS

		Use case 1	Use case 2
Team	Developer	1 full-time	1 full-time
	Scrum master	1 part-time	1 part-time
	Product owner	1 part-time, business expert	1 part-time, business expert
	Usability expert		1 full-time
	Sensitivity to UCD	All team members	All team members, except the developer
Organisation of work	Duration	6 months	Expected 6 months – in reality 2,5 months
	Iteration duration	1 week	2 weeks
	Number of iterations	22	5
	Process	Scrum	Scrum + Sy's parallel tracks
UCD methods	Wire framing	Power Point®	Paper and pen Balsamiq®
	Users' tests in direct observation	6 users, 6 scenarios	At every iteration end with 2 users who know the application and 2 novices
	Users' tests in real situation	1 user during 1 week	NO
	Satisfaction questionnaire	X	X
	Personas	NO	X
	Expert review	NO	X
	Focus groups		To evaluate the wireframes
Other methods used	Brainstorming	To build the product backlog	To build the product backlog
Team dynamic and satisfaction	Feelings of the team	Slow progression	• Quick progression • Go deeper in the functionalities proposed • Improve quality of the application
	Observed team dynamic	• No real dynamic • Demotivation	• Pair-designing • Developer increased his HCI skills
Results		Lot of usability issues but working software.	Lower number of usability issues identified by users and they are less critical. Better users' satisfaction And working software.

Without involving a usability expert we observe a discouragement and disincentive particularly of the developer. On the contrary, involving a usability expert helps maintain a constant pace in the team ([1], principle 8). No difference has been observed on the constant customer collaboration ([1], value 3). Some best practices emerged like "pair-designing" and the whole team improved their practices and knowledge concerning HCI (see Table III for a resume of both experiments). This could justify our third statement S3: the dynamic in the project team is better with a usability expert involved in Agile-UX.

However, the fact that in the first experiment, the team was composed of only one person (the developer) may be of influence. Indeed in the second experiment the team was composed of two persons (the usability expert and the developer), then the dynamic observed may be due to the edge effect of the number of people in the team.

V. CONCLUSION AND FUTURE WORK

These experiments addressed two kinds of Agile-UX implementations. Thanks to these experiments, we can validate that the initial statements are justified hypotheses for further studies. The next step is now to define protocols to validate these hypotheses.

Another possible implementation that Agile evangelists begin to propose is to place the usability expert as the product owner. Indeed, the product owner is responsible for the contact with users, the definition of needs and the validation of the work done. A priori, the usability expert and the product owner have part of their high level responsibilities which overlap. A future work will be to check the legitimacy of the following statement: "usability expert could play the role of product owner".

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