The Current State of User Experience Practices in South African Organisations

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Abstract: Incorporating user experience design (UXD) into systems development processes can give an organisation a competitive advantage over its rivals. However, the number of South African organisations that have embedded UXD into their systems development processes was historically low. This paper reports on the extent to which a selection of South African organisations has incorporated UXD practices into their systems development processes. Interviews were conducted with participants in four organisations. The results showed that the landscape of UXD practices is improving in South Africa.

1 INTRODUCTION

One of the important components of information systems development is user interface (UI) design as it is the first point of contact between the user and the system (Gkonos, Iosifescu Enescu, & Hurni, 2019). There is growing evidence that incorporating user experience design (UXD) practices into the development of information systems can give a business a competitive advantage over its rivals (Paunovic, 2017; Sward & Macarthur, 2007). However, according to studies by Pretorius, Hobbs, and Fenn (2015) and Brosens (2017), the number of South African organisations that have incorporated UXD into their systems development processes was low. User experience (UX) can be defined as "a momentary, primarily evaluative feeling (good-bad) while interacting with a product or service" (Hassenzahl, 2008, 12).

Embedding UXD into an organisation's systems development processes requires the organisation to follow a methodical process, which in turn, requires specialised skills and investment in human capital (Rohn, 2007). Business decision-makers are often reluctant to support the incorporation of UXD practices into systems development processes because of the intangible nature of their benefits (Kuusinen & Väänänen-Vainio-Mattila, 2012).

However, from an organisational perspective, good UX can lead to the creation of the right product for users, reduction in call centre volumes to report errors, and increased customer loyalty (Aleryani, 2020). These benefits can translate into increased profitability (Donahue, 2001; Kolbeinsson, Lindblom, & Thorvald, 2020). Positive UX does not happen by accident, it is the result of the intentional incorporation of UXD practices into an organisation's systems development processes (Erdős, 2019).

Poorly designed user interfaces can lead to inefficient task execution and provoke negative user emotions like frustration and anxiety (Sonderegger, Uebelbacher, & Sauer, 2019). However, contemporary consumers expect and consider an optimised user experience to be a basic requirement (Bilgihan, 2016; Paunovic, 2017) and will not hesitate to abandon applications that tend to elicit negative emotions (McCurdie et al., 2012).

The research reported in this paper forms part of a broader study on the optimisation of the UXD processes for the timeous development of information systems (Chawana, 2020). However, this paper is specifically focused on the current state of user experience design practices in a selection of South African organisations. The main research question for the paper is "*to what extent are South African organisations incorporating user experience design practices into their systems development processes?*"

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81

The structure of the remaining sections of the paper are as follows: section 2 provides an overview of various UXD methods/approaches. The research design and methodology are discussed in section 3, while section 4 contains the research results. The discussion and conclusion of the paper are presented in section 5.

2 USER EXPERIENCE DESIGN

According to Kujala, Roto, Väänänen-Vainio-Mattila, Karapanos, and Sinnelä (2011, 1), the main objective of UXD is "to improve customer satisfaction and loyalty through the utility, ease of use, and pleasure provided in the interaction with a product". UXD follows a user-centred design (UCD) approach where the needs, wants, capabilities, and limitations of users are at the centre of the design process (Rogers, Sharp, & Preece, 2011). It is premised on the principles of active user involvement, holistic perspective on design, prototyping, iterative and evolutionary design, as well as product evaluations in their context of use (Gulliksen et al., 2003). This section provides an overview of various methods/approaches that are used in UXD. It should be noted that a design team may not necessarily follow all the methods/approaches discussed in this section. This is especially the case when a project's budget or schedule is constrained.

User research is a technique used to gain better insight into users' needs, behaviours, experiences, and motivations from their perspective, as opposed to the perspective of designers (Baxter, Courage, & Caine, 2015; Plonka, Sharp, Gregory, & Taylor, 2014). Data gathering techniques, such as interviews, surveys, and focus groups can be used to understand users' needs (Rogers et al., 2011).

Personas are vivid characters created to represent each user type that may use a product in a similar way. Personas enable designers to understand users' needs, experiences, behaviours, and goals throughout the design process (Gualtieri, 2009; Kelle, Henka, & Zimmermann, 2015). Ideally, a persona should include the name, traits, photo, and a narrative of the daily routines of the target user group. Personas should also be based on the outcome of user research conducted to understand a target user group's needs and goals (Gualtieri, 2009; Kelle et al., 2015). An alternative approach to the classic persona is the *proto-persona* technique where the persona created is not based on user research. Rather, it is based on a project stakeholder's knowledge of real users (Pinheiro, Lopes, Conte, & Zaina, 2019; Tomlin, 2018). One of the shortcomings of proto-persona is the potential for bias or misconceptions about the target user group (McKeen, 2019).

Another method that can be used to gain insight into users is *user journey mapping*, which graphically depicts the steps taken by a user to accomplish a goal while interacting with a product or service (Howard, 2014; Kojo, Heiskala, & Virtanen, 2014). User journey maps enable designers to frame the user's motivations & needs in each step of the journey from the user's perspective (Kojo et al., 2014). Unlike personas, which provide a static view of a user group, a user journey map gives a chronological outline of a user's experience with a product or service over time (Howard, 2014).

A *user story* is a high-level description of the features or functionality that a user requires to accomplish a specific task or goal (Clarke & Kautz, 2014). A user story is typically written in the format "as a (role/persona) I want (job to be done/feature) so that (benefit)". A *use case,* on the other hand, is a UXD method that describes the sequence of steps that users will take to perform specific tasks while interacting with a system (Noda, Kishi, & Fukuzumi, 2020; Nudelman, 2018).

Another method that can be used in UXD is *competitor analysis* (Da Silva, Silveira, Melo, & Parzianello, 2013). Competitor analysis enables organisations to learn about a competitor so that strategies can be formulated to respond appropriately to the actions of the competitor (Czepiel & Kerin, 2012). From a UXD perspective, competitor analysis allows the design team to compare their design with the products of their competitors, to get a deeper insight into the strengths and weaknesses of the design, as well as the gaps in the market (Neves, 2018).

Concept testing involves estimating the extent to which users would want to use a product or service (Sproll, Peissner, & Sturm, 2010). In the context of UXD, concept testing is used to measure the user experience of a design during the early stages of its development. This allows the design to evolve based on users' goals, needs, and motivations (Fronemann & Peissner, 2014; Sproll et al., 2010).

Prototyping is a software development method that involves the creation of models of a proposed system to communicate with stakeholders and test the viability of the design (Budde, Kautz, Kuhlenkamp, & Züllighoven, 1992). Prototyping as a UCD approach is typically incorporated into the UXD process early in systems development to enable a shared understanding of users' needs among the

designers and the users (Gulliksen et al., 2003; Hartson & Pyla, 2012). Prototypes can be low or high-fidelity. Low-fidelity prototypes are sketches that are created early in the design phase to test proposed solutions (Gulliksen et al., 2003; Wojdziak, Bansemir, Kirchner, Lochner, & Groh, 2016). Low-fidelity prototypes are useful to communicate design ideas with stakeholders, they are easy to create and modify, and enable designers to have an open mind without committing too early to any particular design solution (Bansemir, Hannß, Lochner, Wojdziak, & Groh, 2014; Gulliksen et al., 2003; Wojdziak et al., 2016). High-fidelity prototypes on the other hand typically resemble the final solution in terms of their look and feel. (Bansemir et al., 2014). Unlike low-fidelity prototypes, high-fidelity prototypes can support limited user interactions because some functionality of the final system would have been implemented in such prototypes. The creation of high-fidelity prototypes requires more time, effort, and resources than low-fidelity prototypes, and designers are typically more reluctant to modify high-fidelity prototypes because of the efforts expended on their creation (Suranto, 2015).

Heuristic evaluation is a well-known usability evaluation method where experts review a design using a set of evaluation heuristics or guidelines, for example, the Nielson heuristics (Nielsen, 1994a), early in the design process. The method enables designers to get feedback about interface design elements before a more detailed usability test is conducted (Jackson & Cheng, 2018). As opposed to usability evaluation heuristics, the heuristics used in UX evaluation should be context-specific due to the unique nature of UX (Rantavuo & Roto, 2013). One of the key issues in heuristic evaluation is the number of experts that should be involved in the evaluation. According to Nielsen (1994c) five expert evaluators can identify an aggregate of 75% of usability problems, but adding more experts will not necessarily increase the number of problems detected. Nielsen (1994c) recommends that any heuristic evaluation should involve at least three experts.

Usability testing is used to evaluate the extent to which users can complete specific tasks effectively and efficiently on a system (Baxter et al., 2015). Participants that are representative of the target users of the system should be involved in usability testing, with the goal being to assess the extent to which the system meets specific measures of usability (Rogers et al., 2011). As with heuristic evaluation, the number of participants that should be involved in the evaluation is a key issue in usability testing. In the past, as many as 50 participants were recruited for

usability evaluation (Barnum, 2002). However, the discount usability testing proposed by Nielsen (1994b) requires three to five participants. This approach is less expensive and relatively effective, making it more practical for incorporation into the UXD process.

3 RESEARCH DESIGN AND METHODOLOGY

This study followed the interpretive research paradigm and is premised on the philosophical assumption that there are multiple realities, which are socially constructed through shared meanings (Klein & Myers, 2001). A qualitative case study research strategy was employed. This strategy was motivated by three factors; (i) UXD often occurs in the context of systems development projects, so the choice of research strategy had to be suitable for investigating UXD practices within organisational contexts; (ii) the researchers wanted to understand the data that was collected from the study participants' perspectives; and (iii) the investigation had to be carried out in more than one organisation, with research data elicited within each organisation's natural context. Case study research is a good strategy to use for qualitative studies where the experiences of the actors are critical to the study (Benbasat, Goldstein, & Mead, 1987). Given that the focus was on more than one organisation, the multiple case study strategy was employed using four different organisations as the cases (Yin, 2011). Because participation in the study was voluntary, only the organisations that were willing to grant permission to their employees to participate in the study were included in the cases.

Data collection was based on the purposive sampling method (Etikan, Musa, & Alkassim, 2016). Semi-structured interviews were conducted in four South African organisations. The four participating organisations had UXD practices embedded in their systems development processes. UX specialists and UX team leads in the four organisations were interviewed. Individuals in roles that work closely with UX specialists, for example, Business Analysts and Product Owners were also interviewed

Data analysis was guided by the five steps to interpretive studies' data analysis of Terre Blanche, Durrheim, and Painter (2006) which entailed (i) familiarisation with the research data; (ii) identification and documentation of responses that were relevant to answering the research question; (iii) grouping similar insights into themes using the

bottom-up analysis approach; (iv) linking the contents from the interview transcripts to the themes; and (v) interpreting and reporting the research findings.

Ethical clearance for this research was granted by the Faculty of Economic and Management Sciences Research Ethics Committee at the University of Pretoria. All four participating organisations granted formal permission to involve their employees as study participants. Individual study participants from each organisation also signed informed consent. Participants were assured that the data will only be used for research purposes. Neither monetary nor non-monetary incentive was offered to participants.

4 RESULTS

4.1 Study Participants

As stated in section 1, the research reported in this paper is part of a broader study on the optimisation of the UXD process for the timeous development of information systems (Chawana, 2020). Hence, a detailed discussion of the results from the broader study is outside the scope of this paper. This section presents the results that are specifically related to the research question that is answered in this paper, namely *"to what extent are South African organisations incorporating user experience design practices into their systems development processes?"*

Thirty-three participants were interviewed from four organisations, hereinafter referred to as Org1, Org2, Org3, and Org4, respectively. Three organisations (Org1, Org2, and Org3) operate in contract software development environments where they develop software systems and applications for clients from different industries. Org1 is a relatively small company located in Johannesburg that was co-founded by the Creative Director and has four design specialists in its employ. Org2 has its head office

located in Johannesburg, with branches in other parts of South Africa, the United States and Australia. At the time of the interviews, 30 people form part of the design team in Org2. Org3 is a management consulting company with 80 people forming part of the design team. Finally, Org4 is a financial services institution and one of the 'big four' banks in South Africa. In addition to South Africa, Org4 has offices and branches in 15 countries across Africa, Asia and Europe. At the time of conducting the interviews, 140 UX design specialists were working on both customer-facing and internal systems and applications. Participants from Org4 function as part of an in-house development team. A summary of the study participants from the four organisations and their roles is provided in Table 1.

4.2 User Experience Design Processes Followed by Participating Organisations

During the interview sessions, participants were asked about their software development processes and the different types of UXD activities that have been incorporated into their design practices. This section presents the UXD methods/approaches that are followed by the participating organisations.

The four participating organisations typically begin their software development processes with the definition of the business problem that will be addressed by the target software (see Figure 1). Project stakeholders, including representatives of the client organisation (in the contract development settings), the representatives of the business unit(s) that triggered the development of the project (in the in-house development setting), the business analyst, and the UX designers are involved in the problem definition process. This allowed for a shared understanding of the business problem that will be solved by the target software.

Table 1: Study participants per organisation.

Org_ID	No of participants	Development context	Participants' role
Org1	2	Contract development	Creative Director and Lead UX Designer
Org2	9	Contract development	Lead UX Designer, User Interface (UI) Designer, UX Researcher, Lead Business Analyst, and Lead Engineer
Org3	5	Contract development	Lead UX Designer and UX Designer
Org4	17	In-house development	Creative Director, Lead UX Designer, UX Designer, User Interface (UI) Designer, UX Researcher, Lead Business Analyst, Product Owner, Customer Experience (CX) Specialist, and Service Design Lead

Analysis of the interview data showed that three main UXD activities were common across all the participating organisations. One of these UXD activities is the creation of user journey maps. As stated in section 2, user journey mapping is used to graphically illustrate the steps followed by a user to realise a goal while using a system. Org1, Org3, and Org4 typically create two types of user journey maps, the 'As-is' and 'To-be' journey maps. The 'As-is' journey map enables the design team to understand the steps that are currently being followed by users to accomplish tasks on an existing system.

Participants from Org1 and Org3, which operate as part of contract development teams, typically hold workshops with representatives from the contracting client to understand the current user journeys. In the case of Org4, where the participants operate as part of an in-house development team, workshops facilitated by the customer experience specialist, the UX researcher and the UX designer are held with representatives from the business unit(s) that request a new system or application to understand the existing user journey. Participants from Org2 do not create an 'As-is' user journey map. The three contract development organisations (Org1, Org2, and Org3) typically create the 'To-be' user journey maps, which will then be verified by representatives of the contracting organisations, whereas Org4 participants typically hold collaborative brainstorming sessions with the business unit(s) representatives to create the desired 'To-be' user journey map.

UxD process	Org1	Org2	Org3	Org4
Problem definition	●	●	●	●
Competitor analysis		●	●	●
Creation of personas (or proto-personas)	●	●	●	●
User stories	●		●	●
User journey mapping	●	●	●	●
Concept testing		●		●
Prototyping ○ Low-fidelity prototype ○ High-fidelity prototype	● ●	● ●	● ●	● ●
Heuristic evaluation		●	●	
Usability testing	●	●	●	●

Figure 1: User experience design processes per organisation.

Another UXD activity that is common across the four organisations is the creation of low and high-fidelity prototypes. As stated in section 2, prototypes are used early in the development process to facilitate a shared understanding of users' needs by users and designers. Participants from all four organisations typically create low-fidelity prototypes using paper sketches, whiteboards, or prototyping software. The prototypes are then shared with representatives from the client company (Org1, Org2, and Org3) or representatives from the business unit(s) that requested the new system or application (Org4). In all cases, the low-fidelity prototypes are refined based on feedback from relevant stakeholders and evolve into high-fidelity prototypes.

Usability testing is the third UXD activity that is common across all four participating organisations. As stated in section 2, usability testing involves evaluating the extent to which users can complete specific tasks on a system with efficiency and effectiveness. Although all four organisations conduct usability tests, the people that are involved varied from one organisation to another. For example, in the case of Org1, other employees working in Org1 whose profile matches that of the personas that have been created would typically be involved as usability test participants. However, such individuals would not have been involved in the design of the system being evaluated. This approach is followed because budget is typically not allocated to the recruitment of end-users as participants in usability tests. Participants from Org1 acknowledged the shortcoming of this approach to usability testing. However, due to budget constraints, they have adopted what they perceived as a pragmatic approach instead of not conducting any usability test. In the case of Org2, usability test participants are typically recruited through a third-party recruitment agency. However, in situations where there is a time constraint, representative users from the contracting organisation would be involved as usability test participants. In addition, the design team at Org2 typically caps the number of usability test participants to three in an attempt to speed up the design process. In the case of Org3, usability test participants were typically recruited only for features that are related to 'complex' tasks. The usability testing approach adopted by Org4 is different from the ones used by the three contract development organisations. In Org4, a series of tests are typically carried out on the design concepts, the 'To-be' user flow journey maps, and the high-fidelity prototypes with user representatives from the business unit(s) that requested the new system or application. The final system is also tested with end-users that are recruited through an external agency as test participants.

Three of the participating organisations (Org2, Org3, and Org4) have competitor analysis as part of their UXD processes. As stated in section 2, competitor analysis as a UXD activity enables designers to compare a product or design with that of competitors. In Org2 and Org3, competitor analyses are carried out through market scanning, interviews with competitors' customers, and investigation of local and international trends. For Org4, the design team often takes a first-hand experience approach to the analysis of the organisation's competitors. For example, one participant indicated she would sometimes sign up as a competitor's customer so that she could use their mobile banking apps to gain better insights into competitors' services.

Three of the participating organisations (Org1, Org2, and Org4) incorporate the creation of personas into their UXD processes, while participants from Org3 often create proto-personas. As indicated in section 2, a persona is a vivid representation of a user group that may use a system in a similar way, based on the insights derived from user research. A proto-persona on the other hand is based on stakeholders' knowledge of users as opposed to the results of user research. The proto-personas created by participants from Org3 are typically validated with representatives from the contracting company.

Three participating organisations (Org1, Org3, and Org4) create user stories as part of their UXD processes. As indicated in section 2, a user story provides a high-level description of the functionality that a user requires to achieve a specific objective when using a system. In all three organisations, the user stories provide the basis for the features that will be implemented in a target system.

Concept testing is one UXD activity that is used by two of the participating organisations (Org2 and Org4) as part of their design process. As stated in section 2, concept testing allows for the estimation of the extent to which users would use a product. In the case of Org2, concept testing is often used to determine whether a proposed system would appeal to the target users and to identify possible improvements to the user journey maps. On the other hand, Org4 uses concept testing to evaluate the low-fidelity prototypes that have been created for potential flaws. Org1 and Org3 do not conduct concept testing as part of their UXD processes.

Heuristic evaluation is another UXD activity that has been adopted by two of the participating organisations (Org2 and Org3). As indicated in section 2, the heuristic evaluation involves experts evaluating interface elements using a set of guidelines. In both organisations, designers conduct heuristic evaluations on their contracting clients' existing systems or applications as part of the problem definition process where there is an existing system or application. The outcome of the heuristic evaluation is then used to identify opportunities for improvement on the existing system. Org1 and Org4 do not use heuristic evaluation as part of their UXD processes.

5 DISCUSSION AND CONCLUSION

This study investigated the extent to which South African organisations are incorporating user experience design practices into their systems development processes. As stated in section 1, previous studies by Pretorius et al. (2015) and Brosens (2017) showed that the number of South African organisations that have embedded UXD into their systems development processes was low. Based on the findings of the study reported in this paper, the landscape of UXD appeared to be improving in South Africa. As discussed in section 2, some of the methods that could be used to incorporate UXD into systems development processes include user research, user stories, personas, prototyping, concept testing, and heuristic evaluation (Fronemann & Peissner, 2014; Gualtieri, 2009; Plonka et al., 2014; Rantavuo & Roto, 2013).

All four participating organisations have three common UXD activities as part of their systems development processes. These UXD activities are user journey mapping, prototyping, and usability testing. However, the extent to which the UXD activities have been infused varied across the four organisations. For example, Org1, Org3, and Org4 typically create 'As-is' and 'To-be' user journey maps, while Org2 typically create only 'To-be' user journey maps. Similarly, only three organisations (Org1, Org2, and Org4) have incorporated the creation of personas into their UXD practices, whereas Org3 typically creates proto-personas. As stated in section 2, proto-personas can lead to misconceptions about a target user group (McKeen, 2019).

Another variation in the participating organisations' application of UXD practices relates to the types of end-users that are involved during design. As stated in section 2, UXD is primarily a UCD approach where users should be actively involved throughout the development process (Gulliksen et al., 2003). Working in contract development contexts,

participants from Org1, Org2, and Org3 typically involve their clients' representatives as opposed to the actual end-users of the systems they develop. On the other hand, participants from Org4 who work as part of the organisation's in-house development team have direct access to users from the business unit(s) that request the development of new applications or modifications to existing ones. Hence, the system development context influences the extent to which end-users could be involved in the organisations' UXD processes. Examples of the influence of the system development context were evident in the processes that were being followed in the creation of user journey mapping, prototyping, personas, and usability testing activities. The design team in Org4 would typically hold facilitated workshops with end-users from the applicable business unit(s) in the organisation to create and test design concepts, user journey maps, and prototypes. End-users are also directly involved in usability tests. In the case of Org1, staff members who were not involved in the design of the system being evaluated would be recruited as usability test participants. While Org2 sometimes recruits end-users as participants in a usability test, this is not always the case. When there is a budget constraint, representatives of the contracting organisation would be involved as usability test participants. Similarly, the design team from Org3 only recruits end-users as usability test participants for features that were deemed to involve 'complex' tasks.

The use of concept testing is another UXD activity that differs in its adoption and application across the participating organisations. Only two organisations (Org2 and Org4) have incorporated concept testing into their UXD practices. However, the application of this activity is different in the two organisations. Org2 typically uses concept testing to ascertain whether a proposed system would appeal to the target users whereas Org4 uses the method to evaluate low-fidelity prototypes for potential design flaws.

Three of the four organisations (Org2, Org3, and Org4) typically perform competitor analysis as part of their UXD processes. However, this analysis is done through market scanning and interviewing the contracting company in Org2 and Org3. Whereas, Org4 often tries to experience its competitors' products directly by signing up as a client of the competitor to gain better insights into competitors' products.

Only two of the four organisations (Org2 and Org3) have adopted heuristic evaluation as part of their UXD practices. In both cases, the design team

conduct heuristic evaluation on their clients' existing systems or applications as part of the problem definition process only if there is an existing system or application.

The application of two UXD activities was similar across all four organisations. Low-fidelity prototypes are created by the design team and then shared with representatives of the contracting organisation in the case of Org1, Org2, and Org3. The low-fidelity prototypes are shared with user representatives from the business unit(s) that requested the new system or application in Org4. In all cases, the low-fidelity prototypes typically evolve into high-fidelity prototypes based on feedback from the stakeholders. Similarly, the three organisations that adopted user stories (Org1, Org3, and Org4) use the user stories as the basis of the features that will be implemented in a target system or application.

The adoption and application of user stories were also similar among the three organisations that have incorporated this UXD activity into their systems development processes. Org1, Org3, and Org4 all develop user stories as the foundation of the features that will be implemented in a target system or application.

In conclusion, there is evidence that the incorporation of UXD practices into systems development processes is improving in South African organisations. However, the extent to which UXD activities have been assimilated differs, especially between in-house and contract development contexts. Even among contract development organisations, the study results showed that the application of UXD activities differed.

A limitation of this research is that organisations that have incorporated UXD practices into their systems development processes were purposefully selected as the cases for the study. Future research will broaden the participating organisations to include those that may not necessarily have adopted UXD practices into their systems development processes. Future research will also consider the influence of the incorporation UXD practices on organisational competitive advantage.

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