A Review of Human-Centred Design Methodologies and How They Can be Used to Develop a Tool for the Infinity Culinary Training School

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ABSTRACT

Unemployment is a big challenge in South Africa and is often caused by a lack of education and a lack of life skills necessary for jobs. Non-profit organisations (NPO) like Infinity Culinary Training (ICT) help to alleviate unemployment by training underprivileged people with the skills necessary to gain employment. ICT currently has a problem in keeping track of student records as the school continues to grow. Therefore, designing a tool for the ICT school will necessitate the use of human-centred design (HCD) methodologies to set and meet specific requirements. This literature review investigates several HCD methodologies, namely participatory design, ethnographic fieldwork, contextual design, empathic design, co-design and the DART method. It also looks at NPOs, similar to ICT, who make use of technology in their operations. The paper then compares the different HCD methodologies and the two NPOs and then looks at which HCD methodologies are beneficial for the current phase of the project. The review of the similarities of the HCD methodologies reveals that participatory design, contextual design and the DART method will all be beneficial in the current phase of the project and DART will also be useful throughout the project cycle. It is also noted that the other NPO is similar in some ways but differs in their use of technology. Finally, it is concluded that an IT system is the best option to solve the current problem ICT has with their student records and that this system will be designed following the HCD process.

Keywords

HCI, HCD, ICT4D, Unemployment, NPO, Co-design, Participatory Design, Contextual Design, methodology, software design

1. INTRODUCTION

Unemployment is one of the biggest challenges faced by South Africans who come from a disadvantaged background. In most cases this unemployment can be partially attributed to a lack of education and life skills that are necessary to stay employed [1]. There are non-profit organisations (NPO) that aim to alleviate this unemployment by training people with the necessary skills to acquire and keep a job. One such NPO is Infinity Culinary Training (ICT).

The main aim of the project is to collaborate with ICT a NPO and chef school in Cape Town. They aim to provide free culinary training for disadvantaged people so that they may work in the hospitality field [4]. One of their goals is to provide their students with the necessary business and life skills so that they may succeed in acquiring employment. Currently they make use of excel spreadsheets to keep track of all current and past students. As the number of students increases this system becomes increasingly difficult to use, it becomes difficult to keep track of students and their employment details. For this reason, it is necessary to provide ICT with a better solution for keeping track of their students. Therefore, it is quite beneficial for ICT to take part in a project whereby they will help design an IT system that will make their day-to-day operations simpler.

The project will focus on Human-Centred Design (HCD) methodologies wherein there will be collaboration with ICT to understand their needs and then build and evaluate products that may fulfil those needs. This collaboration will be based upon methodologies that are used for HCD. The HCD field is an important field as it supplies researchers and professionals with methodologies they can apply to successfully collaborate on projects, with a strong focus on the people they are designing for [16].

This literature review will start by considering the current phase of the project with ICT. It will then move on to look at other non-profit organisations that aim to combat unemployment. This will be followed by an in-depth review of HCD and a few of the methodologies usually associated with HCD projects. At this point, there will be a discussion of the similarities and differences between ICT and the other NPO, a comparison of the HCD methodologies and finally the HCD methodologies that would be

useful for the project in its current phase. Finally, the review will end with the conclusions based on the above-mentioned sections.

2. CURRENT PROJECT PHASE

At the time of writing this literature review the project is still in the early stages wherein the team is conducting interviews and generating knowledge to create a solution that could be useful for the staff and students at ICT. Initial interviews have been conducted with the operational staff and the lecturers at ICT. The aim is to apply HCD methodologies to this project to aid the design of a system that will benefit the staff and students at ICT.

3. NON-PROFIT ORGANISATION USING TECHNOLOGY TO COMBAT UNEMPLOYMENT

The GetOn Skills Development Centre is an NPO that aims to give people in impoverished communities in Pretoria necessary business and life skills [7]. They attempt to alleviate poverty by providing multiple training programs that can help these people to become economically active. They achieve this through their courses which provide people with the necessary skills to obtain employment. In addition, these courses also try to develop them socially and emotionally so that with all these skills they may become financially independent and provide for their families. Many of the courses offered teach computing skills, these include the basic computers, point of sales and office administration courses [7]. Once students have gone through a course they can acquire a job and earn an income. They train hundreds of Pretoria based youths aged 18-30 each year. Of these students 70% of them can obtain employment within 3 months of completing a course. These courses are not free, however they are not overly expensive and the cost depends on the course and its duration. The courses are accredited and at this point have helped to alleviate unemployment in Pretoria.

4. HUMAN-CENTRED DESIGN

Human-centred design (HCD) is a design process where there is a focus on the requirements and needs of the end-user [18]. The end-users help in the design of a solution and aren't just providing the researchers/designers with information, this implies that there is active involvement of end-users in the HCD process [16]. In this approach the expertise of the researchers/designers is combined with the expertise of the end-users to help improve the end-user's current situation [13]. It allows for an early focus on the end-user which is beneficial for understanding the end-users needs and wants early in the project [6]. Sawhney, et al. argues that collaboration between end-users and researchers/designers is an important aspect in creating solutions or products for the end-users [14]. There are many different methodologies that are categorised as HCD methodologies, a few of these are described below.

4.1 Participatory Design

In this methodology, the end-users are treated as experts who bring their knowledge, expertise and skills into the design process [16,12]. The goal of this methodology is for end-users and designers/researchers to create a tool together that will enhance the end-user's ability to perform certain tasks [8,16]. In other words, the goal of Participatory design is mutual learning whereby the end-users learn about the process of designing and the researchers/designers learn about the tasks an end-user may need to perform [16,15]. Implementing the participatory method could involve workshops and interviews with end-users to explore problems and develop solutions [8,16]. There is a range of theories and practices for conducting participatory design but the key point is that the goal is to work directly with users and other stakeholders to design the solution [5,9].

4.2 Ethnographic Fieldwork

This methodology involves designers/researchers going out into the field to observe and better understand end-users by conducting interviews and observing the end-users [16]. This methodology aims to bring the end-users views and perspective to the forefront of the design process [16]. In many cases the ethnographic approach is used to observe end-users in their use of a product and then try to understand why the user behaves in that way [2,16]. In other words, the ethnographic method attempts to get designers/researchers to see a situation through the eyes of the end-user [2,16]. Many projects make use of both ethnographic and participatory methods together. The participatory method will gather knowledge about the end-users and their current problems and practices while the ethnographic method will allow researchers/designers to evaluate products based on observation of end-users [16].

4.3 Contextual Design

This is a methodology wherein the researcher/designer will observe end-users performing tasks or even act as an apprentice to the end-user to gain insight into the end-user's operations [2,16]. The researcher/designer can then use this insight to aid in designing a system for the end-user [16,3]. The project members will gather knowledge about the end-users and then transfer this knowledge to the development process. From this knowledge, the project team can then come up with product requirements [16]. In other words, the goal of contextual design is to get knowledge about the end-user's current situation and then apply this knowledge to a future situation [2,16].

4.4 Empathic Design

This methodology aims to get the researchers/designers to observe and get close to the end-users in their daily life and at work to try to empathise with the end-user's experiences and emotions [2,8,16]. There are many different methods of performing empathic design and with this comes a multitude of techniques that can be combined into a project using empathic design [16]. Examples of techniques that can be used in empathic design include observing end-users and role-playing aspects of an end-user's life [2,16]. As the name suggest the goal of empathic design is to empathise with end-users and then use this knowledge and experience to create a solution that end-users will be able to

use. The researchers/designers attempt to experience something about the end-users and use this experience to find inspiration and even to creatively design solutions [2,8,16].

4.5 Co-design

This methodology focuses on the collaboration of researchers/designers and the end-users in all phases of the design and implementation of a project [16]. It can be viewed as a way to help organise joint creativity between end-users and researchers/designers [17]. In co-design end-users and researchers/designers will jointly create sketches, prototypes, mock-ups and other generative tools that aid communication to design a solution for the end-user's problem [8,16,11]. The knowledge of the end-users and researchers/designers is brought together to generate knowledge about a favourable future solution [16]. In other words, co-design is a collaboration of all stakeholders to create a solution/product that solves a problem for the end-users [8,16].

4.6 DART method

DART stands for Dialogue, Access, Risk-Benefits and Transparency [10]. This methodology asserts that dialogue, access, risk-benefits and transparency are important aspects of co-designing or co-creating [8]. Dialogue implies that both researchers/designers and end-users are equally important and can engage and communicate to create solutions. This dialogue must be centred on issues that are of interest to all stakeholders [10]. Transparency is important as it allows end-users and researchers/designers to communicate and keep track of all aspects of the project, all knowledge is shared [10]. Access is quite similar to transparency in that all knowledge is shared, in this case it refers to both end-users and researchers/designers being able to access all information for the project [10]. Lastly the risk-benefits is for end-users and researchers/designers to understand the risks and benefits associated with the project [10]. Using the DART method can result in better engagement for all stakeholders in the project [8].

5. DISCUSSION

5.1 Non-profit Organisations

The GetOn Skills Development Centre and ICT both aim to alleviate unemployment and poverty in disadvantaged communities in South Africa. They are both non-profit organisations that work with people from disadvantaged communities to supply them with business and life skills that can help them to acquire employment. ICT supplies their students with a free course in culinary training while GetOn provides their students with many different skills, depending on the course, at a small fee. In both cases the courses aim to give the students life skills and the necessary skills to acquire jobs in a specific field. ICT does not currently make use of computers for teaching the students, while in GetOn it is an integral part of many of the courses for the students to be trained while using computers. Therefore, GetOn makes use of technology a bit more in their courses than ICT does. However, it is not necessarily the case that ICT would need to use computers for training the students as they are learning culinary skills. The need for a technological solution at ICT is mostly in the operation and running of the school where the current systems in place are quite tiresome and require some effort to use. As shown above, there are many similarities between the schools but in terms of their technological needs they are quite different. Both schools are trying to alleviate unemployment and therefore it is beneficial to compare them to get a better understanding of the needs for ICT even if their technological needs are vastly different.

5.2 Comparison of HCD Methodologies

There are many HCD methodologies that can be applied to projects with different requirements. When working on an HCD project one must choose from these methodologies or even use multiple methodologies together. Contextual design, ethnographic fieldwork and empathic design all have an emphasis on the knowledge of the designers/researches and has a focus on their use of this knowledge to help the end-users. Whereas participatory design and co-design have an emphasis on the knowledge of the end-users and a focus on how this knowledge helps them with research and design activities. Empathic design and co-design also tend to have an emphasis on an opportunity or the future situation while, participatory design and ethnographic fieldwork focus on a problem or the current situation. In participatory design and co-design there is a focus on end-users participating in the design process and collaborating with the researchers/designers. Whereas in ethnographic fieldwork and contextual design the researchers/designers will get knowledge about the end-users and then use this knowledge to come up with a solution for the end-users. In empathic design researchers/designers tend to use the knowledge generated to create a solution for the end-user but the method they use to generate this knowledge is to empathise with the end-user instead of collecting it through interviews and other such methods [16]. The DART method tends to have a focus on the knowledge of all stakeholders in the project, it aims to allow for engagement that is transparent. The DART method tends to emphasise the importance of the engagement of all stakeholders in all aspects of the design and implementation process. While the literature reviewed does tend to include aspects such as which methods work best in certain situations it fails to mention which methodologies would work well with each other. As such it is up to the research/design team to decide on an appropriate strategy for their project. Due to participatory design and co-design being similar but focusing on different techniques and stages in design it would be quite beneficial to have a combination of the two methodologies in some cases. Participatory design would be the focus in the initial stages of such a project for interviewing end-users and co-design would then be the focus during the implementation phase by using prototypes and user evaluations of iterations.

5.3 Relevant HCD Methodologies for this Project Phase

After careful consideration of all the above-mentioned methodologies and the current phase of the project it would be beneficial to make use of the participatory design methodology. As this phase of the project is focused on collecting information and generating knowledge, running interviews and workshops with the end-users is more than sufficient at this point. The participatory methodology will allow the ICT staff and students to

have an involved role in the design and implementation of the system. They will easily be able to give feedback and supply the team with their opinions and views. Another methodology that would fit in well with this phase of the project is contextual design. By following the end-users and observing their everyday actions the team can also generate useful knowledge that will aid in designing the system. The ideas behind the DART method should also be kept in mind, it will allow for mutual respect and trust between all stakeholders in the project. The research/design team and the staff and students of ICT will be able to transparently share knowledge and engage meaningfully to jointly solve the current problems [8].

6. CONCLUSION

As explained in this literature review there are a multitude of design methodologies that can be applied in human-centred design. In addition, there are many ways to implement each of these methodologies. These methodologies have both similarities and differences between each other, and many of these methodologies can be combined or used together in human-centred design projects. Each of the methodologies have different contexts in which they would excel, and in some cases combinations may be the best option [16]. Additionally, some of these methodologies only work at certain stages of the project cycle. These methodologies focus on giving the end-users a voice in the design process and thus allow the researchers/designers to more effectively solve the problems [16]. HCD methodologies allow researchers/designers to collaborate with the end-users throughout the project to design a system that is what the end-users want and need.

This review also looks at NPOs that aim to alleviate unemployment with a specific focus on ICT as a stakeholder in this project. It draws parallels between ICT and GetOn and then notes that there are significant differences in the requirements for these organisations. ICT will require an IT system for their operations as opposed to the IT systems used for GetOn, which focus on delivering the course content [4, 7].

In terms of the project, it would be beneficial to implement some of these methodologies to effectively design a solution for ICT. As stated a combination of the participatory and contextual design methodologies would be quite advantageous in the current project phase. In addition, the DART method would be useful throughout the whole project as it promotes transparency and better communication between all stakeholders [8]. These methodologies would allow the research/design team to generate knowledge about ICT and better understand their needs and wants in this project [16]. This review also allows for the conclusion that an IT system would be the best solution for the problem ICT has. Their current systems are disorganized and quite difficult to work with as the number of students increases and a new system made through an HCD design process would greatly benefit them.

7. REFERENCES

1. Banerjee A, Galiani S, Levinsohn J, McLaren Z, Woolard I. 2006. Why Has Unemployment Risen in the New South Africa?. J. IPC Working Paper Series 35. (December 2006).
2. Daae J, Boks C. 2013. A classification of user research methods for design for sustainable behaviour. J. Journal of Cleaner Production 106. (May 2014). Retrieved April 26, 2017 from http://www.sciencedirect.com/science/article/pii/S0959652614004120
3. Holtzblatt K. 1999. Introduction to special section on contextual design. J. Interactions 6. (January 1999).
4. Infinity Culinary Training. 2009. Infinity Culinary Training. Retrieved May 10, 2017 from http://www.ictchefs.org/
5. Kensing F, Blomberg J. 1998. Participatory Design: Issues and Concerns. J. Computer Supported Cooperative Work 7. (March 2008).
6. Kujala S. 2003. User involvement: A review of the benefits and challenges. J. Behaviour & Information Technology 22, 1. (2003).
7. LeadSA. (2013). Helping to tackle youth unemployment in Pretoria. (November 2013). Retrieved May 10, 2017 from http://leadsa.co.za/articles/7820/helping-to-tackle-youth-unemployment-in-pretoria
8. Mukhtar M, Ismail M.N., Yahya Y. 2011. A hierarchical classification of co-creation models and techniques to aid in product or service design. J. Computers in Industry 63. (April 2012). Retrieved April 26, 2017 from http://www.sciencedirect.com/science/article/pii/S0166361512000474
9. Muller M.J., Wildman D.M., White E.A. 1993. Taxonomy of PD Practices: A Brief Practitioner's Guide. J. Communications of the ACM 36, 4. (June 1993).
10. Prahalad C.K., Ramaswamy V. 2004. Co-Creation Experiences: The Next Practice in Value Creation. J. Journal of Interactive Marketing 18, 3. (2004). Retrieved April 26, 2017 from http://www.sciencedirect.com/science/article/pii/S1094996804701073
11. Sanders E.B. 2000. Generative Tools for CoDesigning. Collaborative Design. (2000).
12. Sanders E.B. 2002. From User-Centered to Participatory Design Approaches. Design and the Social Sciences. (2002).
13. Sanders E.B., Stappers P.J. 2007. Co-creation and the new landscapes of design. J. CoDesign: International Journal of CoCreation in Design and the Arts 4. (June 2008).
14. Sawhney M, Verona G, Prandelli M. 2005. Collaborating to Create: The Internet as a Platform for Customer Engagement in Product Innovation. J. Journal of Interactive Marketing 19, 4. (September 2005).
15. Spinuzzi C. 2005. The Methodology of Participatory Design. J. Technical Communication 52, 2. (May 2005).
16. Steen M, Kuijt-Evers L, Klok J. 2007. Early user involvement in research and design projects - A review of methods and practices. Paper for the 23rd EGOS

Colloquium. Retrieved April 26, 2017 from http://www.marcsteen.nl/docs/EGOS2007%20Early%20user%20involvement.pdf

17. Steen M, Manschot M, De Koning N. 2011. Benefits of Co-design in Service Design Projects. J. International Journal of Design 5, 2. (August 2011).

18. Vredenburg K, Mao J, Smith P.W., Carey T. 2002. A Survey of User-Centered Design Practice. J. CHI 4,1. (April 2002). Retrieved May 1, 2017.