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Automation Experience at the Workplace – Playing the 1980’s Record?

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When we talk about user experience of automation at work, are we back to the 1980’s when computers arrived to the workplaces and automated manual work? We seem to be playing the same record of understandability, usability and automation interaction today as 40 years ago when Human-Computer Interaction (HCI) research gained momentum by studying the same topics. This position paper reviews the HCI waves to explicate the new perspective we should take to user experience research in the 2020’s.

Additional Keywords and Phrases: UX at work, Automation, HCI history, Design for Wellbeing

1 INTRODUCTION

When I talk about user experience (UX) of work automation being my present interest area, fellow researchers often give me that look: ‘She has dropped off the cutting-edge research, UX at work research was done long ago when digitalization started’. In this workshop paper, I practice providing an explanation on what makes automation experience at the workplace a cutting-edge research topic. I base my long explanation on the development of Human-Computer Interaction (HCI) research field, the so-called waves of HCI. It may explain what kind of UX I study and what is new in this research area.

1.1 Human Factors – the 1st wave of HCI in 1980’s

Human-computer interaction (HCI) research started in work contexts. Efficient and accurate use of computers at workplaces required research on new type of interaction between man and machine, since the new computing machine was not a mechanical one. The first wave of HCI during the 1980’s studied the human factors: how can human understand computers and interact with them without making costly mistakes (e.g., Card, Moran & Newell 1983). The objective was to avoid human errors and fully utilize the expensive computers by efficient input by human operators. Seeing the user as an extension of the system, the first wave of HCI was system-centric rather than human-centric.

1.2 Usability – the 2nd wave of HCI in 1990’s

When computers spread out of workplaces, the roles between human and computer changed from user as a servant for the computer to computer as a servant for the user. HCI research moved from human factors to human actors (Bannon 1986), and the mindset changed to user need fulfilment. The key theme of 1990’s, the 2nd wave of HCI research, was usability. While user-friendliness of software systems increased a lot by

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improvements in efficiency and effectiveness, the satisfaction element of usability was defined as freedom of discomfort (ISO 1999). This shows that on this wave, the focus was on removing usability problems, and thereby removing user's frustration.

1.3 User experience – the 3rd wave of HCI in 2000's

The popular keyword for the 3th wave was user experience (UX). The idea about experience design, in contrast to utilitarian design, came out 1999 (Sanders & Dandavate 1999), and the Funology book some years later (Blythe et al. 2003) convinced the HCI field to not only fix the usability bugs in interactive systems but also design enjoyable interactions. This was an important shift in the design goal of interactive systems: from freedom of discomfort to providing positive experiences (Hassenzahl 2008). Unfortunately, this shift has not been easy to explain or understand, and the UX hype term was soon devalued as a synonym for usability, user-centredness, or plain user interface.

1.4 Wellbeing – the 4th wave of HCI in 2010's

Since 2010, HCI research has been expanding to manifold directions, and it is hard to name one theme for the 4th wave. From affective UX research perspective, however, the field has moved from design for momentary pleasure (fun) towards subjective wellbeing and human flourishing over time, e.g., studies on healthy lifestyle (Desmet & Pohlmeier 2013, Steen 2016). This has led to the positive design movement of wave 4, where the basic psychological needs (Ryan & Deci 2000) play a central role. As Hassenzahl et al. (2010) showed, positive experiences with technology can be mapped to the basic psychological needs. These needs are also connected to wellbeing (e.g., Orkibi & Ronen 2017), and experiences with technology that supports the need fulfilment can improve wellbeing.

2 AUTOMATION EXPERIENCE AT WORK

It is alarming that research of interactive systems at work seems to reside on the 2nd wave (usability). A vast majority of the HCI publications studying UX at work context are focusing on improving efficiency and effectiveness or on removing frustration (Roto, Palanque & Karvonen 2018). It is hard to locate publications that study designing interactive systems for positive UX at work, such as work engagement and feeling proud of one's work (ibid.).

Even worse, Human-Automation Interaction research at work largely stays on wave 1, human factors, since researchers struggle finding the way to make automation systems easier to understand, and the same problem of incomprehension of the complex work systems is topical also in Human-AI Interaction (Liao et al. 2020). Human operators of highly automated systems are often seen as the problematic part of the automation systems. Indeed, automation design gives the operator a role of extension of or servant for automation. And responsibility on top of it.

Monitoring work is the most inhuman job role, since human cognition is not built for hours-long monitoring autonomous systems. Staying alert while an autonomous car is driving you is a popular example of this. Unfortunately, development of systems to higher levels of automation tends to assign us this supervisory role, although research has not been able to solve the human factors problems it introduces in 30 years (Mouloua 2019). Mouloua (2019) concludes: "Given *that the development of automation shows little evidence of declining,*

human factors professionals will be severely challenged to come up with effective methods to help those who will be required to ‘watch the computers.’

The visions of minimal human role in a fully automated production systems have led to neglect of human-automation interaction (HAI) design. While we know that human operators do need the possibility to intervene the automated process, we are in a similar position as in the 1980’s when it was difficult to imagine how human-computer interaction should be organized.

2.1 The record of 2020’s

I hope it will not take us 40 years to figure out how to design automation for employee wellbeing. We need to start by turning the prevalent system-centric perspective to automation to human-centric, just as HCI turned the focus from computers to people in 1980’s. Such concepts do exist in consumer products, such as conversational agents (Janssen et al. 2019), but are those interfaces the right solution for interacting with complex professional automation?

HCI and HAI researchers of the 2020’s should take the IEEE ethics guideline as the baseline and set increased human wellbeing as the primary success factor for design of intelligent systems (IEEE 2019). While ethics should be a baseline, in practice prioritizing employees over business success may be difficult to sell. However, also companies know ethics is increasingly important, and organizing the future of work with AI will require new attitude from industry (ILO 2019).

Rethinking Human-Automation Interaction from the perspective of prioritizing employee wellbeing has much potential both from research and practice perspective. Radically new interaction methods are needed in order to make high levels of automation usable, enjoyable, and sustainable from employee’s perspective. This is the record we play in the 2020’s.

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