A Duality of Digitalization

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Abstract

Throughout the last 2 decades, workplaces have been provided with digital services for optimizing work activities and processes. A variety of professions have incorporated their tasks for teaching and learning through the utilization of novel digital services. Teachers and students have the opportunity to interact with each other regardless of geographical locations through distance education and learning. Overall, the phenomenon of digitalization has generated consequences and effects for the society in general, and workplaces and professionals in particular.

Recently, a notion of digitalization has reached projects conducted on a national level for integrating newcomers in Sweden. The Swedish government has appointed members from University West, together with a municipality in West Sweden to launch a novel digitalization project. The project emphasizes challenges and issues with designing, developing and evaluating an open digital experience in Civic Orientation. This paper examines and discusses a duality of digitalization by investigating how we can understand the tension between professional's pre-understanding and affordances of digital services in Civic Orientation. We will present results from interviews with professionals at the municipality, together with results from a survey evaluation. We argue in the paper, that it is beneficial for further research, to understand the tension between professional's beliefs and affordances of digital services.

Introduction

The rise and development of new technologies has throughout the last three decades of technological evolution, formed and transformed societies capacity to process and understand the roles and values of technology at use (Castells, 2010). The phenomenon of digitalization has given rise to different instantiated forms of consequences for the society in general, and workplaces and professionals in particular (Taras et al., 2004; Acemoglu & Autor, 2011). Consequences of digitalization have for example resulted into increased investments of digital devices and services at work (Teknion, 2011), mediating activities for professional's needs of collaborating across geographies in real time (Bean & Eisenberg, 2006; Venkatesh et al., 2010), and increasing the management of workplace learning (e.g. blended learning, flipped classroom) through the use of supporting IT-tools (e.g. video-conferencing tools, learning management systems). But at the same time, creating and establishing a fully acceptable digital workplace, may in terms of exploring technology at work (Orlikowski, 2000; 2007), generate significant challenges for both designers of services and professionals whom use the services at work.

One challenge with digitalizing workplaces deals with design and functionality of digital services in terms of what they have to offer. The properties of what digital services have to offer, exhibits the possibility of some action (e.g. clicking a button, opening a web-browser) providing professionals a relationship between the properties of digital services and the capabilities of professionals, which determines just how digital services could be used. Scholars such as Norman (1988; 1999) and Van Lier, (2004) define this relation as *affordances*, generating perceived action possibilities for

professionals, which they may perceive and act upon. Such affordances emerges partly through the constitution of digital services (e.g. design and functionality), but mainly through how professionals perceive what the services has to offer in terms of available information indicating for possible actions (Gave, 1991). Therefore, it is a challenge for professionals to easily perceive and comprehend affordances of digital services for proper action and use.

Another challenge with digitalizing workplaces emphasizes the aspect of professional's pre-understandings (e.g. beliefs, pre-conceptions, prejudices) towards the establishment of desired digital services. Professionals interact with desired digital services based on their pre-understandings on how similar digital services work. Their capacity to fully understand the added value with digital services at work, may affect the quality of coordinating and operationalizing workplace learning activities that are beneficial for the professionals. In turn, professionals may not fully grasp the potentials of digital services, and therefore neither fully utilizes their learning capacity and skills at work.

When professionals whom intend to work with digital services starts to use them as a system, their ways of understanding the structure and possibilities with the system are governed by their pre-understandings (beliefs, pre-conceptions, prejudices). Their pre-understandings affect how they perceive the system's affordances. Also, depending on differences between professional's pre-understandings, different users may create their own conceptions regarding the purpose of the actual system. In some cases, their experiences and pre-understandings may vary to a degree where professionals actually interpret one and a same system as two different ones. In such cases, the system is perceived as two different systems. We argue that such situation, where professionals derive their perception from their pre-understandings and perceive one system as two

different ones with different purposes, creates a duality of digitalization, which may generate potential challenges and opportunities for professional's affordances of digital services, which in turn may affect their potentials of learning at work.

Problem

Recently, a digitalization project was initiated as a case study for designing, developing and introducing digital services for an open digital experience of Civic Orientation (Haj-Bolouri & Svensson, 2014). Professionals such as tutors, administrators and coordinators at a municipality in Sweden, were all included as involved participants throughout the process of digitalization. Their initial ideas and knowledge have through iterated forms of group activities (e.g. design workshops, meetings) evolved and flourished into new forms of knowledge and learning outcomes. They have together with members from University West, been involved in supplementary courses for learning how to manage and use various forms of digital services for collaboration, production, maintenance, organization and distribution of an open digital experience of Civic Orientation. In this paper, we will investigate how we can understand a potential phenomenon for research.

We have throughout the last two months of the project, together with findings from our earlier studies (Haj-Bolouri et al., 2014; Haj-Bolouri & Svensson, 2014), observed a constitution of the phenomenon. We define this constitution as an emerging tension between professional's pre-understandings and affordances of digital services in Civic Orientation. Hence, in order to contribute an understanding upon our observed phenomenon, we formulate the following research question:

- *How can we understand the tension between professional's pre-understandings and affordances of digital services in Civic Orientation?*

We do not aim to understand the nature of our research question from an ontological point of view, where we formulate a general ontology for how the tension emerges and behaves. Instead, we humbly intend to ground our research question in empirical findings from our digitalization project. Doing so, our purpose is to *investigate,* rather than to *formalize,* how we can understand professional's pre-understandings and the affordances of digital services in Civic Orientation. Furthermore, we have the ambition to clarify how a potential duality of digitalization relates to findings from our research question.

In the forthcoming sections, we will briefly describe our case study, present our methodology for this paper, and also build a discussion based on our results for this paper.

The Case of Proximity and Distance: Civic Orientation and IT

"Proximity and Distance: Civic Orientation and IT" is the title of our digitalization project. The pilot-phase in the project initiated in late 2013 and finished in the end of March 2015. The initial purpose of the project was to develop technology and pedagogical strategies for implementing and distributing an open digital experience of Civic Orientation. A second purpose was to create proper organizational prerequisites for professionals such as tutors, administrators and coordinators at the municipality. The goals with the prerequisites were to provide the professionals with proper knowledge on how to organize activities for producing, maintaining, distributing and presenting learning material in Civic Orientation. Professionals at the municipality were due to their roles and tasks, divided into three different categories:

- **Tutors**: responsible for teaching and supervising the newcomers in Civic Orientation. They conduct teachings in both classroom-environments, but also flipped classroom-environments through e-learning.

- **Administrators**: responsible for producing and maintaining learning material in Civic Orientation, by using digital services for group-collaboration. They are also responsible for updating the digital infrastructure with content and new features.

- **Coordinators**: responsible for coordinating and arranging group activities at the municipality. They are also responsible for distributing learning material in Civic Orientation.

The third, final and most crucial purpose with the project was to provide newcomers in Sweden (e.g. immigrants entering Sweden) with 60 hours of Civic Orientation, engaging and including them in supervised lectures on societal themes such as democracy, employment, studies etc.

Several activities were conducted throughout the lifecycle of the project, emphasizing activities and processes for identifying early needs and requirements for design and development of digital services, incorporating activities for production, maintenance, distribution and presentation of Civic Orientation. We have during the long run of the project, collaborated together with different professionals at the municipality, engaging them in various activities and processes such as design workshops for identifying early needs and requirements, weekly reconciliations and decision making, design and development activities, and supplementary courses on how to manage and use digital services sufficiently for learning activities (e.g. classroom-teachings, distance lectures, blended learning). We have also written research papers, addressing the following challenges and issues in the project:

- Conceptual design implications for creating and distributing advanced learning modules in Civic Orientation (Haj-Bolouri et al., 2014)

- Tentative design principles for an open digital experience of Civic Orientation (Haj-Bolouri & Svensson, 2014)

- Conceptualizing the essence of presence for learning prerequisites in distance learning and education (Haj-Bolouri & Flensburg & Svensson, 2014)

But until now, we haven't investigated and problematized the consequences and effects of digitalizing Civic Orientation. Neither have we ever before conceptualized any notions on the evolvement of professional's pre-understandings and learning outcomes throughout the project.

Method

Between February and March 2015, we conducted a survey evaluation together with professionals (tutors, administrators and coordinators) at the municipality. The survey was created with Google Forms. 20 respondents were asked to answer questions emphasizing the usability of digital services, together with the respondents learning outcomes. A link to the survey was distributed through e-mail to the respondents, providing them a semi-structured survey-questionnaire with the following questions:

Question
Q1. *Have you used the digital services?*
Q1.1. *If 'No', why haven't you used the digital services?*
Q2. *Do you experience that the digital services fulfill your expectations?*
Q2a. *What features of the digital services contribute to your experience?*
Q2b. *Do you believe that the digital services will fulfill your expectations in the future?*
Q2c. *What features do you miss among the present features of the digital services?*
Q2d. *How should the digital services have been designed and developed instead?*

| Q3. *How have you used the digital services?* |
| Q4. *Describe your general experience with IT and computers* |
| Q5. *Describe your previous experience of using IT as a supporting tool for learning* |
| Q6. *Other comments* |

Table 1. Questions for a survey evaluation

The questions in our survey evaluation are formulated with the intention to investigate and identify the tension between professional's pre-understandings and affordances of digital services in Civic Orientation. Each and every question emphasizes a certain aspect of our purpose and research question in this paper. For example, questions Q1, Q2 and Q3 emphasize the respondent's expectations, their actual interaction with, and affordances of, digital services. Questions Q4 and Q5 emphasizes the respondents pre-understandings in terms of their previous experience with IT in general, and IT as a supporting tool for learning in particular. Together, the questions have the potentials to point our understanding into right direction.

We will analyze the results by applying a basic thematic analysis approach (Guest et al., 2012), with the ambition to transform our qualitative data into themes, which represents a level of patterned response or meaning from our collected answers. We are however not intending to interpret our data into *latent themes* (Boyatzis, 1998), because we are at this moment of time not interested in identifying underlying ideas, assumptions or patterns. Instead, we are interested in generating themes that may help us provide an initial, but accurate, understanding of the "big picture" (Braun & Clarke, 2006).

Results

20 different respondents answered our survey evaluation. Each and every respondent were professionals from the municipality, working as tutors, administrators and/or coordinators. The findings from our survey evaluation indicate that there is a tension between respondent's pre-understandings and affordances of digital services in Civic Orientation. By judging from the content of our findings, the results mainly reveal and implies for an understanding based on the following themes:

- **Theme 1 - *Professional's previous experience of using IT as a supporting tool for learning activities***: 35 % of the respondent's answers implied for a *high level of experience*, 45 % of the answers implied for a *normal level of experience*, and 20 % of the answers implied for a *low level of experience*

- **Theme 2 - *Professional's IT-skills in general***: 35 % of the respondent's answers implied for a *high level of skills*, 60 % of the answers implied for a *normal level of skills*, and 5 % were dropouts.

- **Theme 3 - *Professional's affordances of digital services in terms of functionality and usability***: 60 % of the respondent's answers implied for *sufficient functionality, intuitive usability and content*, 27 % of the answers implied for *non-sufficient functionality*, and 13 % of the answers implied that *it is difficult to know anything att his moment of time*.

- **Theme 4 - *Professional's future beliefs on the affordances of digital services***: 80 % of the respondent's answers implied for *positive beliefs and expectations*, 10 % of the answers implied *that it is to early to conclude anything substantial yet*, and 10 % of the answers implied for *negative beliefs and expectations*.

Concluding Discussions

In this paper, we have investigated how we can understand the tension between professional's pre-understandings and affordances of digital services in Civic Orientation. We have contextualized our research question in a recent digitalization project, by conducting a survey evaluation together with 20 respondents. Judging the findings from our survey evaluation, emerging themes shows that there are variations in the respondents' answers. But the variations can be separated into two distinct groups of respondents: the first group of respondents consists of respondents who sees potentialities in how the digital services can be used to develop, design and conduct Civic Orientation. The second group of respondents describes the new digital services as a different form of distribution than how the services actually are used today.

The second group of respondents, which didn't explicitly recognize the pedagogical possibilities with the services, describe themselves as professionals with a low level of experience with using computers and IT as a supporting tool for learning. They imply that the new digital services simply work as a different form of distribution, without any greater amount of differences in terms of what they have to offer. An excerpt from the answers shows how two of the respondents from the second group express their answers:

- *"The services resemble the old PowerPoint software that we are using right now."*
- *" There are at the moment no explicit 'profits' with using the services instead of using a USB-stick with all the learning material."*

The first group that have a higher level of experience with using IT as a supporting tool for learning, share a different view in terms of potentials with using the digital services. They recognize a developing support for individual adaptation for learning

and possibilities with developing pedagogies for learning (e.g. flipped classroom). Particularly, they have noticed how they can use the digital services to create learning modules and courses in Civic Orientation with unique learning material for each course: "*We can use the services to create new course-pages and distribute learning material in form of video clips.*"

The distinction between the two groups is so obvious that one can describe it as a duality. Our results reviled that the duality has existed before the design and development of the new digital services, and that the duality is based on the professional's experiences with other IT-services from before. Furthermore, the duality shows how the respondent's divide their views into two different ones, emphasizing one and the same digital services. Their views generate an understanding about how the tension between professional's pre-understandings and expectations operate with their affordances with digital services in Civic Orientation. Such tension can generally be established because of several different reasons. One general example on how such tension can be established emphasizes frequently used software such as Microsoft Word: when a new version of MS Word is installed, the design and layout is different from the previous version. The previous version and the affordances of users (such as professionals), creates a pre-understanding for how Word can be used. A consequence of such relation creates a tension, which affect the user's conception of Word in terms of what it has to offer and how the functionality is allocated. Users may in other words allocate desired functionality, which hinders them from establishing a wider picture about the actual potentialities with Word. If Word is, for a organization, a commonly used software, the organization may benefit from introducing the software for potential users, before it is installed and implemented.

It is possible that previous experiences of digital services affect how a professional perceives new forms of digital services and what they have to offer. The experience of using a certain feature, governs how previous experiences of using similar digital services, affect the professional blinding them from recognizing new possibilities and potentials with new digital services. Experiences from learning supported systems (such as digital services in Civic Orientation) affect respondent's views in terms of how they recognize novel possibilities with using newly introduced digital services.

The difference between the groups and their views upon newly introduced digital services in Civic Orientation, shows how important it is to conduct early activities of work together with both group of professionals, and establish a common specification regarding the potentials of new digital services. Doing so, a homogeneous pre-understanding may be established, serving the professionals a unifying specification about what the digital services have to offer, and revile the possibility of a duality of digitalization.

<div align="center">**References**</div>

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