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UNEQUAL TRAINING PARTICIPATION AND TRAINING EXPERIENCE AT THE DIGITAL WORK PLACE - AN INTERDISCIPLINARY STUDY

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ABSTRACT

Despite technological progress and the resulting changes, the human actor remains the decisive critical factor for the economic success of companies. This paper presents an interdisciplinary approach and research design to examine issues of unequal access to training in the new digital workplace. The research project combines an in-depth state-of-the-art study with an experimental design that tests in a lab environment how learning barriers can be tackled by manipulating the educational situation. In a final step, the methods developed and the results of the experiment are implemented and evaluated in the real situation using the example of one or more companies. The aim of the study is to identify possibilities for different actors in companies to better design working and learning conditions.

KEYWORDS

Learning Factory; Digitalization; Training; Experiment; Low-skilled workers

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1 INTRODUCTION

Industry 4.0 creates considerable opportunities for companies of all industries and sizes, which at the same time require, the training and further education of employees. Despite technological progress and the resulting changes, the human actor remains the decisive critical factor for the economic success of companies. However, the human capacity for change is influenced by individual competencies and qualifications. The employees in production in particular, have to cope with changes and adapt to new roles, technologies and tasks.

For low skilled workers – the focus of this study – four different pathways of the digital transformation have been derived: deskilling, upskilling, substitution, or persistence of given tasks and jobs (Hirsch-Kreinsen 2016).

Though scholars have repeatedly argued against technological determinism (Pfeiffer 2018) or focused on the consequences of technological change (Acemoglu & David 2011; Brynjolfsson & McAfee 2016), few studies investigate how the shape and use of new technology is influenced by the company's setting in terms of labor relations and institutional arrangements (Noble 1979). Our study suggests an interdisciplinary approach to this question: First, we want to study how the introduction and use of new digital technology is shaped by labor relations, corporate actors, and institutional arrangements at the company level. The aim is to understand why digital technology was applied in a certain way that rather limits than extends workers' skills and autonomy and restricts training and job opportunities. Second, we want to use an experimental design in order to study alternative pathways to introduce and apply this technology in a way that increases skills and work autonomy of low skilled workers but did not come into being due to the given company setting. This will extend our knowledge on the possible role and outcomes of an alternative use of digital technology for low skilled jobs that fosters upskilling.

2 RESEARCH OBJECTIVE

In a study planned for 2019, our interdisciplinary team will investigate the prerequisites for and the design of education and training measures using digital technologies.

We focus on manufacturing companies that apply so called digital assistance system in order to meet new qualification and training requirements for low skilled workers. By providing visual information on tasks and work process, these systems enable workers to optimize their work performance and to perform a broader variety of tasks. However, there is evidence that the use of digital assistance systems for low skilled jobs can be related to losses of work autonomy, devaluation of experience based knowledge and higher stress levels (Warnhoff & de Paiva Lareiro 2019). Our study investigates how the application of digital assistance systems is shaped and influenced by existing and targeted organizational processes and by the organizational framework. Moreover, it sheds light on the role and possible outcomes of alternative ways to use digital assistance systems and to contribute to the better skill development and higher job satisfaction of low skilled workers.

3 INITIAL SITUATION

Companies are dependent on changes in the social environment, especially with regard to personnel requirements. An example are the actual changes in an age structure and the risk of labor shortages (Gesamtmetall 2015). Another example are the challenges in the context of the refugee debate, where companies depend to a large extent on the labor force of refugees, but should first invest in their training and adapt the enterprise technological infrastructure and processes.

While around 40% of the skilled workers took part in continuing training in 2017, the share

among the low-skilled workers (doing work that does not require a vocational degree) was only 20% (IAB 2017; Janssen and Leber 2015). The low training participation of low-skilled workers raises questions for both, the underlying obstacles as well as for measures and arrangements at the company level to overcome these obstacles.

New technologies such as digital assistance systems can be used to train these workers on the job, to enable them to perform a broader variety of different tasks and to adapt quickly to changing work demands.

Recent social developments such as labor shortages, the need to better integrate refugees, or low skilled workers in the labor market, challenge the world of work and organizations. At the same time, the ability to master these challenges strongly depends on the adaptability and innovative power of companies.

This mutual relationship is the starting point of our research.

4 DESCRIPTION OF THE STUDY

We combine an in-depth, state-of-the-art study with an experimental design that tests the success of training and qualification measures by manipulating the educational situation. We proceed in two steps by using insights from interdisciplinary theoretical or applied research.

Step 1: We will conduct a firm-level case study in a real Industry 4.0 company that has recently introduced a digital assistance system for low skilled jobs. We will examine how this system impacts on work autonomy, skill requirements, and job satisfaction of low skilled workers. Moreover, we will identify organizational characteristics (like labor relations, work organization, corporate actors, and learning environment conditions) that have shaped the given application of the digital assistance systems for training low skilled workers.

At the end of this step, we will be able to develop the experimental design and our hypothesis on restrictions at the company level that prevent alternative ways to use digital assistance systems for increasing work autonomy, skills, and job satisfaction.

Step 2: The experimental part of the study will be conducted an Industry 4.0 application center, where a realistic working environment will be investigated using a simulated production task and a simulated organizational context. Here the test persons learn to carry out a business process-oriented activity. We plan to manipulate the learning environment in different ways and examine the learning process and outcomes at the individual level. We will develop two specific learning scenarios: 1) with a direct response of the assistance system to the current action (right or wrong) and with continuous support from the assistance system and 2) with extensive training (paper-based) at the beginning of "production" and a summarized feedback on performance only at the end.

At the end of this step we will be able to identify the best learning environment conditions and formulate recommendations for personalized competence identification and qualification as well as the structuring of team building and learning processes.

5 CONCLUSION

This paper presents an interdisciplinary approach and research design to study issues of unequal access to education and training in the new digital workplace. It extends our knowledge on the determinants that help to prevent processes of deskilling for low skilled workers. The paper focuses on the role of digital assistance systems in companies' training policies. It emphasizes the role of labor relations, organizational arrangements, training situations, and learning environments and brings together the perspectives of sociology of work and organization and the perspective of business informatics and education.

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