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Agile Learning for vocationally trained expert workers. Expanding workplace-based learning one sprint at a time.

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Abstract

Ever increasing automation and virtualisation are two interconnected prevalent processes in today's work-life. Consequently, requirements for all occupational groups change and necessary competence profiles shift rapidly within companies. Company leaders as well as the workforce see this change as an opportunity and experienced and skilled employees are needed more than ever for jobs which formally require an academic education. However, so far learning methods and career paths are missing which would allow to acquire the necessary competencies at an academic level as well as within company lines at the same time. Classical training frameworks (e.g. seminars) and educational programs (e.g. bachelor degrees) are usually not tailored for the changing needs of their participants. Thus, we propose the concept of Agile Learning, as a workplace-oriented, problem-based framework for competence development embedded in company structures. Two agile learning projects were implemented at different levels in two major companies. Topics ranged from cross-cutting issues to specific technical subjects. Results, best practices, and evaluation outcomes will be presented in this paper as well as a discussion of restrictions and the remaining challenges of the model.

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1. Introduction

The rapid technological development accompanying the fourth industrial revolution [1] leads to an ever-increasing virtualization of industrial work environments. At the same time, experience-based knowledge becomes more important in solving complex problems in highly interconnected factories. Specifically, there is an ongoing debate in Europe and the US over the lack of skilled and experienced workers in engineering and how it is affecting the industry [2][3]. Admittedly, which skills are needed most is still widely disputed, but there is growing consensus that university education alone cannot close this skill gap [4]. Highly qualified, experienced workers with a vocational training background like technicians would be ideal candidates to fill this void. However, this approach faces two major challenges:

- A promotion at this level usually leads to a position which requires an engineering education. Yet, for financial or family reasons, these workers are unlikely to attend university at some point after their vocational training (in Europe only around 3% of students have a vocational training background [5]).
- Companies report that their vocationally trained workforce is not ready to meet these new challenges albeit their technical experience and skills, because they lack key competencies (e.g. thinking in interconnected systems). Therefore, learning methods and career paths should be developed allowing these qualified employees to acquire missing competencies at an academic level outside of higher education institutions.

Supported by the Federal Ministry of Education and Research of Germany, the project “Brofessio” (workplace based professionalization in the producing industry – see www.brofessio.de) currently investigates strategies and methods that allow implementing this approach into the industrial practise with a specific focus on blended and online learning environments to support and promote a seamless integration in existing company structures. Thus, the goal of this new learning approach is twofold:

- To create a learning environment which allows workers to acquire necessary key competencies within their work place, creating an embedded system of learning and working.
- To ease the path for workers with a vocational training background to reach higher qualification levels, therefore opening new opportunities for advancement within their field.

2. Theoretical background

BROFESSIO set out to create a learning concept that can be implemented on a broad base. The resulting learning framework of Agile Learning is based on the experience and success of agile project management techniques, in particular the SCRUM-Method [6]. SCRUM is an iterative and incremental agile software development methodology for managing product development. It defines a flexible, holistic product development strategy in which a development team works as a unit to reach a shared goal. It enables teams to self-organize by encouraging physical co-location or close online collaboration of all team members. Scrum is already widely established, well described [7] and apt to be transferred to the field of learning in a company environment. It contains only three roles and a few well-defined steps to move forward. They determine a framework for team-centred project work that can be mapped to learning projects as well.

2.1. Agile Learning Framework

On this basis, an agile learning framework has been developed which takes advantage of best practices from agile project management [8][9]. In such an environment, learning objectives must be modular, incremental, and easily adaptable to changes. The agile learning framework is therefore based on the principles of inquiry based learning (or problem-based learning, [10]) on the part of the learner and a demand-driven and reflexive perspective of the learning coaches which rests on the ideas of *expansive learning models* [11]. Specifically, we chose a mixture of these two methodologies to achieve an environment which gives enough room for self-organized learning and knowledge construction – following the ideas of inquiry-based learning – as well as a structural role (i.e. the coach)

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