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Published in:
Journal of Workplace Learning

DOI:
[10.1108/JWL-06-2020-0109](https://doi.org/10.1108/JWL-06-2020-0109)

Published: 29/06/2021

Document Version
Peer reviewed version

Please cite the original version:
Haj-Bolouri, A., Östlund, C. M., Rossi, M., & Svensson, L. (2021). Action Design Research as a Means for Organizing Workplace Learning: Case Studies of E-Learning Platforms. *Journal of Workplace Learning*, 33(6), 405-425. <https://doi.org/10.1108/JWL-06-2020-0109>

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**Action Design Research as a Means for Organizing
Workplace Learning: Case Studies of E-Learning Platforms**

Journal:	<i>Journal of Workplace Learning</i>
Manuscript ID	JWL-06-2020-0109.R2
Manuscript Type:	Research Paper
Keywords:	Action Design Research, Workplace learning, Pedagogically Rich Activities, E-learning

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Action Design Research as a Means for Organizing Workplace Learning: Case Studies of E-Learning Platforms

Abstract

Purpose

Although there is a large body of literature available on the foundations of Workplace Learning, little is known about designated research methods that systematically combine intervention, design, and learning at work. The purpose of this study was to propose Action Design Research as an alternative method for organizing workplace learning in general, and facilitating pedagogically rich activities in particular.

Design/methodology/approach

This research employed a case study approach to focus the Action Design Research method and exemplify its utility through two case studies that emphasize workplace learning in general, and how the method can be used to facilitate pedagogically rich activities in particular.

Findings

The results of the case studies indicate that the Action Design Research method had a significantly positive effect on organizing workplace learning in organizations systematically, as well as creating a narrative that structures the research process and its outcomes.

Originality

The findings help scholars that are in need of organizing workplace learning research in a systematic way. The findings do also help practitioners in organizations to solve real world problems and develop new knowledge jointly together with scholars. Consequently, the findings contribute to the existing literature by exemplifying how to facilitate pedagogically rich activities and disseminate the outcomes of doing so in a formalized way.

Keywords

Action Design Research, Workplace Learning, Pedagogically Rich Activities, E-Learning

Introduction

The idea of producing knowledge that is integrated with work activities has occupied scholars within the domain of Workplace Learning (WPL) for nearly two decades (Malloch et al., 2010) and a large body of literature on WPL has been produced (e.g. Billett 2004; Boswell & Buchanan, 2007; Perlow, 2012; Engeström et al., 2014; Brown & Martin, 2015; Sannino et al., 2016; Watson et al., 2018; Lemmetty & Collin, 2020; Bontemps-Hommen et al., 2020). Such research is rooted in social learning theories, which treat learning as a situated and socio-cultural phenomenon (Lave & Wenger, 1991), typically facilitated through participation, engagement (Billett, 2001a, 2004; Fenwick, 2001; Vaughan, 2008), and formative intervention at the workplace (Engeström et al., 2014; Sannino et al., 2016).

Workplace learning scholars (e.g. Billett, 2001b; Skippington, 2002; Fuller et al., 2007; Vaughan, 2008) discuss the perspectives of participation and engagement as successful factors that shape the process of workplace learning by emphasizing the dual features of workplaces that either afford or constrain opportunities for learning at the workplace. Billett (2001b) in particular argues that the quality of the participation of academics and stakeholders is influenced by their occupational expertise, which is a key aspect of advancing learning at work (Billett, 2001a). Consequently, such process of identifying learning opportunities and explicating them at work through participation and engagement, is conceptualized by Billett et al. (2016) as ‘pedagogically rich activities’.

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3 However, there are no universal methods for WPL and neither approaches for facilitating
4 pedagogically rich activities. There are a number of studies where researchers have employed
5 methods that emphasize intervention as the driving force of organizing WPL. Such studies range
6 from adopting formalized process models, e.g. Action Research (AR) (Rowley, 2003) and
7 Engaged Scholarship (ES) (McCormack, 2011), to less formalized approaches such as
8 communities of practice (Wenger, 1998; Boud & Middleton, 2003), e-learning at work (Tynjälä,
9 2005), or incidental learning scenarios (Berg et al., 2008).

10
11 In addition, other research methods, such as the formative intervention research method
12 elaborated by scholars such as Engeström et al. (2014) and Sannino et al. (2016), stresses
13 learning through collective efforts among participants (e.g. participatory analyses). The
14 collective effort is designed and re-designed by the participants themselves, rather than by an
15 instructional design intervention, in order to transform the work activities and redefine the
16 objectives of the participants' work iteratively. Sannino et al. (2016) also point out the challenge
17 of bridging formative interventions with structured approaches towards workplace learning. In
18 this paper, we propose Action Design Research (ADR) method by Sein et al. (2011) as a means
19 to organize for WPL.

20
21 The ADR method combines elements from action research with design research, and has since
22 its birth in 2011 been widely applied within the field of Information Systems (IS) (e.g. Mustafa
23 & Sjöström, 2013; Maccani et al., 2014). The overall philosophy of ADR is to provide a bridge
24 between academia and practice, by (1) solving real world problems in organizations together
25 with stakeholders, practitioners, and end-users, through cyclical iterations of building,
26 intervention, and evaluation of Information Technology (IT) artifacts; and (2) producing and
27 sharing formalized learning outcomes that are developed through active reflection during the

intervention process (Sein et al., 2011).

We argue that ADR incorporates a continuous learning process that enables a reciprocal knowledge transfer among scholars, practitioners, stakeholders, and end-users within an ADR project. We address this kind of learning outcome as important for WPL, because it is organized and executed within the working environment of practitioners and stakeholders through a process of reflective practice, intervention, and knowledge development (Schön, 1987; Cole et al., 2005). The purpose of this study is thus to propose and show how and why the ADR is a sufficient method for organizing WPL. More specifically, our study is motivated by the following two points:

- **Collaboration, participation, and organizational intervention in WPL:** all three aspects are highlighted in the WPL literature (e.g. Billett, 2001a, 2001b, 2004; Engeström et al., 2014; Sannino et al., 2018) as driving factors that engage researchers, practitioners, and stakeholders, in learning processes at work
- **Collaboration, participation, reflection and learning in ADR:** through cyclical iterations of producing practical outcomes that are bridged with formalized learning outcomes. Consequently, ADR emphasizes *organizational intervention, reflection and learning*, as key components of an ADR-cycle, which is also considered to be important elements formative intervention (Engeström et al., 2014; Sannino et al., 2018)

Consequently, our goal is to contribute to the WPL literature by fulfilling the following two objectives:

1. To show how ADR can be employed to organize for WPL; this objective will be achieved by presenting two illustrative case studies
2. To initiate an explicit discussion about why the ADR is a sufficient method for organizing for WPL; this objective will be achieved through a discussion about the implications of ADR for WPL research, and the idea of facilitating ‘pedagogically rich activities’ through participation and engagement in cycles of intervention

Thus, we seek to contribute to the methodological discussion on WPL by introducing the ADR method as an alternative for WPL scholars to use. The illustrative case studies will show how ADR has been used to organize for WPL research, and how WPL scholars can draw inspiration from our cases to organize their own research.

The rest of the paper is organized as follows: first, we will discuss WPL from the perspectives of participation and engagement, as well as current limitations in the literature regarding methods for WPL. Then, we will provide a detailed presentation of the ADR method and tie it to the Scandinavian tradition of research in IS. After that, we will exemplify the usefulness of ADR for organizing for WPL through two cases. Finally, we will discuss the implications of our findings and chart avenues for further research.

Participation and Engagement for Pedagogically Rich Activities:

Methodological Challenges and Limitations

In this paper, we frame our understanding of workplace learning within the realms of the socio-cultural theory around knowledge in general, and address workplace learning as a social phenomenon in particular. Our theoretical framing focuses learning as something that emerges between humans, work, their participation, engagement, and implications of intervention in practice (e.g. transformation, skill acquisition) at work. These aspects of learning are strongly related to the socio-cultural learning theory, with a particular focus on situated problems (Lave & Wenger, 1991), formative intervention (Engeström et al., 2014) active participation (Billett, 2004), which also happens to be key aspects of conducting ADR (Sein et al., 2011). Hence, for this study, the linkage between ADR and our theoretical framing of workplace learning focuses: (i) the socio-cultural theory in general, and (ii) intervention and participation in particular, as essential facets of workplace learning. We will now elaborate on these facets as follow.

Starting with the socio-cultural theory, which elaborates learning as a phenomenon that emerges from sociogeneses comprising history and culture (Cole, 1998), manifested as situated learning (see Lave & Wenger, 1991) within for instance the context of work (Billett, 2001a). Interactions with and in the social world thus become the key bases for learning. Consequently, learning experiences in workplaces are not without a structure or organization, but rather, they are formalized and structured by the goals, activities, and culture of the work practice and organization (Billett, 2004).

Billett (2004) stresses the importance of joint participation of researchers, practitioners, and stakeholders as a fundamental premise for promoting workplaces as learning spaces that afford

opportunities for engagement at work. At the same time, he points out that the degree and quality of engagement varies depending on pragmatic and selfish decisions among individuals:

“[...] individuals will engage in ways that best serve their purposes, such as how it will assist their career trajectory, securing opportunities, or even locating easy work options. [...] Therefore, the kinds of opportunities the workplace affords individuals in terms of activities they engage in and interactions with others, and how individuals elect to engage are salient to their learning through participation in the workplace.” (Billett, 2004, p. 1)

Understanding how the opportunities to engage at work, the kind of tasks that regulate individuals work and the guidance provided along with the tasks, become key factors of evaluating how and what individuals are able to learn at work. Consequently, guidance is a reciprocal process that enables different parties (e.g. researchers and practitioners) to experience and become familiar with each other’s practices (Billett, 2004). For instance, practitioners guide researchers into the realms of their practice by showing how tasks are undertaken and completed, whereas researchers guide practitioners into the space of academia by making concepts and theories accessible and relevant for practitioners’ work (Van de Ven, 2007). However, the contribution of this guidance is dependent on learners’ engagement (Billett, 2003).

Moreover, Billett (2004) conceptualizes workplaces as learning spaces, by emphasizing how active participation can increase levels of knowledge, skills, and expertise among employees. Here, WPL is manifested through gradual and continuous learning processes at work, which inspire employees to become a part of ‘pedagogically rich activities’ (Billett, 2016).

‘Pedagogically rich activities’ are defined as:

“[...] pedagogically rich work-tasks (i.e. those with the potential to support a particular lesson), direct instruction and ‘hands on’ assistance by more experienced....” (Billett, 2016, p. 128)

Subsequently, Billett (2016) elaborates the following key characteristics of pedagogically rich activities:

- **Accessibility:** provide practitioners access to a practice’ knowledge domain (e.g. healthcare, higher education) through others’ insights and practices
- **Permission:** permit comparisons and appraisals with what these practitioners know, can do and value
- **Availability:** offer the availability of interactions and access to knowledge, which might not otherwise be available

In order to support pedagogically rich activities, participation and engagement need to be organized according to the rich pedagogical potential of either presently existing, or emerging, workplace activities (Billett, 2016). It is also important to understand organizations that support WPL where the outcome of methodological choices, catalyzes persistent organizational development through active participation and involvement of stakeholders (Billett, 2016). As an alternative for organizing and supporting WPL research systematically, as well as facilitating pedagogically rich activities, we propose Action Design Research by Sein et al. (2011).

The Action Design Research Method

The ADR method is defined as a *“[...] research method for generating prescriptive design knowledge through building and evaluating ensemble IT artifacts in an organizational setting”*

(Sein et al., 2011, p. 40). ADR deals with two seemingly disparate challenges: (i) addressing a problem situation encountered in a specific organizational setting by intervening and evaluating; and (ii) constructing and evaluating an IT artifact that addresses the class of problems (a set of interrelated problems) typified by the encountered situation. Additionally, the ADR method incorporates an explicit dimension of reflection and learning through, which can be seen in **Figure 1**.

[FIGURE GOES HERE]

Figure 1 ADR Method: Stages and Principles (Sein et al., 2011)

The framework in **Figure 1** provides four interrelated stages. Together the stages form a cycle that is organized by an ADR team consisting of researchers, practitioners, stakeholders, and end-users. Each stage invokes guiding principles that help the ADR team to organize an ADR cycle sufficiently within the boundaries of an organization. Intervention has been incorporated via a strong influence from Action Research (Lewin, 1946; Susman, 1983; Baskerville & Wood-Harper, 1998), whereas principles such as ‘Reciprocal Shaping’ and ‘Mutually Influential Roles’, acknowledges the underlying philosophy and core of ADR that is strongly tied to the Scandinavian school of design research in the IS field (Sein et al., 2011).

The Scandinavian approach (Iivari & Lyytinen 1999) to information systems design started in the early nineteen seventies with the Scandinavian unions wanting more influence over the new technologies that were being introduced in the workplace (Ehn, 1988; Bansler, 1989). The unions had little knowledge about computers and the consequences of computing technologies being used in the workplace. To address this knowledge gap, several large projects were initiated studying the impact and effect that computers had on everyday work (Ehn & Kyng, 1987; Ehn,

1988; Bansler, 1989).

The key insight from the Scandinavian approach was the importance of understanding analyzing the actual work processes and fitting the managerial data processing needs, and the information needs of the workers performing their tasks was needed to make the systems work (Ehn & Kyng, 1987; Ehn, 1988; Bjerknes & Bratteteig, 1995). The ADR method is thus a direct descendant of the Scandinavian approach, and the abovementioned principles of ‘Reciprocal Shaping’ and ‘Mutually Influential Roles’ are put in place to guarantee that an ADR project is governed through mutual co-participation between all members of an ADR team.

Reflection and Learning through Action Design Research

A common denominator among prior studies concerns organizing of the reflection and learning activities, which are considered to be an integral part of conducting an ADR project in general (Sein et al., 2011). *Reflection* in ADR is considered as an activity that augments *learning*, rather than being a synonym to it. Conscious reflection on the problem framing, the chosen theories, and the emerging outputs from an ADR cycle, is critical to ensure that contributions to knowledge are identified (Sein et al., 2011). Scholars report how they have augmented the learning process through active reflection, together with stakeholders and practitioners in organizational settings through a number of different ways, including: formal workplace training sessions (Hattinger & Eriksson, 2015); workshops for developing multi-tasking skills at work (McCurdy et al., 2016); and/or internally within the research team through academic retreats and writing sessions (Veling et al., 2016).

Consequently, the reflection and learning stage of ADR has been conceptualized (Anon et al., 2016) as a double loop learning experience (Argyris, 2002), where evaluation of learning

outcomes facilitates active reflection among members of the ADR team. However, there are currently no strict rules in terms of how to organize and conduct reflection and learning through ADR, but rather, particular techniques for reflection are selected depending on the circumstances of the research setting and objectives.

Research Approach

For this study, we employed the case study approach to address the research purpose and objectives of this study, because the case study approach is considered to be particularly effective for exploratory research that aim to generate fresh, or novel insights about methods and their implications for a research area (Eisenhardt, 1989; Yin, 1994). Case studies do also allow to investigate research objectives and questions that explicate findings from research projects that have adopted a particular methodology or approach (Klein & Myers, 1999; Runeson & Höst, 2009). And although there are plenty of empirical studies on how ADR has been used in the field of Information System (IS) (e.g. Lempinen et al., 2012; Schact & Maedche, 2013; Maccani et al., 2014; Anon et al., 2016; Keijzer-Broers et al., 2016; McCurdy et al., 2016; Petersson & Lundberg, 2016; de Vries & Berger, 2016; Leinhard & Legner, 2017; Dreyer et al., 2017), very few have emphasized the use of ADR for workplace learning (e.g. Hattinger and Eriksson., 2013; MacKrell, 2016). Hence, we seek to generate new insights on how and why the ADR method is a sufficient alternative for organizing WPL research in particular, by focusing on two successful case studies, where ADR was used to organize WPL. A summary of the case studies is depicted in Table 1.

Table 1 Summary of the Case Studies

[TABLE GOES HERE]

The cases were conducted in two different settings during different periods of time. We selected the two cases because two of the authors in this study were principal researchers for each case, and because there are commonalities as well as differences among the cases (e.g. designing e-learning platforms, facilitating workplace learning). Another reason towards why we chose the given cases is because learning at work was emphasized as a central objective of both cases, where the whole ADR teams were involved in multiple ADR cycles. Furthermore, the case study approach enabled us to gain further insights about the objectives of this study (described in Section 1) by looking into the data and analyzed outcomes from each of the cases. **Table 2** depicts an overview of the research design with respect to the undertaken methods for data collection and data analysis in each case.

Table 2 Data Collection and Data Analysis Methods

[TABLE GOES HERE]

The first case applied chosen data collection methods across four ADR cycles, in order to increase problem awareness, evaluate learning outcomes, test design concepts, and integrate learning at work through intervention. For example, a workshop was conducted and a web questionnaire consisting of 29 questions was used to establish an initial insight about the employees expectations, IT-literacy, and ambitions, whereas 18 face-to-face interviews were conducted together with employees at the municipalities (e.g., administrators, coordinators that write newsletters, reports) to evaluate web lecture applications and how well they fit into the

present IT milieu. The questionnaire was constructed using SurveyMonkey and the interview process was informed by McCracken’s (1988) four-step method.

The second case applied chosen data collection methods across three ADR cycles, in order to establish early problem awareness, identify research problems, incorporate learning at work through intervention, and test design concepts. For example 11 in-depth interviews were conducted early on to gather rich insights about the expectations, fears, and ambitions that integration workers (e.g., tutors, coordinators, content producers of learning material) have for adopting and learning new information technologies at work. Subsequently, 4 participatory workshops were conducted together with 9 integration workers to in situ evaluate and re-evaluate e-learning concepts and technologies. Last but not least, 6 workplace training sessions were organized and performed together with a total of 12 integration workers. The workplace training sessions served as means for enabling pedagogically rich activities to take place, either through hands-on demonstrations of e-learning tools, or through hand-overs of knowledge between experienced and less-experienced integration workers.

Data from both cases were analyzed using qualitative techniques such as open coding, axial coding, and categorization to find themes and categories that reveal patterns among respondents’ answers. Examples of excerpts from in-depth interviews from the second case is depicted in **Table 3** to illustrate one instance of the data analysis process, with a focus on data that informed the problem awareness phase of the project.

Table 3 Examples of Excerpts from In-Depth Interviews in the Second ADR Case

[TABLE GOES HERE]

Finally, The outlined methods for data collection and analysis were incorporated into the ADR cycles of each case systematically, by following the ADR stages. Both researchers adopted and employed methods for data collection over a larger period of time, because each of the cases were an integral part of each researchers' individual research projects. Hence, the findings which are presented in the next section, will only highlight aspects from each case that has a specific relation to how workplace learning was organized through the use of ADR. Moreover, the findings will, due to ethical agreements with representatives from each case, provide anonymized examples from the collected data (e.g. excerpts from interviews).

Findings

This section outlines our findings in form of two illustrative cases studies where WPL was systematically organized through use of ADR. The purpose of this section is twofold: (i) to illustrate how the ADR method, together with its subsequent stages, can be employed to organize and provide a narrative for the research process; and (ii) to highlight the workplace learning outcomes of each case.

The Case of Designing a National Work-Integrated E-Learning Platform

For this first illustrated case, four ADR cycles were executed between 2006-2011, resulting into design principles for e-training as the main contribution of the cycles (see Anon, 2017 for more information). Subsequently, the research setting for this case was a project called the *Academy of County Administrations*, initiated by the County administration of Västra Götaland in Sweden. County administration covers issues that involve most aspects of society, they consequently need a wide range of specialists. Their employees are generally well-educated and have a leading

expertise in all their fields of interest (e.g. law, biology, architecture, engineers, and more). For instance, one of the employees described his/her work as follows:

“What I’m working with is contaminated areas so I supervise contaminated areas and I work with cases. So my job is about reviewing reports and responding to them,”

The overall project goal focused on developing organizational processes (e.g. analysis, production, implementation) and describing clear roles and responsibilities for producers and consumers of online competence development. Consequently, the project involved 6 out of 21 county administrations in Sweden, and early on in the project, an ADR team was established consisting of: two senior scholars, the principal researcher (at that being a junior scholar), and three representatives from the County administration (HR manager, IT-manager, and an IT-expert). Moreover, organizing workplace learning through e-training was a major component of the research project, as will be elaborated through the illustrated narrative below (the narrative illustrates stages from the executed ADR cycles in the case).

Starting with the **Problem Formulation stage** of the project, the county administration expressed an initial need for an e-learning effort on how to better search the World Wide Web (WWW). This effort in the form of a system should be adapted for the conditions of workplace training, where employees learn how to sufficiently search the WWW. The following excerpt from one of the interviews illustrates this further:

“In my job it is crucial to find accurate information fast. Sometimes I feel like I’m somewhat of an online detective, and the computer is my tool.”

Another employee stressed the importance of integrating a structure for their learning activities at work, and have this structure to rely on continuously at work:

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3 “One advantage with the local courses we’ve had before, for the most parts it is someone who comes to us and visits
4 the different offices, then there is a time and a place set aside for the occasion. Then you book it and it gets done.
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7 These types [e-training like ‘searching the WWW’. Authors note] when it is up to yourself, you need to be
8 disciplined to get it done. Often it is like: Oh, I don’t have time for this now, it will have to wait. It just never gets
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10 done.”
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14 As a way to address the need of organizing and informing the learning activities in a structured
15 way, the ADR stage evolved through a literature review on e-learning and workplace training.
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17 More specifically, the authentic e-learning by Herrington & Herrington (2006) and Herrington et
18 al. (2010) was chosen as a base for the pedagogical design of e-learning environment.
19
20 Subsequently, the authentic e-learning framework has 9 central components: authentic context;
21 authentic activities; expert performance; multiple perspectives; collaboration; reflection;
22 articulation; coaching & scaffolding; and integrated assessment. Additionally, frameworks that
23 informed the creation of the digital material and the graphical user interface was also chosen
24 during this stage (e.g. Mayer, 2009; Norman, 1988; Rogers et al., 2011).
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34 In ADR there is a constantly ongoing refinement of the artifact through active reflection (Sein
35 et al., 2011), which in this case manifested itself during a demonstration of a prototype using
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37 Synchronized Multimedia Integration Language (SMIL) with two representatives from the
38 county administration academy. After the demonstration it became apparent that the application
39 had to be developed so that it did not demand the installation of programs or plug-ins not already
40 available in the IT-infrastructure of the county administration. As a consequence of this, a new
41 prototype using HTML with embedded Windows Media Video files were initiated to be
42 developed in the **Building, Intervention, and Evaluation (BIE) stage**.
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The **BIE stage** can be characterized as being IT-dominant (Sein et al., 2011), meaning that end-user involvement increased as the project progressed in each design cycle. As described above, the first version of the e-learning environment consisted of embedded streamed videos on how to search the WWW, a discussion board, information on how to contact the teacher and a list of links with additional resources on how to search the WWW. The e-learning system was evaluated through an online survey with the 15 users of the pilot study. Most of the users were satisfied with both the content and the e-learning system. During the test period none of the users had used the discussion forum. The reason for this was that they did not feel the need to collaborate or discuss the subject of study with the other participants.

The **Reflection and Learning stage** was organized against the backdrop of evaluation; when evaluation was conducted against the goal of authentic e-learning, which is the objective of the authentic e-learning (see Herrington et al., 2010), the evaluation posed a potential problem since collaboration promotes reflection and critical thinking, and the debate board was incorporated into the e-learning system to address the potential problem. It was thus evident that reflection still took place since the users stated that they had learned something new and had changed the way they search after information on the WWW after completing the web lecture. The following excerpt illustrates this further by elaborating one of the employee's reflections about e-learning in comparison with face-to-face learning:

"The advantage with e-learning systems is that you do not need to be at a certain place, I can take part of the education wherever I want. I could even be at home. That's the big advantage, plus that you can do it at a pace that suits you compared to ordinary education. On the other hand you can't make those spontaneous comments, create a discussion from a problem that appears during the lecture. I miss that to some degree. Another advantage is that you do not have to take notes like a madman, since you always can return to the lecture."

Furthermore, others reflected that the learning outcome would be of more relevant if they were encouraged and coached to collaborate and thereby reflect even more. To address this, assessing assignments was suggested and to further motivate the completion of the assignment a certificate was awarded upon conclusion.

During the final ADR stage, **Formalization of Learning**, two learning outcomes from the ADR cycle were formalized based on results from participatory workshops with representatives from the county administration. The sole purpose of the workshops was to facilitate active participation and engage the employees in pedagogically rich activities. The learning outcomes from the workshops are summarized as following:

- **Learning Outcome 1:** reinforcing gathered insights from literature review, by mapping the linkage between prototype features and components of the authentic e-learning framework, for employees. Here, the pedagogically rich activity was to provide an access point to a knowledge domain of e-learning, by demarcating the relevancy of the authentic e-learning framework in accordance with employees' own experiences and expectations of using e-learning technologies
- **Learning Outcome 2:** increased know-how among employees within the development team. The increased knowledge the employees understand how the county administration can integrate outcomes from workshops as direct input for the development of their e-learning system in a new IT milieu. Here, the pedagogically rich activity was to offer an availability that merges two knowledge domains (knowledge from academia on e-learning, and knowledge from employees' about the counties' general IT milieu), and develops a synthesis of IT literacy

The Case of Designing an E-Learning Platform for Civic Orientation

The setting for this project was a project called *Proximity and Distance* at a municipality in Western part of Sweden. The overall goal of the project was to digitalize the civic orientation program by designing, implementing, and evaluating an e-learning platform that support the work of integration workers (people responsible for working with integration of newcomers), and subsequently provides civic orientation through e-learning; ‘Civic Orientation’ is a part of newcomers’ establishment program where they attend the program to learn facts about the Swedish society (see Vesterlind, 2016 for further details on Civic Orientation).

Early on in the research project, the ADR method was employed to accomplish the goal and to organize WPL for the integration workers. An ADR team was consequently established, consisting of: two senior scholars, the principal researcher (at that time being a junior scholar), two research assistants and developers, and integration workers from the integration center (manager, coordinators, content producers, tutors/teachers). A total of three ADR cycles were organized and executed between 2013-2017. The subsequent narrative unfolds the organized activities of the ADR cycles

Early on during the **Problem Formulation stage**, interviews and meetings revealed a collective anticipation and fear for digitalizing the civic orientation program. A tension emerged between enthusiastic and sceptic integration workers about the implications of introducing and working with new technologies. This tension is illustrated through two different excerpts from interviews with the integration workers, one being the sceptic’s voice and the other one being the optimist’s voice:

“Our situation as integration workers is unstable as it is due to the uncertain circumstances of integration policies. Bringing in new technologies can create more uncertainties, or potentially resolve some of the current ones. We don’t want more pressure or more things to feel not so reliant to though.”

“I believe that technology can help us as long as we [Integration workers; Authors note] can be included in the decision-making process. I mean, we need to be involved in the process of decisions regarding the technology, what we want to use it for, how... you know, these kind of things... because it must match our strange working situation.”

In an attempt to resolve the tension, the **BIE stage** emphasized the necessity of building and evaluating a set of early learning modules that incorporate future intended workplace training sessions for the integration workers. The modules were consequently created by: (i) drawing upon WPL literature that emphasizes successful e-learning at work (e.g. Tynjälä et al., 2014); and (ii) engaging the integration workers of the civic orientation program to actively participate in the building process through workshops and meetings. A summary of the modules is shown in **Table 4**.

Table 4. Supportive Learning Modules for Workplace Training Sessions

[TABLE GOES HERE]

The overall idea with the modules was to embed and distribute them through the e-learning platform a period before the workplace training sessions were organized. Doing so, the integration workers could become familiar with the topics and structure of the training sessions. The learning modules were thus distributed two weeks before the workplace training sessions. However, none of the integration workers did actually engage with the learning modules, and as a result, it became difficult for the researchers of the ADR-team to refine the modules before organizing the workplace training sessions. This issue was diagnosed and addressed as a problem

of not fully engaging the practitioners in the process of defining and constructing the learning modules, and thus creating a lack of communication and encouraging participation among the integration workers. In order to address the identified problem, the researcher of the ADR-team revisited WPL literature that focuses workplace training and e-learning (Berge, 2002; Lee, 2010; Tynjälä et al., 2014), to prepare the workplace training sessions.

In this case, the **Reflection and Learning** and **Formalization of Learning** stages were executed at the same time, and were incorporated into six workplace training sessions. The sessions were organized between the beginning of May 2015 and the middle of June 2015 (shown in **Table 5**). The overall purpose of the workplace training sessions was to facilitate pedagogically rich activities through sessions that focused the relevancy of platform features mapped with integration workers' extended roles and competency.

Table 5. Workplace Training Sessions

[TABLE GOES HERE]

The WPL outcomes of this project were essentially produced and facilitated throughout the six workplace training sessions, where the **first three training sessions** focused on systematically training tutors on how they can use the platform to organize civic orientation sessions. Here, the researcher demonstrated all of the platform features and invoked on-site exercises for the tutors; the tutors were basically provided with a tablet or laptop to interact with the platform features and orient themselves. The approach of this session was inspired through WPL literature (Berge, 2002; Lee, 2010; Malloch et al., 2010; Tynjälä et al., 2014) that promote direct interaction between participants and technology, and which advocates reflective thinking through round-table discussions (Argyris & Schön, 1978; Schön, 1983). Once again, Billet's (2016) concept of

pedagogically rich activities was applied to the training sessions, in order to elucidate the following:

- **Learning Outcome 1:** increased skills among tutors about the relation between abstract e-learning concepts and pedagogical approaches for teaching in various learning spaces (e.g. classroom, online). Here, the pedagogically rich activity was to introduce concepts in relation to tangible assignments that assisted their practical training (e.g. testing administrative features for content sharing) and encouraged them to reflect while doing the assignment (e.g. through asking questions to the instructors)

The **fourth and fifth training sessions** focused on systematically training the content-producers and coordinators by providing them advanced *know-how* about how to produce, coordinate, share, maintain, update, distribute, and publish civic orientation content. At this stage, a dichotomy was made between standardized content and non-standardized content, where standardized content was addressed as the book about Sweden or PowerPoint slides, whereas the non-standardized content was addressed as content that a unique tutor, in collaboration with content producers, can create and implement in their unique course sites. Essential artifact features of this purpose, were presented and tested during the sessions. Here, the pedagogically rich activities were manifested through accessibility and permission to practice knowledge domains such as higher education, e-learning in organizations, and integration work. The integration workers were provided with a tablet or laptops that provided them an access point to tutorials and aggregated learning material from the different knowledge domains. Consequently, the activities generated the following learning outcome:

- **Learning Outcome 2:** increased skills in how to produce, manage, and share learning objects that comprise knowledge from a cluster of knowledge sources across multiple course sites. Here, the pedagogically rich activity was to show how tutors can apply and test their new skills in the context of their digital course sites; for instance, what does it mean to become an owner of a course site, how can a tutor share content from their course sites to another tutor

The **sixth training session** focused on introducing and explaining extended roles and areas of responsibilities. This concerned extending and re-defining the integration workers' current roles with respect to new system roles, which concern new areas of responsibilities for managing and administrating the instantiated artifact. The new areas of responsibilities included: adopting system roles that focus on various aspects of maintaining components of the artifact's technical architecture, as well as its system layers. The session ended with a pedagogically rich activity in form of an open-ended discussion that explicated the organizational implications of introducing new roles, and how such implications may affect the current competency among integration workers. The following learning outcome was generated as a consequence of the activities:

- **Learning Outcome 3:** integration of new competency, and adaptation of professional roles to expand prior routine knowledge with increased IT-literacy, which encourages content producers and tutors to co-produce learning material. Here, the pedagogically rich activity was to increase the sense of permission among integration workers to cross boundaries and co-produce knowledge that they can value together (instead of separately only)

Discussion

The purpose of this paper was to propose and show how and why ADR is an applicable method for organizing WPL. Our case studies show that researchers and practitioners work tightly together to identify and solve problems, test and evaluate IT-prototypes at the workplace, and reflect, learn, and share knowledge throughout ADR cycles. The ‘reflection and learning’ stage in particular, encourages the researchers and practitioners to participate and engage in co-designed activities. Participation and engagement are also driving elements of WPL in general and pedagogically rich work-tasks in particular (e.g. Billett, 2001a, 2004; Vaughan, 2008), which the case studies reinforced through the use of ADR. In this section, we will discuss the implications of our findings by emphasizing the implications of employing ADR for workplace participatory practices, and the implications of employing ADR to mediate pedagogically rich activities in an organized way.

Implications for Facilitating Workplace Participatory Practices

Individuals engage actively in the process of determining the worth of what they experience and how they might engage with it and learn from it (Goodnow, 1990). This is also the case when individuals co-produce knowledge through co-participation (Valsiner, 2000). Co-participation at work (Billett, 2001a, 2002) is augmented through workplace participatory practices (Billett, 2004) that support the development of robust WPL outcomes; e.g. knowledge that can be generalized and applied elsewhere. Thus, generalizability is an important aspect of the learning outcomes’ quality (Billett, 2001b). In this study, we identified a set of implications for facilitating WPL practices. We elaborate these implications in the context of the illustrated ADR stages of both cases.

The two first stages of ADR (**Problem Formulation, BIE**) encourage scholars to facilitate and create a collaborative space from the beginning, which is a crucial factor to emphasize in order to gain early trust from the organizational representatives (Sein et al., 2011; Anon et al., 2018).

After early trust is established between the different parties, different roles are delegated within the ADR team to initiate the collaboration process. It is important to define formal roles to the team members so that everyone is aware of their areas of responsibility and contribution to the ADR project (e.g. Svensson, 2016).

The first case overcame potential issues with workplace regulations, and facilitated continuous participation among stakeholders by inviting all representatives to early meetings, discussing their current situation, negotiating the needs for adaptable IT solutions to their infrastructure, and testing tangible prototypes continuously. This was appreciated by the host county administration, and resulted in individual engagement, an element that is crucial to incorporate in order to encourage stakeholders towards ‘agentic’ actions (Billett, 2014); e.g. actions that go beyond routine-based behaviors and professional identities, to stimulate the production of new norms and engagement among employees of a workplace (Billett et al., 2004; Billett, 2006).

The second case stimulated engagement and participation in similar ways, with the addition of reinforcing the value of engagement, participation, and work-integrated learning for the entire organization and not just a few hand-picked stakeholders. As pointed out in prior WPL research (e.g. Billett, 2004; Tynjälä et al., 2014; Billett, 2016), participation may be actively supported, welcomed, resented, or opposed among employees. By formalizing dedicated sessions with clear and adapted incentives for the participants, integration workers (tutors, coordinators, content producers) were comfortable with the idea of dedicating their time to learn new skills, extend their professional roles and areas and responsibilities. Their participation transcended their pre-

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3 conceptions of change, and early resistance towards new ways of thinking and working. Hence,
4 the training sessions enabled them to reflect over their own practice (integration work) and start
5 re-constructing their workplace pedagogies.
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10 The last two **stages of Reflection and learning**, and **Formalization of Learning**, emphasize
11 the necessity of explicating and consuming workplace affordances in order to maintain a creative
12 participatory space (Bratteteig & Wagner, 2012) within the ADR team. Tension arise between
13 innovative ideas for change in the workplace due to intervention, and the intended continuities of
14 the work practice (Billett, 2004) and those of the personal agency in learning through and for
15 work (Billett, 2011). Subsequently, mechanisms of power and control to maintain a certain
16 workplace culture, can generate detrimental implications that causes inertia in the collaboration
17 between scholars and stakeholders of an engaged initiative (Van de Ven, 2007). To transcend
18 such mechanisms and surpass the potential inertia, team members are encouraged to develop a
19 “*Researcher-client agreement similar to AR efforts (Davison et al., 2004)*” (Sein et al., 2011, p.
20 40). In this way the ADR project becomes an opportunity for the organization to test and re-
21 evaluate their workplace practices.
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38 The first case introduced theory incrementally in the project to focus stakeholders’ attention
39 and elaborate their understanding of the situation. This allowed them to cross boundaries of their
40 workplace culture; focusing on the linkage between theory and practice transformed the
41 stakeholders’ views on the added value of academic knowledge for their workplace practice.
42 Similar outcomes have been reported from other ADR studies (e.g. Sherer, 2014) that reinforce
43 the value of theory in practice, and transformation of work activities due to iterative cycles of
44 organizational intervention. However, intervention alone does not necessarily motivate an
45 incentive for transforming workplace practices (Billett, 2004), but rather, in the case of
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employing ADR it is the BIE-cycles that focus collaborative activities through engagement and participation.

Implications for Mediating Pedagogically Rich Activities

The implications of employing ADR allowed the scholars and practitioners to jointly elucidate and ‘unpack’ (make visible through active reflection and communication) the elements of the pedagogically rich activities. The learning outcomes of each case illustrated that participation and a sense of engagement with on-going activities, create a space for identifying and reinforcing pedagogical ideas into the practice of integration workers. In the WPL literature we can for instance find the key characteristics of pedagogically rich activities: *accessibility*, *permission*, and *availability* (Billett, 2016; Billett et al., 2018). When these key characteristics are incorporated into pedagogical activities at work, ‘practice pedagogies’ (Billett, 2016, p. 128) are manifested through activities or interactions that enrich and augment WPL experiences. This was illustrated through both case studies; e.g. the first learning outcome of the first case illustrated, the second case study, where early workshops triggered the integration workers to not only share, but to make visible their pedagogical approaches for organizing civic orientation with different group of newcomers (e.g. different nationalities, languages, cultures).

Another example from the second case concerned the last **two stages of Reflection and Learning, and Formalization of Learning**, where one aspect of the training sessions’ underlying pedagogy was to provide direct instruction and ‘hands on’ assistance by more experienced participants among the employees. The direct implication of such engagement between the tutors, reinforced a *permission* for the junior tutors to organize and conduct their tasks, and permit comparisons and appraisals with what they learned by following the seniors’

advice. Consequently, Inspired by Billett's (2014) ideas about mimetic learning at work and other work that emphasizes learning and teaching in workplaces (e.g. Teunissen & Wilkinson, 2010; Billett et al., 2013; Billett, 2015), the concept of handovers in nursing (Billett, 2015) was 'theoretically ingrained' (Sein et al., 2011, p. 40) into training sessions; meaning that the concept was used to inform and inspire the training sessions. Here, senior tutors 'handed over' their experiences and knowledge to junior. These activities and interactions inspired workers to elaborate a reflective mindset (Schön, 1983) into their future training sessions for future employees in a similar way as the ones organized in the ADR project.

Conclusion

In this paper we proposed ADR as a method for organizing WPL. The method incorporates reflection and learning as integral parts and it stresses principles that support stakeholder participation and different project outcomes for different groups. The ADR method provides a structured way of organizing pedagogically rich activities which strengthens the learning potential of everyday work activities in a variety of workplace settings both case settings. This was exemplified through two different cases where ADR was employed to organize WPL in a systematic way. In summary, we conclude that ADR is a prominent and feasible method for WPL scholars to adopt because of two main reasons.

First, ADR bridges theory with practice by integrating theoretical knowledge (e.g. principles, concepts, terminology) with workplace activities. In both of cases the workshop and training sessions showed the value of situating abstract concepts in action. WPL scholars will thus find justifiable means in employing ADR for bridging theory with practice in their projects, because the method puts a

Second, ADR facilitates pedagogically rich activities through iterative cycles of intervention and formalization of learning outcomes. Both case studies illustrated how ADR can be employed to intervene and change across organizational boundaries with the help of stakeholders and practitioners. Subsequently, both cases also illustrated that practitioners become more engaged in learning activities when the goals and implications of those activities are presented in a clear and pedagogical manner.

We believe that the provided points are beneficial ones for WPL scholars to look over and consider for future research. Consequently, we acknowledge that this study has limitations in terms of only emphasizing two cases, and hope that future research can overlook some of the challenges with adopting and employing ADR for coming WPL research.

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Workplace Learning with Action Design Research

Figure

Figure 1 ADR Method: Stages and Principles (Sein et al., 2011)

Workplace Learning with Action Design Research

Tables

Table 1 Summary of the Empirical Cases

Empirical Case	Summary
1. Designing a national work-integrated e-learning platform	The overall goal of the project was to design, build, and implement a digital platform for work-integrated e-learning on a national basis in Sweden. The purpose of the platform was to manage and provide the expertise of municipal authorities in an accessible way for the public. The workplace learning activities of this case focused the development of soft and hard skills among municipal authorities within 21 different Swedish counties. The project started in 2006 and ended 2011.
2. Designing e-learning platform for civic orientation	The overall goal of the project was to design, build, and implement a digital platform for support of the civic orientation program in Sweden. Civic orientation is provided to newly arrived immigrants (newcomers) as a part of their establishment program so that they learn the basic concepts of Swedish society (e.g. laws, regulations, and more). The project was organized and performed at municipality together with responsible stakeholders of the civic orientation program and the workplace learning activities were organized and conducted through formal training sessions for increasing the stakeholders' competency development and IT-skills. The project started in December 2013 and ended January 2017.

Table 2. Data Collection and Data Analysis Methods

Case	Data Collection Method(s)	Data Analysis Method(s)
1. The Case of Designing a National Work-Integrated Learning Platform	<ul style="list-style-type: none"> - 1 Workshop with representatives from IT-department - 18 Face-to-face interviews - 1 Questionnaire with 15 respondents 	<ul style="list-style-type: none"> - Open Coding - Categorization
2. The Case of Designing an E-Learning Platform for Civic Orientation	<ul style="list-style-type: none"> - 11 In-Depth Interviews - 4 Participatory Workshops - 6 Workplace Training Sessions 	<ul style="list-style-type: none"> - Open Coding - Axial Coding - Analytical Memos

Table 3. Examples of Excerpts from In-Depth Interviews in the Second ADR Case

Transcripts (Excerpts)	Analytical Memos	Emerging Insights
<i>Well, I believe that it is a good idea to provide our program to as many newcomers as possible... but I also believe that it may become difficult for the newcomers to use new technology... the technology must be simple for them to use... as well as for us who organize the sessions. (Tutor)</i>	Expectations on providing sessions through support of e-learning technologies	Sufficiency as a key design feature for addressing the heterogeneity of integration workers and newcomers, with respect to sufficient functionality for different purposes
<i>When we produce content for civic orientation, we don't share a common set of tools or resources... Instead, we work separately, and sometimes we do the same work, without being synchronized... this causes some overlap in our work and takes time to adjust. (Content producer)</i>	Expectations and beliefs on how IT can support integration workers to organize and conduct activities of civic orientation through collaboration	Efficiency as a key design and pedagogical feature for supporting the heterogeneity among integration workers

Table 4. Supportive learning modules for workplace training sessions

Module	Description
Collaborative Features for Embedding and Distributing Online Content	The first module was defined to support the first set of workplace training sessions. The module was constructed with content that concern how to use collaborative features for embedding and distributing learning objects as non-standardized online content of a course site. Thus, the module was defined and constructed to support tutors. Consequently, the module was targeted toward features that are implemented and available for the presentation layer of the platform

Administrative Features for Content Production and Coordination	The second module was defined to support the second set of workplace training sessions. The module was constructed with content that concern the process of producing and coordinating standardized and non-standardized content. Thus, the module was defined and constructed to support content producers and coordinators. Consequently, the module was targeted toward features that are implemented and available for the production layer of the platform
System Roles and Responsibilities	The third and final module was defined to support the third and final set of workplace training session. The module was constructed with content that concern extended roles and areas of responsibility among integration workers, with an emphasis on system roles (e.g. admin, super-admin) and descriptions of these new roles. Thus, the module was defined and constructed to support a handful of integration workers that have different roles (tutors, content producers, coordinators). Consequently, the module was targeted toward different levels of features that concern the WordPress Multisite component of the platform

Table 5. Workplace Training Sessions

Training Session	Purpose	Period of Time
1, 2, & 3	To demonstrate, test, and learn collaborative features for distributing and publishing non-standardized online-learning content, together with underlying teaching pedagogies that support the features. The objectives of the sessions were provided on a very fundamental level, with a simple structure and facts about the nature and purpose of the collaborative features. Participants were encouraged to test the features systematically within the frame of each session and ask questions sporadically when needed. These three sessions lasted for three hours per session and ended with roundtable discussions	May 2015

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4 & 5	To demonstrate, test, and learn administrative features for producing, coordinating, sharing, maintaining civic orientation content (both standardized and non-standardized). Participants were encouraged to test the features systematically within the frame of each session and ask questions sporadically when needed. These two sessions lasted for two hours per session and ended with roundtable discussions	May 2015
6	To elaborate extended roles of practitioners by introducing and explaining new areas of responsibilities. Here, the participants became familiar with new concepts and words, which help them understand their new responsibilities better. The new roles were introduced as system roles. The session lasted for three hours and ended with informal discussions	June 2015