Working Out Loud: an intervention study to test an agile learning method

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Abstract

Purpose – Today's unpredictable and fast-changing work environment challenges researchers and organizations to rethink learning. In contrast to traditional learning designs, new learning frameworks such as agile learning are more learner centered, integrated into the workplace and socially shaped. The purpose of this study is to examine Working Out Loud (WOL) as an agile learning method.

Design/methodology/approach – This intervention study used a pre–post and six-month follow-up design ($N = 507$) to evaluate the effects of WOL on learners' vigor (affective outcome), WOL behavior (behavioral outcome) and psychological empowerment (cognitive outcome) at work.

Findings – The authors compared the three longitudinal measurements using multilevel modeling. Results revealed that WOL could significantly increase learners' WOL behavior and psychological empowerment at work in the post and six-month follow-up measurements. No effect was found on learners' vigor at work.

Originality/value – This study highlights the need for research on new, more agile learning frameworks and discusses their relevance to the literature. Agile learning frameworks enable learners to be more autonomous and flexible, allowing them to better adapt to changing environmental demands.

Keywords Intervention study, Agile learning, New learning, Working Out Loud

Paper type Research paper

Introduction

Today's rapidly changing business environment challenges modern organizations to constantly adapt and remain flexible to keep pace with international competition (Decius *et al.*, 2022). Employees must be willing to change jobs flexibly and acquire new skills as needed (van Laar *et al.*, 2020). To survive and thrive in such a world, leading organizations need to focus on the continuous development of their employees (Muzam *et al.*, 2023). Employees' continuous and self-directed development has consequently become a key competence (Kortsch *et al.*, 2019). This places a new focus on learning within organizations. Learning is defined as an engagement in mental processes that leads to acquiring and retaining skills, knowledge and affect over time (Kraiger and Ford, 2021).

Three primary work-related learning contexts can be distinguished: "on the job," as informal learning behavior that occurs more casually in the work process; "near the job," which leads to learner-planned, self-directed learning; and "off the job," as a more structured or formal method of learning (Decius *et al.*, 2022). Organizations, as well as researchers, tend to focus on "off the job" learning, through formal development programs such as training or

seminars – but rapidly changing work demands or restricted time commitments hinder companies from offering and employees from participating in these programs (Noe *et al.*, 2014). Furthermore, in today's dynamic and volatile environment, organizations often have a limited understanding of what learning content is required for their employees and when and where it is best for them to learn (Decius *et al.*, 2022). Only limited empirical research has examined alternative approaches to these static programs (Armanious and Padgett, 2021). While traditional "off the job" learning designs regard learners as passive actors acquiring knowledge and skills, new learning frameworks are more learner driven, occur naturally in the workplace and are socially influenced (Noe *et al.*, 2014).

As a result, a new learning framework has been proposed, known as agile learning (Deery and Deery, 2014), which refers to "the process through which individuals learn following the agile principles" (Noguera *et al.*, 2018, p. 112). With its origins in software development, this new framework helps learners adapt more easily to rapid change (Deery and Deery, 2014) and thus be better prepared to meet the challenges of modern workplaces. The educational literature has already addressed agile learning in school and university environments, with the agile manifesto in higher education, for example (Kamat, 2012). However, no unified classification of agile learning in the work environment has been established, although similar elements have been outlined in the research.

Accordingly, we reviewed relevant literature and identified four common elements of agile learning. First, as the agile manifesto highlights the human factor by focusing on teamwork, human behavior and continuous development (Beck *et al.*, 2001), agile learning places learners at the center by granting them a more self-directed role in the learning process (Deery and Deery, 2014; Longmuß and Höhne, 2017; Noguera *et al.*, 2018). Second, most researchers emphasize the iterative design of agile learning (Deery and Deery, 2014; Longmuß and Höhne, 2017; Noguera *et al.*, 2018). As stated in the agile manifesto, the project team works in short iterations, so-called sprints, delivering valuable software (Beck *et al.*, 2001). This iterative approach is also reflected in agile learning, where learning is gradually divided and integrated into the workplace. The team thereby learns in alternating phases of working and learning (Longmuß and Höhne, 2017). Third, collaboration and interaction between team members, managers and customers are inherent parts of the agile manifesto (Beck *et al.*, 2001). As such, agile learning is also based on collaboration (Deery and Deery, 2014; Longmuß and Höhne, 2017; Noguera *et al.*, 2018). Through social exchange, learners create content and develop skills in a collaborative but competent environment (Lazorenko and Krasnenko, 2020). Fourth, agility originates in the world of technology; the agile manifesto was created by a small group of software industry leaders (Beck *et al.*, 2001). Accordingly, technology is also crucial in agile learning (Deery and Deery, 2014; Longmuß and Höhne, 2017; Noguera *et al.*, 2018). A suitable digital infrastructure supports the learners in their learning processes, enabling them to share their knowledge and collaborate closely (Longmuß and Höhne, 2017; Noguera *et al.*, 2018).

Based on this previous research, we define four meta-principles characterizing agile learning: self-direction, iteration, collaboration and technology. In terms of the three contexts of work-related learning (Decius *et al.*, 2022), we commonly classify agile learning methods as "near the job," first, because they lead learners to a more active, self-directed understanding of their role in the learning process, and second, because the iterative approach provides a semi-formal setting with working and learning phases that are integrated into the workplace but still leave space for learning.

In this article, we aim to test this agile learning framework by investigating its impact on learners. We operationalize agile learning using Working out loud (WOL), a learning method developed by John Stepper (Stepper, 2020). WOL is a self-organized 12-week program that

fits the characteristics of agile learning, as it is self-directed, iterative, focuses on collaborative learning and uses technology. Therefore, WOL seems to be a suitable instrumentalization to test the agile learning framework. Furthermore, the high prevalence of WOL indicates the critical need for more scientific research. A German study reported that approximately 20% of the surveyed companies already used WOL within their organizations (Schermuly and Meifert, 2022), and a growing number of organizations are incorporating WOL as part of organizational change programs (Stepper, 2020). WOL may thus represent a valuable contribution to professional learning that should be further explored and understood.

We aim to contribute to research in several ways. First, we introduce WOL as an agile learning method in the literature. On the one hand, the complex work environment forces organizations to continuously develop their employees (Muzam *et al.*, 2023); on the other, the currently predominant "off the job" learning methods do not meet the demands of today's work context (Noe *et al.*, 2014). We present WOL as a valuable approach to address these current shortcomings – as an agile learning method, WOL is self-directed, can be integrated into the workplace and builds on the fundamental concept of social exchange in learning. Second, we test the effectiveness of WOL by evaluating its impact on three learning outcomes at work (ABC – affective, behavioral and cognitive outcomes) in a pre–post design ($N = 507$) and assessing its long-term effects in a six-month follow-up survey. To examine the impact of WOL in the work context, we investigate its effects on three work-related constructs: vigor (affective outcome), WOL behavior (behavioral outcome) and psychological empowerment (cognitive outcome). Third, we provide practical contributions for companies already using or planning to use WOL in the future.

The conceptual understanding of Working Out Loud

Understanding the construct requires differentiating between first, the behavior and, second, the learning method to practice and develop this behavior. Although we focus primarily on the WOL learning method – simplified as WOL – it is important to understand its origins at the behavioral level.

The original term "Working Out Loud" was first identified by Williams (2010), who described it as a behavior with two key elements: first, narrating work in blog posts or status updates; and second, performing work transparently for others to see, follow and contribute to. When people "work out loud," they share how they approach their tasks, ask questions and deliver results as they are being produced rather than waiting until a final result is ready to be revealed. In 2014, John Stepper extended this understanding by establishing five WOL principles: relationships, generosity, visible work, purposeful discovery and a growth mindset. These principles shift the focus to people and relationships, clarifying that a purposeful network can improve effectiveness and provide access to new opportunities. Thereby, Stepper deepens the fundamental understanding and notes that making work visible is only one type of contribution people can make to build trust and relatedness with other people (Stepper, 2020).

To train and learn this behavior, Stepper developed the WOL learning method, which guides learners through a 12-week self-organized program. The method is captured in 12 weekly WOL guides, which provide orientation and guidance. In small groups, called "WOL circles," four to five circle members meet for 1 h per week over 12 weeks. In these meetings, circle members share their individually set goals and support each other in achieving their diverse goals. Through various exercises, they build and structure a network outside the circle that supports them. Each week, circle members learn to make different contributions to the people in their network. Within small exercises to foster appreciation, attention, visible work and vulnerability, they learn to cultivate trusting relationships that enhance cooperation and access to resources and opportunities (Stepper, 2020).

Working Out Loud as an agile learning method
WOL demonstrates distinct characteristics of an agile learning method by addressing all four above-mentioned meta-principles.

(1) Agile learning emphasizes the learner's role by demonstrating a high degree of self-direction (Deery and Deery, 2014; Longmuß and Höhne, 2017; Noguera *et al.*, 2018). WOL provides sufficient space for self-directed learning, as circle members choose their learning goals and guide themselves independently – within their circles – through the 12-week process. Simultaneously, however, they receive a systematic framework and order for orientation through the WOL guides.

(2) Agile learning is iterative and divides the learning process into incremental steps that can be embedded in the daily work context (Longmuß and Höhne, 2017). This allows participants to learn from prior iterations and improve for upcoming ones (Noguera *et al.*, 2018). Likewise, WOL divides the learning process into 12 incremental weekly steps. Circle members are encouraged to apply their learning between sessions by contributing to their networks and deepening their connections over time.

(3) Agile learning is based on collaborative exchange in a competent environment (Deery and Deery, 2014; Longmuß and Höhne, 2017; Noguera *et al.*, 2018). Consistent with the social learning approach within WOL, participants learn from and with each other within their circles and networks and build meaningful connections and support each other in the process.

(4) Agile learning aims to integrate technology into the learning process (Deery and Deery, 2014; Longmuß and Höhne, 2017; Noguera *et al.*, 2018). This is consistent with WOL, as one type of contribution is sharing knowledge in internal and external social networks. Additionally, virtual collaboration tools enable locally distributed WOL circles to meet across organizational boundaries.

Overall, WOL fits the characteristics of agile learning and might therefore provide a fruitful path to assess its contribution to professional learning. A graphic overview is presented in Figure 1.
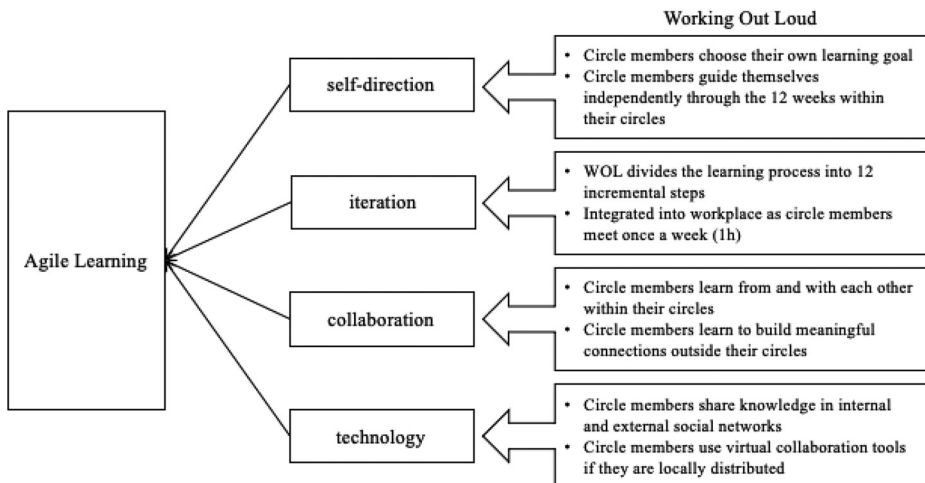
Figure 1.
WOL characterized as an agile learning method

Source: Authors' own work

Testing the effects of Working Out Loud on various learning outcomes
Learning not only involves learners being able to do something they could not accomplish previously (Kraiger *et al.*, 1993); changes in affective and cognitive states are equally important (Ford *et al.*, 2009). To measure the effects of WOL, we used a classification scheme by Kraiger *et al.* (1993) that differentiates between three broad categories: affective, behavioral and cognitive learning outcomes (the ABCs of learning; Kraiger, 2002). We evaluated changes in all categories by comparing measures before the completion of WOL, immediately after and six months later. As WOL is a "near the job" learning method, we measured its effects at work rather than during WOL itself. We thereby addressed Baldwin and Ford's (1988) widely recognized "transfer problem," the gap between learning and sustained performance on the job. We further assumed that, according to the transfer literature (Wexley and Latham, 2002), a higher immediate effect occurs directly after completing WOL, which decreases again slightly over time:

- *Affective outcome*: Affective outcomes include attitudes and motivations (Ford *et al.*, 2009), which are essential in the learning process, as they might determine learners' behavior and performance (Gagné, 1984). We chose to measure the effect of WOL on circle members' vigor at work. The literature has classified vigor as an important dimension of affective experience, as vigor increases employees' work-role effectiveness through motivational processes at work (Kanfer and Kantrowitz, 2002). Vigor is expressed in high levels of energy and mental resilience; a willingness to exert effort; and perseverance, even when facing difficulties (Schaufeli *et al.*, 2006). As a context-specific construct, vigor results from individuals' evaluations of events, objects and situations (Shirom, 2011).

  We argue that WOL increases circle members' vigor at work via a two-step process. In the first step, we assume that WOL increases circle members' vigor levels during WOL. Based on the conservation of resources theory (Hobfoll, 2011), positive relationships enhance the experience of vigor, as they create a positive gain spiral in which feelings of vigor and peer social support synergize and reinforce each other (Shirom, 2011). WOL leads circle members to build high-quality relationships within their circles and networks. The circle members make valuable contributions to their network by sharing resources, such as empathetic listening, appreciation and attention, or by reinforcing each other's self-esteem as they learn from and with each other (Stepper, 2020). These are all essential components of high-quality interpersonal interactions (Carmeli *et al.*, 2009) and comprise contributions that can be made in person or with the help of technology, via email, intranet or social networks (Stepper, 2020). These interpersonal interactions should occur over time (Bakker and Xanthopoulou, 2009), which is given through the iterative approach of WOL over 12 weeks. In the second step, we assume that these positive effects spill over into the work context. According to the spillover theory, employees' experiences in the workplace can extend to the non-work domain, and vice versa (Staines, 1980). Due to the close connection between WOL and work – through self-directed, work-related goals and relationships – we propose that WOL increases participants' vigor at work. Given the two-step process outlined, we hypothesize the following:

- *H1*. Circle members' vigor at work will significantly increase immediately after completing WOL (post) and slightly decrease again in the long term (follow-up).

- *Behavioral outcome*: Behavioral change comprises the performance of a behavior that the learner has not previously exhibited or has exhibited ineffectively (Kraiger, 2002). As the WOL method aims to develop behavior, we compared the pre, post and six-month follow-up measurements of WOL behavior at work. WOL behavior

comprises observable work performance alongside the creation of meaningful connections in a supportive network (Stepper, 2020; Williams, 2010).

According to Bandura's social learning theory, people learn through observing role models, paying attention, retaining observed information and reproducing observed behavior (Bandura, 1962). In WOL, circle members learn in a collaborative environment. They observe and copy the behavior of other circle members and the people in their network (Stepper, 2020). On this basis, we assume that learners should build or maintain lasting mental models through WOL, depending on whether they fit information into existing mental models and confirm them (mental model maintenance) or modify and restructure their mental models to accommodate new information (mental model building; Vandenbosch and Higgins, 1996). The learning literature has already highlighted the importance of mental models, as they guide human behavior and reduce the menatl workload in planning fure actions (Norman, 1983). We argue that during WOL, circle members develop or extend specific mental models to perform WOL behaviors as they become more experienced and continuously apply their newly learned behaviors in different exercises. These mental models guide learners in their future behaviors and further mature over the 12 weeks via the iterative approach of WOL. Thus, learners should build and internalize WOL behavior, which should be maintained even after WOL has been completed. Therefore, we propose the following:

H2. Circle members' WOL behavior at work will significantly increase immediately after completing WOL (post) and slightly decrease again in the long term (follow-up).

- *Cognitive outcome*: Cognitive outcomes encompass beliefs, knowledge structures and thoughts (Breckler, 1984). In terms of cognitive change, we measured differences in circle members' psychological empowerment at work. Previous research has demonstrated positive associations between psychological empowerment and various employee outcomes, such as higher job satisfaction or lower turnover intention (see Seibert *et al.*, 2011, for meta-analytic findings). Psychological empowerment comprises four cognitions: meaning, competence, self-determination and impact (Spreitzer, 1995). Compared to a personality trait that can be generalized across different situations, psychological empowerment represents a cognition shaped by the environment (Thomas and Velthouse, 1990). Organizational conditions, such as decision-making autonomy and responsibility, help employees feel more appreciation and thus experience a sense of empowerment (Safari *et al.*, 2011).

We propose that WOL acts as a launching point for developing psychological empowerment by triggering self-initiated changes at work. WOL drives individual development. This newly developed skillset might initiate a change in the work context, increasing the perception of psychological empowerment at work. The underlying mechanism could be explained in terms of the four dimensions of psychological empowerment. First, WOL enables circle members to choose their own learning goals. A close connection between work and the chosen learning goals in WOL could trigger participants to engage with and question their work differently. This reflection on their position can increase the sense of meaning in the work context. Second, WOL is a method to learn a new topic or skill; this new knowledge can be applied in the work context, increasing the experience of competence in the workplace. Third, WOL provides a high degree of autonomy. Through the self-organization of WOL, the circle members learn to organize, motivate and discipline themselves. This newly learned skillset can be applied in the work context, triggering change and

thereby strengthening the sense of self-determination. Fourth, circle members learn to make their work visible through various exercises while receiving feedback and commenting on others' work. This approach can be applied in the work context and helps individuals recognize their impact by allowing them to regularly evaluate the immediate results of their work (Kraimer *et al.*, 1999). Following the arguments presented, we hypothesize the following:

H3. Circle members' psychological empowerment at work – comprising the four cognitions of meaning, competence, self-determination and impact – will significantly increase immediately after completing WOL (post) and slightly decrease again in the long term (follow-up).

Method
Design
The study was a single-arm trial to explore the effects of WOL on different learning outcomes in a pre–post and six-month follow-up design. The pre-measurement occurred within the first week of WOL, the post-measurement within the last week and the follow-up measurement six months later. WOL was part of a campaign to promote women launched in Germany in January 2021. Although the campaign was mainly directed toward women, anyone could participate. It was primarily promoted via the professional networking platform LinkedIn. Participation was free; in return, attendees were asked to complete self-reported evaluation questionnaires via the platform SoSci Survey.

Sample
Within the first week of WOL, 1,354 participants completed the first survey. We excluded 107 cases with incomplete data sets. The resulting 1,247 pre-measurement cases were matched to the post and follow-up measurements by individualized codes. To measure the effects of WOL with at least two measurement points – one before and one after WOL – we excluded 608 participants who did not answer either the post or six-month follow-up measurement (dropout rate: 48.76%). Of the 639 resulting cases, 92 showed incomplete data sets and were excluded. Because WOL comprises 12 weekly sessions, we also excluded 40 participants who reported attending fewer than one-quarter of the total sessions. The final data set comprised 507 participants (97% women; age $M = 41.53$ years, $SD = 9.0$) who completed the pre-measurement and at least one other measurement: post or follow-up. Most participants were employed (83%) and well educated (85%) with a university degree or higher.

Measures
Vigor. To measure vigor, we used the vigor subdimension of the Utrecht Work Engagement Scale developed by Schaufeli and colleagues (2006). Vigor describes the level of energy, resilience and perseverance when facing difficulty. The short version comprises three items. Participants indicate agreement on a five-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*) to items such as "At my work, I feel bursting with energy." Cronbach's alpha was between 0.91 and 0.93 for the three measurements.

WOL behavior. WOL behavior was measured using a subscale of the instrument developed by Pearce (2014), who developed a scale to measure WOL behavior with two dimensions: individual and group WOL. Because we focused on individuals, we only used the subscale to measure WOL behavior on the individual level with three items, including "I

share my thoughts and ideas on social platforms with others beyond my immediate co-workers." The items focus on specific actions rather than feelings or opinions to capture actual WOL behavior and not merely associated attitudes. Agreement was indicated on a five-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Cronbach's alpha was between 0.85 and 0.92 for the three measurements.

Psychological empowerment. Psychological empowerment was measured using a 12-item questionnaire created by Spreitzer (1995). The scale comprises four dimensions: meaning, self-determination, competence and impact. Example items include "The work I do is meaningful to me" and "I am confident about my ability to do my job." All items were scored on a seven-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). For the three measurements, Cronbach's alpha for overall empowerment score was between 0.90 and 0.92.

Data analysis

We ran three separate multilevel models to evaluate the development of vigor, WOL behavior and psychological empowerment over time. The three models were estimated using a multilevel modeling approach with the lmer function in the lme4 package in R (version 4.2.2; R Core Team, 2022). The mixed-effects models comprised two levels, with repeated measurements of vigor, WOL behavior and psychological empowerment (Level 1 = time) nested within the participants (Level 2 = individual). Nesting the data in WOL circles, as a third level, was considered but deemed unsuitable due to an insufficient amount of participants per circle.

We examined different nested models with increasing levels of complexity per outcome variable. Starting with a "null model," we estimated the sources of variance in outcome variables at the occasion level (within participants) and participant level (between participants) and used this baseline model to determine whether the model's fit to the data improved. We then included time as a Level 1 predictor and the control variables age and intensity, as the number of attended WOL sessions. We selected the best-fitting model by successively comparing the Akaike information criterion (AIC) and Bayesian information criterion (BIC) values of the competing models. To test our hypotheses, we performed post-hoc multiple comparison tests using the multcomp package with Tukey contrasts in R (Hothorn *et al.*, 2008).

Results

Descriptive statistics and correlations. Table 1 presents descriptive statistics and correlations for the main study variables. The stability correlations for vigor, WOL behavior and

Variable	M	SD	1	2	3	4	5	6	7	8
1. Vigor (pre)	3.72	0.88								
2. Vigor (post)	3.76	0.87	0.78**							
3. Vigor (follow-up)	3.52	0.91	0.46**	0.50**						
4. WOL behavior (pre)	2.28	1.08	0.28**	0.23**	0.19*					
5. WOL behavior (post)	2.74	1.00	0.25**	0.29**	0.20*	0.72**				
6. WOL behavior (follow-up)	2.52	1.16	0.24*	0.24*	0.37**	0.70**	0.80**			
7. Psych. empowerment (pre)	5.69	0.89	0.65**	0.56**	0.27**	0.30**	0.26**	0.21		
8. Psych. empowerment (post)	5.83	0.85	0.62**	0.69**	0.39**	0.27**	0.33**	0.19	0.76**	
9. Psych. empowerment (follow-up)	5.84	0.89	0.49**	0.50**	0.54**	0.25**	0.33**	0.38**	0.58**	0.63**

Notes: M and SD are used to represent mean and standard deviation. * $p < 0.05$; ** $p < 0.01$
Source: Authors' own work

Table 1.
Means, standard deviations and correlations

psychological empowerment across the three measurements were moderate to high (Cohen, 1977).

Multilevel modeling and post hoc comparison on vigor. To test whether WOL could increase circle members' vigor at work (*H1*), we started our analysis with the unconditional means, or "null model." A model with no predictor was used to examine the relative amounts of within- and between-person variance in vigor (Model 1), AIC = 2,543.4, BIC = 2,558.5. The intraclass correlation was 0.69, indicating that 69% of the variance in vigor was due to differences between people, while the other 31% was due to differences within people. We then added time as a predictor (Model 2), AIC = 2,527.0, BIC = 2,552.2, which improved the model fit, as indicated by lower AIC and BIC values. Finally, we added age (Model 3), AIC = 2,505.9, BIC = 2,536.2 and intensity (Model 4), AIC = 2,507.4, BIC = 2,542.7, as control variables. While age improved the model fit, no improvement was found for intensity, so our final model included only age as a control variable (Model 3).

Regarding vigor, a *post hoc* comparison between the three measurements revealed that participants' vigor did not significantly increase after completing WOL (pre–post: $z = 1.173$, $p = 0.460$), and that the vigor levels even decreased compared to follow-up measurement (pre-follow-up: $z = -4.608$, $p < 0.001$; post-follow-up: $z = -3.931$, $p < 0.001$; see Table 2 for more details). The visual inspection, shown in Figure 2, indicates that vigor at work remained stable from pre- to post-measurement but decreased at follow up. Thus, we found no support for *H1*. A significant effect of age ($b = 0.02$, $p < 0.001$) revealed that older participants scored higher on vigor than younger participants.

Multilevel modeling and post hoc comparison on WOL behavior. In terms of an increase in circle members' WOL behavior (*H2*), the null model with no predictor in WOL behavior (Model 1), AIC = 2,923.1, BIC = 2,938.1, revealed an intraclass correlation of 65%. Adding time as a predictor (Model 2), AIC = 2,776.4, BIC = 2,801.4, improved the model fit, as did controlling for age (Model 3), AIC = 2,758.3, BIC = 2,788.3. However, no improvement was found by including intensity in the model (Model 4), AIC = 2,756.5, BIC = 2,791.5. Therefore, we performed the *post hoc* comparison with Model 3.

Regarding WOL behavior, the *post hoc* comparison revealed a significant increase after completing WOL in the short (pre–post: $z = 13.073$, $p < 0.001$) and long term (pre-follow-up: $z = 3.921$, $p < 0.001$). The decrease from post-measurement to follow-up was not significant

	Estimate	SE	z	p
Vigor				
Pre–post	0.036	0.031	1.173	0.460
Pre–follow–up	−0.207	0.053	−3.931	<0.001
Post–follow–up	−0.243	0.053	−4.608	<0.001
WOL behavior				
Pre–post	0.453	0.035	13.073	<0.001
Pre–follow–up	0.288	0.073	3.921	<0.001
Post–follow–up	−0.166	0.073	−2.266	0.056
Psychological empowerment				
Pre–post	0.138	0.029	4.707	<0.001
Pre–follow–up	0.121	0.050	2.416	0.039
Post–follow–up	−0.017	0.050	−0.344	0.935

Note: Tukey *post hoc* comparison
Source: Authors' own work

Table 2.
Summary of the *post hoc* multiple comparisons between the three measurements
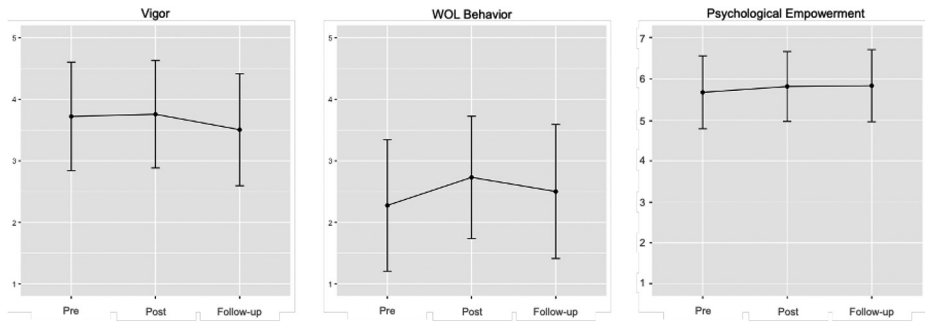
Figure 2.
Intervention effects of
WOL on vigor, WOL
behavior and
psychological
empowerment

Notes: The constructs were measured on different scales; vigor and WOL behavior on a
five-point scale; psychological empowerment on a seven-point scale
Source: Authors' own work

(post-follow-up: $z = -2.266$, $p = 0.056$; see Table 2 for more details). As the visualization in
Figure 2 demonstrates, participants' WOL behavior scores increased from pre- to post-
measurement and decreased at follow up. Thus, we found support for *H2*. The significant
effect of age ($b = 0.02$, $p < 0.001$) revealed that older participants scored higher on WOL
behavior than younger participants.

Multilevel modeling and post hoc comparison on psychological empowerment. Concerning
the development of psychological empowerment through WOL (*H3*), the null model with no
predictors (Model 1), AIC = 2,477.9, BIC = 2,493.0, revealed an intraclass correlation of 71%.
The model fit improved when adding time (Model 2), AIC = 2,458.8, BIC = 2,484.0; and age
(Model 3), AIC = 2,430.1, BIC = 2,460.3, as predictors. As with vigor and WOL behavior,
including intensity (Model 4), AIC = 2,429.7, BIC = 2,465.0, did not improve the model fit.
We used Model 3 to perform a *post hoc* comparison.

Regarding psychological empowerment, a *post hoc* comparison revealed significantly
higher levels of psychological empowerment after completing WOL – with higher scores in
the short (pre-post: $z = 4.707$, $p < 0.001$) and long term (pre-follow-up: $z = 2.416$, $p < 0.05$).
No significant differences were found between post-measurement and follow up (post-
follow-up: $z = -0.344$, $p = 0.935$; see Table 2 for more details). The visual inspection shown
in Figure 2 confirms that psychological empowerment scores increased from pre- to post-
measurement and remained stable at follow up. In *H3*, we assumed higher levels in post-
measurement, but a slight decrease at follow up. As the effects remained stable in the follow
up, *H3* was only partially supported. The significant effect of age ($b = 0.02$, $p < 0.001$)
suggests that older participants report higher psychological empowerment scores than
younger participants.

Discussion

Our study aimed to introduce WOL as an agile learning method and measured its impact on
three learning outcomes at work: learners' vigor (affective outcome), WOL behavior
(behavioral outcome) and psychological empowerment (cognitive outcome). In a single-arm
trial, we compared the pre, post and six-month follow-up measurements of 507 WOL
participants. The results indicated that WOL significantly increased participants' WOL
behavior and psychological empowerment at work, with higher levels immediately after

completing WOL (pre–post). While the effect remained stable for psychological empowerment in the follow-up measurement (post-follow-up), WOL behavior slightly decreased again in the long term (post-follow-up) but remained significantly higher compared to the pre-measurement (pre-follow-up). Contrary to our assumptions, we found no significant effect of WOL on learners' vigor at work.

Theoretical implications
The findings of our study expand upon prior research in several ways.

First, we propose an alternative approach to traditional static training by introducing WOL as an agile learning method. Thereby, we address shortcomings in current static "off the job" training, which does not fit modern corporate learning needs. The agile learning framework offers a fruitful contribution to professional learning, as it is learner-driven, flexible and fosters social learning within learning communities (Deery and Deery, 2014). As WOL as a learning method has emerged and evolved from practice, its theoretical foundation is limited. However, this shortcoming was addressed by highlighting the thematic proximity between WOL and agility. WOL emphasizes the importance of human connections (Stepper, 2020), just as agility emphasizes the human factor in software development (Beck *et al.*, 2001). WOL's alignment with the four characteristics of agile learning made it an appropriate operationalization for testing the agile learning framework. Future research on WOL should assess its impact on other constructs, such as job satisfaction or commitment, and consider collecting data weekly through diary studies to identify its dynamic consequences. To get a more comprehensive picture of agile learning, other learning methodologies should be examined alongside WOL, and research from work and organizational psychology should be incorporated to better understand how individuals learn in the context of agile learning.

Second, we examined the effects of WOL on learners' vigor, WOL behavior and psychological empowerment at work. As we measured the three constructs in the work environment, we placed WOL in the context of workplace behavior and tested its effectiveness as an agile learning method. In the following, we discuss our results regarding the three learning outcomes and provide implications for future research.

Regarding learners' vigor at work, our results showed no effect, with even lower scores in the follow-up measurement. As we did not find any differences in the pre–post comparison, we assume that the lower scores six months after the completion of WOL (follow-up) were not due to WOL. A recent long-term study found that participants' vigor levels declined during the COVID-19 pandemic (Richardson *et al.*, 2022). Accordingly, a statistic from a German health insurance company showed an increase in sick days in October and November 2021 compared to January and April 2021 (AOK, 2022). Future research could examine whether WOL impacts vigor when circle members work in the same organization and thus can meet face to face. In this study, WOL was part of a nationwide campaign to promote women. Therefore, the circles consisted of participants who were locally distributed and could only interact through virtual collaboration tools. This might have influenced the development of vigor.

Concerning learners' WOL behavior, we found a positive trend, with higher levels immediately after WOL (post) and a slight decline six months later (follow-up). This aligns with the transfer literature (Wexley and Latham, 2002). New learnings are applied immediately following the training, leading to stronger effects in post-measurement. However, these effects decrease over time if learners are unable or less motivated to recall and apply the new learnings (Velada *et al.*, 2007). Because WOL is a method to develop WOL behavior, the strongest effect occurred for this construct. Future research could examine the

impact on similar constructs, such as knowledge sharing, and use more objective measures such as ratings from teammates or managers in addition to self-reported questionnaires.

In terms of learners' psychological empowerment, we found positive effects of WOL in the short term (post), which remained stable in the long term (follow-up). The significant increase in learners' empowerment is rather small. However, compared to targeted empowerment programs, WOL is not inherently designed to increase empowerment, and the participants already had relatively high empowerment scores before WOL ($M = 5.69$; scale 1–7). Previous research has found mixed results regarding the effectiveness of empowerment initiatives. While one study on nurses reported an increase in psychological empowerment scores of approximately 20% (Özbaş and Tel, 2016), another clinical study found no effect on patients' empowerment after attending an empowerment training (Alegría *et al.*, 2008). This indicates that further research is needed to more accurately interpret effect sizes and understand the critical aspects that make empowerment modifiable. Furthermore, future research could test the influence of moderators, such as organizational environment or culture.

Regarding all three learning outcomes, adding intensity – as the number of attended WOL sessions – did not improve the model fit, presumably because we excluded participants who attended less than one-quarter of the 12 sessions, and the majority of the remaining participants attended between 10 and all 12 sessions ($M = 11.36$).

Practical implications

Previous research has shown that modern professionals are more likely to remain with companies that offer various learning opportunities (D'Amato and Herzfeldt, 2008), turning workplace learning into a useful instrument for talent retention (Muzam *et al.*, 2023). This has practical implications for human resources and organizational development. As employees only learn when it is relevant and appealing, organizations need to constantly adapt their learning capabilities (Muzam *et al.*, 2023). The flexibility of implementing WOL could offer a viable alternative to static "off the job" learning. The hours spent on WOL (12 h plus preparation time) are spread over three months and can easily be integrated into their daily work routines by the employees themselves. In addition, WOL is highly scalable. Due to WOL's self-organization, employees can independently guide themselves through the 12 weeks. Human resources departments do not have to organize a trainer or coach, nor do they have to cover hotel and travel expenses. Furthermore, WOL could be integrated into existing organizational processes, such as onboarding or change programs. Our findings regarding the positive impacts on WOL behavior and psychological empowerment also suggest that WOL could be used as part of knowledge sharing programs or empowerment initiatives.

Limitations

While the results of our study are promising, limitations should not be dismissed: first, our study design included no control condition. Although we had a relatively large sample size ($N = 507$) and chose a reasonable period of six months for the follow-up measurement, the results should be interpreted cautiously and not generalized. In future studies, randomized controlled designs are needed to evaluate the efficacy of WOL more generally. Additionally, diverse samples with an equal distribution of men and women should be used to identify gender differences.

Second, we did not nest our multilevel model on a third level, the WOL circles. As agile learning is generally based on collaboration, WOL relies on collaboration within the circle. Circle members learn from and with each other; therefore, the circle could influence the development of the learning outcome. During data collection, each circle received a unique number for

identification. However, this identification number was requested voluntarily and therefore not provided by all participants. Nesting the data in WOL circles as a third level was deemed unsuitable because the remaining participants who provided their identification number were mainly in different circles, leaving an insufficient amount of participants per circle. Future research should therefore nest the data within WOL circles for a more holistic picture and investigate the influence of group variables such as psychological safety or trust on the development of participants' learning outcomes.

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