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RESEARCH ARTICLE

Toward holistic corporate sustainability—Developing employees' action competence for sustainability in small and medium-sized enterprises through training

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Abstract

To advance holistic corporate sustainability in small and medium-sized enterprises (SMEs) requires employees to fully engage in sustainability efforts, which, in return, means to develop employees' action competence for sustainability. Little empirical evidence, however, exists on how to do this considering well-known constraints SMEs face (time, expertise, resources). We present a transdisciplinary project that developed, delivered, and evaluated a sustainability training for the workforce of the Bohlsener Mühle, an SME that has pioneered corporate sustainability in Germany. The training was piloted for the business' apprentices and combined different learning modes to build participants' sustainable action competence. The pre-post evaluation, supported by observations and qualitative interviews, revealed that employees' action competence for sustainability can be fostered through such trainings and is most effective if organizational factors that enable a corporate culture of sustainability are aligned. We conclude that a human-centered and action-oriented approach to training is needed to unleash the full potential of the workforce to advance corporate sustainability.

KEYWORDS

employee engagement, sustainability-oriented workforce, sustainable human resource management, sustainable workforce education, transdisciplinary case study

1 | INTRODUCTION

Businesses increasingly recognize that a holistic approach to corporate sustainability enables and empowers the entire workforce to adopt sustainable practices as opposed to delegating sustainability to a few experts (Süßbauer et al., 2019; Witjes et al., 2017). Such an approach positively influences businesses' sustainability and overall performance while enhancing employees' productivity, satisfaction,

retention, and identification with the corporation, as well as the attraction of new employees (Aguinis & Glavas, 2012; Roscoe et al., 2019; Sánchez-Marín et al., 2021).

Sustainable human resource management (SHRM) develops employees' sustainability competencies and fosters a corporate sustainability culture (Macke & Genari, 2019; Pellegrini et al., 2018). Sustainability *trainings* are key SHRM measures that positively influence employees' propensity to act sustainably at work, as Pellegrini et al.'s (2018) study in the retail sector, Roscoe et al.'s (2019) study in the manufacturing sector, and Cop et al.'s (2020) study in the hotel industry show.

Abbreviations: HR, human resource; HRM, human resource management; SHRM, sustainable human resource management; SME, small and medium-sized enterprise.

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However, SMEs often struggle with building sustainability competence in their workforce due to limited time, expertise, and monetary resources (Bos-Brouwers, 2010; Davies, 2014). Although the workforce is an ideal leverage point for advancing corporate sustainability also in SMEs (Bikefe et al., 2020), there is a void of sustainability trainings that reflect the specific needs and constraints of SMEs (National Environmental Education Foundation [NEEF], 2009). Moreover, corporate sustainability training programs focus on conveying basic information about sustainability, often restricted to resource efficiency (Davies, 2014). Yet, they rarely enable and empower employees to engage with sustainability holistically and to *act* sustainably (Langwell & Heaton, 2016). Specific trainings are missing that foster *action competence for sustainability*, that is, the willingness, ability, and confidence to act sustainably in professional and private contexts (Piasentin & Roberts, 2018; Vermeulen & Witjes, 2016).

There is a need for empirical research on *how SMEs can develop action competence for sustainability in their workforce through training*. We conducted a transdisciplinary study with the Bohlsener Mühle, a grain milling SME in Northern Germany that received the German Sustainability Award for SMEs in 2015 and has been a finalist in 2021. This case illustrates that even SMEs with a strong track record in sustainability, sometimes struggle to engage the workforce comprehensively in their sustainability efforts. In part, this is due to not fully seizing the potential of SHRM. At times, however, it is also due to rapid business success—the more employees need to get hired with little consideration of their sustainability orientation, the less they contribute to the enterprise's sustainability efforts, and the more important is training that builds a workforce capable of advancing the enterprise's sustainability performance. While committed to sustainable workforce development, the Bohlsener Mühle has struggled with these issues (like many other SMEs), and thus offers a suitable empirical setting to examine how to cope with them.

Through a close collaboration between university researchers and the Bohlsener Mühle, we developed, delivered, and evaluated a training for developing action competence for sustainability in the workforce. The training was piloted with the business' apprentices ($n = 8$) and facilitated different learning modes. Effects of the training were evaluated, and success and hindering factors were identified through pre-post surveys, observations, and semistructured interviews.

Our study offers contributions to the literature on holistic corporate sustainability in SMEs, SHRM, and sustainability trainings. From a workforce-development perspective, we expand research on sustainability education and competence development in corporate contexts (Langwell & Heaton, 2016; Sass et al., 2020). Specifically, we provide insights into how sustainability training influences participants' action competence and the need for a comprehensive approach to such trainings. From an organizational perspective, we strengthen previous work on the importance of trainings for holistic corporate sustainability in SMEs (Roscoe et al., 2019; Witjes et al., 2017) by highlighting the need to not only develop employees' sustainability orientation but also their engagement in sustainable actions. We also illustrate the role of training as a key SHRM measure (Pellegrini et al., 2018) by

shedding light on the organizational factors that influence the development and use of employees' action competence in day-to-day operations. As such, we assert the call to pay attention to comprehensive SHRM to achieve holistic corporate sustainability (Vermeulen & Witjes, 2016).

2 | CASE SELECTION—THE BOHLSENER MÜHLE

We used a case study approach to illustrate how SMEs can develop sustainable action competence in their workforce through training (Siggelkow, 2007). Applying a set of case sampling criteria to select a suitable case in need of this workforce development, we sampled the Bohlsener Mühle (see Table 1), located in Bohlsen, Lower Saxony, Germany. This SME sources, processes, and distributes organic grains, flours, and baked products. The company was founded in 1952 based on the homonymous mill which existed since 1265. Fierce

TABLE 1 Key features of the Bohlsener Mühle selected for the case study

Criterion	Bohlsener Mühle
1. Is an SME	290 employees, € 58m annual revenue (2020)
2. Strives for holistic corporate sustainability	<ul style="list-style-type: none"> - Sustainability strategy (since 1979) and performance, including: <ul style="list-style-type: none"> • 100% organic ingredients • Using renewable energy • Local sourcing and production (e.g., quinoa project) • Climate-positive strategy until 2025 - Office of Sustainability [1 manager, 1 trainee] since 2016 - Winner of the German Sustainability Award for SMEs in 2015 - Finalist of the German Sustainability Award for SMEs in 2021 - One of the first <i>We Care</i> certified companies worldwide in 2021
3. Recognizes the need for workforce development	<ul style="list-style-type: none"> - Mostly focused on environmental aspects so far - Top-down management, limited workforce engagement - Recognized importance of workforce development - Initial sustainable workforce development project (2018) - Current challenges: <ul style="list-style-type: none"> • Workforce fluctuation of 12.8% in 2020 • 60 new employees in 2020 • Limited sustainability orientation of new employees

Sources: Bohlsener Mühle (2021a, 2021b, 2021c) and Wiek et al. (2018).

competition from large high-performance mills led Volker Krause to focus on organic grain products when taking over the mill from his father in 1979. This focus and the comprehensive restructuring of the Bohlsener Mühle made the company become a sustainability pioneer in Germany.

The Bohlsener Mühle strives to create a sustainable impact beyond the corporate borders. As an intermediary supply-chain actor, it has used its position to infuse sustainability upstream (organic farming) and downstream (retail of organic products). The company also contributes to the economic, social, and cultural development of the region. Internally, the company has recognized the importance of the workforce for advancing corporate sustainability (Wiek et al., 2018). Yet, progress on this approach has proven to be challenging due to different needs and working conditions of employees in administration vs. production, as well as the business growth, workforce fluctuation, and shortage of skilled labor. Meanwhile, further advancing environmental practices and regional engagement occupies the corporation's sustainability focus and resources.

The case of Bohlsener Mühle represents a success story of a corporate sustainability transformation. Yet, it also illustrates continuous challenges in pursuing holistic corporate sustainability and sheds light on the importance of workforce development and SHRM. Relevant to many SMEs, the case of the Bohlsener Mühle offers both lessons of encouragement and caution.

3 | LINKING SUSTAINABILITY TRAINING, ACTION COMPETENCE, AND SME PERFORMANCE

A capable and valued workforce can engage in a broad arsenal of sustainable actions (Bacq & Alt, 2018) that positively influence an SME's sustainability performance (Figure 1, Arrow 3), including thoughtful innovation, proactive monitoring, sustainable practices/routines, compassionate communication, continuous learning, respectful advocacy, responsible decision making, purposeful community work,

comprehensive self-care, and mutual support among employees (Wiek et al., 2018).

It requires *action competence for sustainability* (Figure 1, Arrow 2) for a workforce to engage in sustainable actions, defined as *the willingness, ability, and confidence of employees to advance sustainability at work and in private* (Wiek, 2020). Action competence for sustainability offers employees specific *thinking skills*, that is, to be able to plan (assess the current state, set a goal, develop a sequence of actions), and *application skills*, that is, to be able to implement the plan (Brundiers et al., 2021; Redman & Wiek, 2021).

Of the several SHRM measures suitable for advancing corporate sustainability, such as recruitment and internal communication, workforce *training* is the most direct because it targets action competence for sustainability (Pellegrini et al., 2018; Piasentin & Roberts, 2018) (Figure 1, Arrow 1). Previous studies have shown that sustainability trainings in SMEs had positive effects on employees' confidence and sustainable actions at work (Gray & Jones, 2016) as well as the financial success of SMEs (Sánchez-Marín et al., 2021).

Finally, organizational factors affect the training process, employees' action competence, and the possible scope of action for sustainability (Figure 1, Arrows 4). Elements of the corporate sustainability culture, such as corporate commitment and organizational support, set the stage for sustainable workforce development (Cop et al., 2020; Roscoe et al., 2019).

Figure 1 summarizes the underlying theory of change that informs the design of the training program and the research design (see sections below): The sustainability training enhances employees' action competence for sustainability; which, in turn, enables employees to act sustainably in professional and private life; which, finally, positively affects corporate sustainability (and beyond); if supported by conducive organizational factors.

This research focuses on evaluating the effects of the training on employees' action competence for sustainability and the role of organizational factors. Longitudinal effects on employees' sustainable

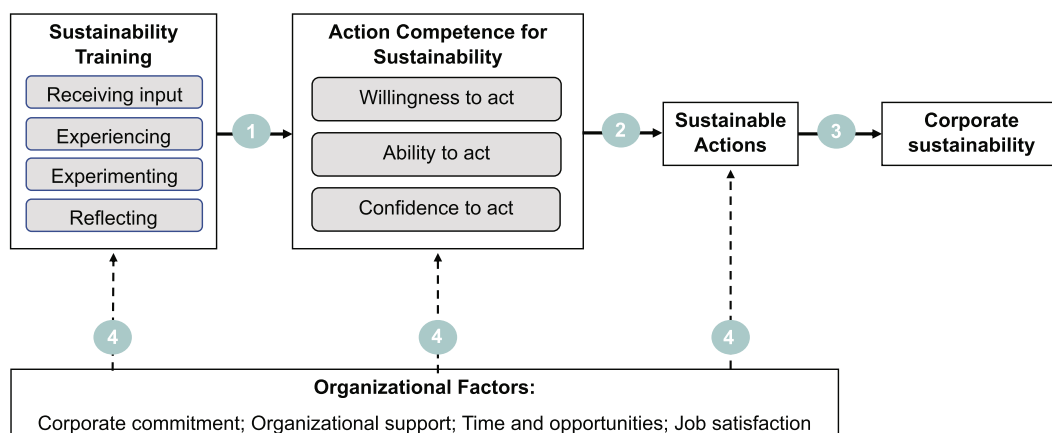


FIGURE 1 Theoretical model for the research project

actions and overall corporate sustainability are outside the research scope.

4 | RESEARCH DESIGN

We adopted a transdisciplinary approach (Lang et al., 2012) to integrate scientific knowledge and professional experiences. This allowed to (1) design and deliver an effective sustainability training, suited to the needs of the enterprise and its employees; (2) evaluate the training program regarding parameters relevant to the enterprise; (3) gain an understanding of influential organizational factors; and (4) generate insights to offer guidance to other SMEs on sustainability trainings for their workforce. Figure 2 summarizes the structure of this transdisciplinary project, highlighting the contributions of the Bohlsener Mühle and the scientific research team on the left side and specifying the research process on the right side.

4.1 | Training design and delivery

The sustainability training was designed and delivered in a transdisciplinary cooperation between the researchers (offering insights from previous studies and the literature) and the sustainability manager and trainee from the Bohlsener Mühle (providing insights on the enterprise, the workforce, and relevant organizational factors). Due to the COVID-19 restrictions, all training sessions were delivered virtually (Zoom). To foster interactions, the training sessions made use of Miro, a virtual whiteboard that can be edited by all participants (Appendix A.1).

The training consists of three training sessions and two practical application phases in-between. Table 2 summarizes the training

structure and utilized materials. All elements build upon each other, starting with a general familiarization with sustainability (Training session 1) and leading to practical ideas that could enhance sustainability at the Bohlsener Mühle, if implemented (Training session 3). Throughout the training, participants' role is intended to shift from reception to engagement to foster sustainable action competence (Wiek, 2020):

- a. *Participants receive inputs on sustainable actions:* Developing action competence best starts with conveying knowledge about sustainability problems as well as pathways to problem-solving and future visions (Jensen, 2004). Employees can get inspired by knowing the suite of sustainable actions as well as tangible and practical examples from other SMEs.
- b. *Participants experience sustainable actions:* Witnessing sustainable actions through field visits, “shadowing” professionals, and so forth can further develop sustainable action competence (Jensen & Schnack, 1997; Piasentin & Roberts, 2018). Experiencing sustainable actions enhances the understanding of required skills and resources, as well as barriers and impacts (Breiting et al., 2009).
- c. *Participants experiment with sustainable actions:* Finally, particularly for *action* competence, learning by doing is essential (Læssøe, 2010). Practical workshops, apprenticeships, and so forth support this mode of learning. It might even be beneficial to provide some of this training directly in the work environment where employees act.
- d. Providing opportunities for *reflections* through discussion and feedback allows participants to put the learned content into perspective and facilitates lasting learning effects (Piasentin & Roberts, 2018).

The training structure incorporates all four modes of learning (Table 2). *Inputs* are given throughout all training elements in the form of personal talks, videos, or texts. Participants *experience* sustainability actions mainly in training sessions 1 and 2 through given practice

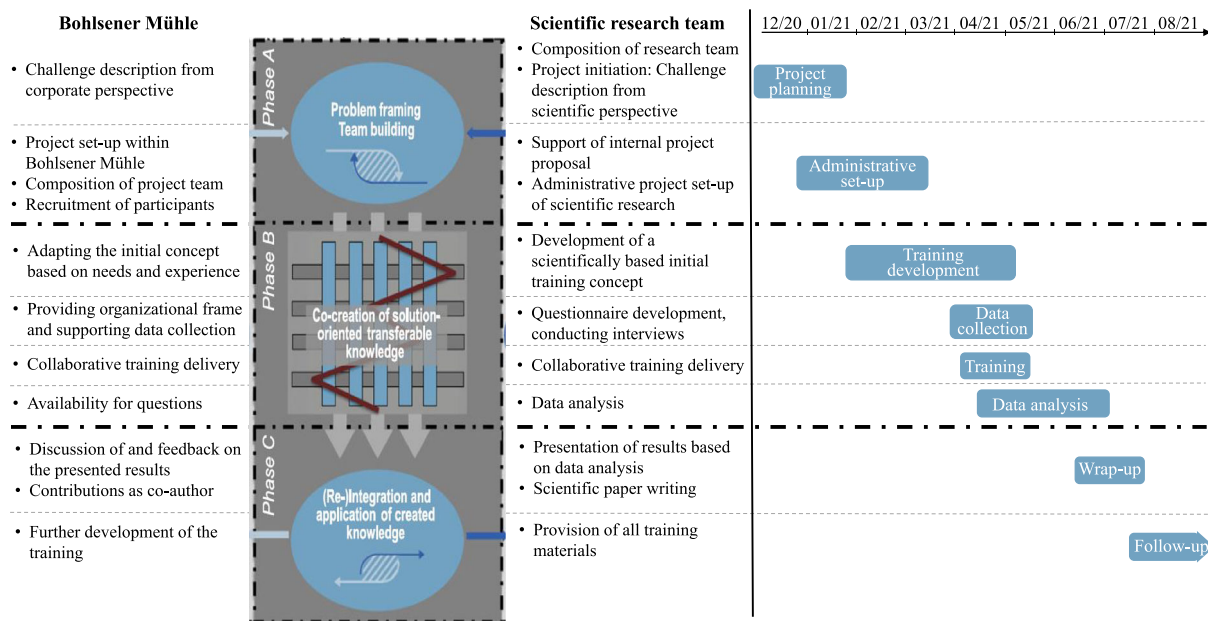


FIGURE 2 Structure of the transdisciplinary research process (based on Lang et al., 2012)

TABLE 2 Overview of elements, goals and content, and pedagogies of the sustainability training

Training Element	Goal and Content	Methods and materials
Training session 1: Sustainability understanding ; 6.5 h	Building a foundation for the training <ol style="list-style-type: none"> 1. Introduction of participants to each other, the utilized tools, and the training structure 2. Introduction to sustainability 3. Sustainability activities along Bohlsener Mühle's supply and value chain 4. Guest speakers: Contracted local farmer, Bohlsener Mühle's managing owner 5. Introduction to the task for the observational phase 6. Wrap-up and initial feedback 	Inputs, videos, exercises (participants only), guest speakers
Practical phase 1: Observational phase ; 10 working days	Discovering sustainability aspects in daily life <ol style="list-style-type: none"> 1. Introduction of three focus topics: waste, mobility, organic agriculture 2. Focus on one sustainable action (proactive monitoring and evaluation): making it tangible at work 3. Challenges that encourage experimenting with sustainable actions (e.g., zero-waste day) 4. Impulses to think about solutions for experienced challenges 5. Reflection on encountered challenges 	Journal with texts and tasks (Appendix A.2) inspired by a sustainable vocational training in the food industry (Pranger & Hantke, 2020; Pranger, Heitzhausen, Loga, & Flohr-Spence, n.d.).
Training session 2: Sustainability actions ; 3.5 h	Familiarizing with sustainability actions and their role for developing ideas for application <ol style="list-style-type: none"> 1. Check-in and reflections on the first training session 2. Presentation of the full suite of sustainable actions 3. Reflections on the experiences with sustainable actions in the observational phase 4. Focus on one sustainable action (creative and thoughtful innovation) based on a practice example 5. Developing an application idea for each of the three focus topics 6. Introduction to the task for the experimental phase 7. Wrap-up and interim feedback 	Inputs, videos, exercises (guided by one of the three trainers)
Practical phase 2: Experimental phase ; 9 working days	Experimenting with sustainable actions to further develop the application ideas from training session 2 <ol style="list-style-type: none"> 1. Information on the sustainable actions 2. Step-by-step guide through a canvas-inspired scheme for idea development (description of the problem and the idea, implementation plan, required resources, expected added value) 3. Impulses to utilize specific sustainable actions to advance the application ideas 4. Reflection on encountered challenges 	Journal with texts and tasks
Training session 3: Sustainability ideas ; 3.5 h	Further development and exchange on the application ideas <ol style="list-style-type: none"> 1. Check-in and reflection on the second training session 2. Reviewing and revising the application ideas (checking their completeness, contribution to sustainability, and feasibility of implementation) 3. Pitch of the ideas (one per each group) and feedback round 4. Exchange and discussion with the sustainability manager 5. Concluding reflections and feedback 	Inputs, groupworks (guided by one of the three trainers), feedback and discussion rounds

examples and guest speakers. Furthermore, the practical phase 1 focuses on creating opportunities for the participants to witness sustainable actions in their day-to-day life. The practical phases also allow participants to *experiment* with sustainable actions. While the training sessions mainly focus on collaborative *reflection*, the practical sessions encourage an individual reflective process within the work environment.

4.2 | Data collection

Data on eight apprentices of the Bohlsener Mühle aged 18 and older was collected through a pre-training and a post-training questionnaire, as well as semi-structured interviews and observation notes. The research project draws on a single-case study design (Siggelkow, 2007) and a combination of qualitative and quantitative

analytical techniques. Following principles of case study research, we engaged with staff and leadership at the Bohlsener Mühle to develop trustful relationships and triangulated the findings via multiple data sources for increased validity (Gibbert & Ruigrok, 2010).

The pre-training questionnaire (online or on paper) captured the different components of action competence for sustainability and collected basic demographic data on age, gender, educational background as well as year and type of apprenticeship. It adopted the scale for self-perceived action competence for sustainability developed by Olsson et al. (2020) and was supplemented by questions from other validated scales, such as items adapted from the New Environmental Paradigm scale (van Liere & Dunlap, 1981; other scales were adapted from, e.g., Craig & Allen, 2013; de Groot & Steg, 2008; Perrault & Clark, 2017). Considering the limitations of competence assessments based on self-perception (Redman et al., 2021), we also included questions to test participants' sustainability knowledge (various types). The post-training questionnaire consisted of the same questions with additional questions, e.g., about the satisfaction with and self-perceived impact of the overall training. Sections, sources, scales, and exemplary items used in the questionnaires are compiled in Appendix A.3.

To validate survey data and gain deeper insights, short (30 min.) semistructured interviews were conducted with all participants (Zoom) the day after the training was completed. The interviews had a similar thematic structure as the questionnaires (Appendix A.4). Initial analysis of survey data informed the interviews.

Additional data points stem from observations before, during, and after the training. While the project set-up and wrap-up notes are based on collaborative exchanges with the project partners from the Bohlsener Mühle, training notes reflect on interim evaluations, feedback rounds, and content from the journals.

We obtained six complete data sets from participants. One data set includes an incomplete post-training questionnaire (due to participant's time constraints), and one data set misses the pre-training and post-training questionnaires. Even though the depth and validity of data differs within and across the participants, the combination of questionnaires, interviews, and observations in a mixed-methods design generated rich data providing in-depth insights into the participants' learning processes during the training as well as crucial organizational factors.

4.3 | Data analysis

The training program was evaluated as a purposeful intervention toward an action-competent, sustainability-oriented workforce (Alvarez et al., 2004). We investigated *changes in participants' action competence* (training effects) and *factors* for the observed changes. Interviews were transcribed and coded with MAXQDA based on the theoretical model. Observation data were not systematically analyzed but used to complement the previous analyses.

First, the *effects of the training* on the participants' action competence for sustainability were analyzed in three steps. Step 1, the data from the questionnaires was coded with numeric values and aggregated on the level of the overarching construct. For comparability, values were normalized (0-1). The delta between the normalized pre-training and post-training scores for each category was calculated and rated (*significant* change, if difference ≥ 1 -point; *slight* change, if ≥ 0.5 -point). Step 2, the additional post-training questions were analyzed similarly. Step 3, interview data and documented observations nuanced previous insights.

Second, to identify the relevant *training elements*, the interviews were inductively coded for mentioned content and pedagogical approaches. To identify relevant *individual traits/behavior* a comparative analysis was conducted (pre-training vs. post-training scores). A heterogeneity analysis compared each participant's score to the mean value of all participants (lower/higher if difference > 1 -point).

We also identified *organizational factors of the enterprise* (Bohlsener Mühle) that offered explanations for the identified training effects, based on pre-training and post-training comparison, additional post-training questions, and the interviews.

Third, the training design was evaluated through post-training questions as well as participants' feedback and documented observations. Figure 3 summarizes the steps of data collection (light grey boxes) and analysis (dark grey boxes) as well as provides information on how the analyzed data were triangulated.

5 | EFFECTS ON ACTION COMPETENCE FOR SUSTAINABILITY

While the analysis revealed that the sustainability training program had positive effects on participants' sustainable action competence, the effects were strong for six participants, but only minimal for two participants (Table 3, arrows). The changes in participants' action competence were evaluated based on the summative changes in their *willingness*, *ability*, and *confidence to act*. However, we deemed slight changes in only one of the three areas to be not sufficient for an overall increase of action competence, explaining the limited effect of the training on Participants 7 and 8. The positive change in all three measures offers strong evidence of the training effects on action competence, as experienced by most participants. Additionally, Table 3 shows the positive effect of the training on participants' engagement in sustainability actions.

5.1 | Effects on the willingness to act sustainably

The training had positive effects on the majority (6) of the participants' *willingness to act sustainably*. Willingness to act is expressed through motivation and commitment to act (Sass et al., 2020). This often means self-motivation, because sustainable actions are typically "not explicitly recognized by the formal reward system" (Boiral, 2009, p. 223). The analysis shows participants' increased

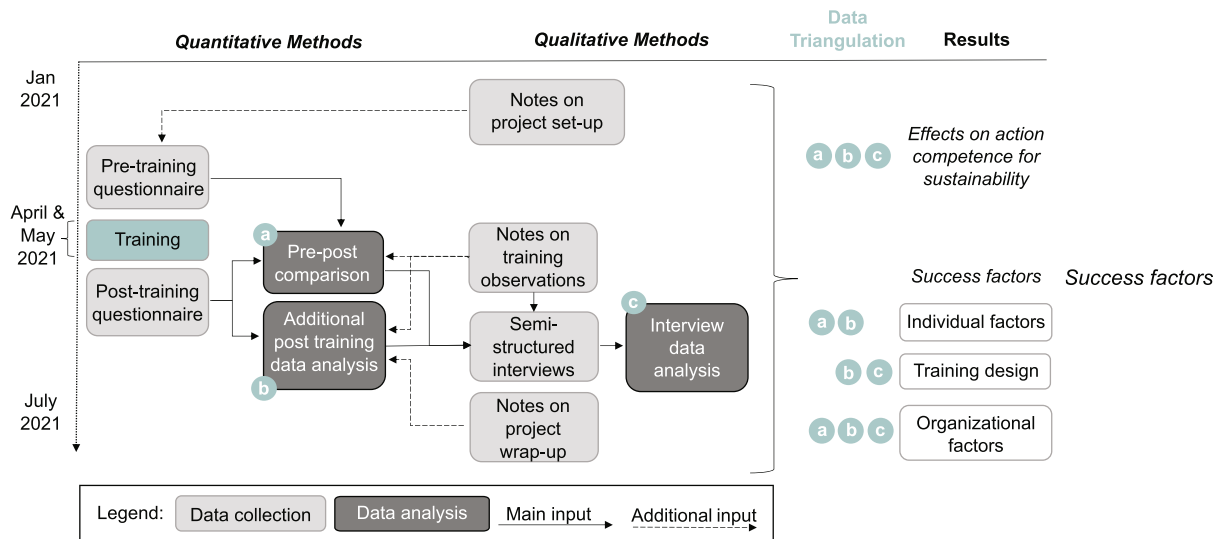


FIGURE 3 Overview of the data collection and analysis process, within a transdisciplinary research setting

TABLE 3 Summary of training effects on participants' action competence for sustainability, its subcomponents, and sustainability actions. Arrows indicate change based on overall interpretation of all data. The colored precells and postcells indicate levels before and after the training based on the pre-training and post-training questionnaires (score <0.2: low; 0.2 ≤ score <0.4: rather low; 0.4 ≤ score <0.6: medium; 0.6 ≤ score <0.8: rather high; score >0.8: high)

Participants		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6 ²	No. 7	No. 8
Action competence for sustainability	Pre	↑	rh	↑	m	↗	rh	↗	rh
	Post	↑	h	↑	h	↗	rh ¹	↗	rh ¹
Willingness to act	Pre	↗	h	↗	m	↗	rh	↗	rh
	Post	↗	h ¹	↗	rh	↗	rh ¹	↗	rh ¹
Ability to act	Pre	↑	rh	↑	rh	↗	h	↑	rh
	Post	↑	h	↑	h	↗	rh ¹	↗	rh ¹
Confidence to act	Pre	↑	m	↑	rh	↗	rh	↗	rh
	Post	↑	h	↑	h	↗	rh ¹	↗	rh ¹
Sustainability actions	Pre	↗	rh	↗	rh	→	rh	→	rh
	Post	↗	h	↗	h	→	rh	→	rh

Note: ¹Overall change as indicated through arrow differs from pre-post-training questionnaire comparison. ²Solely interview data available due to missing pre-training and post-training questionnaires. ³Missing post-training questionnaire data.

personal interest, perceived importance of sustainability (in general), and motivation to engage in specific sustainable actions. At the same time, we neither found changes in motives (biocentric, altruistic, egocentric) nor in underlying attitudes toward sustainability. This is not surprising as motives and attitudes are mainly formed through socialization and linked to habitual components and personality traits (Plath, 2002). It is unlikely that such changes occur through a 4-week-training program.

The personal interest in and perceived importance of sustainability (slightly) increased for almost all participants and helped them to realize “how important this topic is [...] and that it is good for everyone to know about it” (Int. #5). The training served as a “nudge [...]

to think about it [sustainability] more actively and engage more” (Int. #3). This includes the continuity of the training. Having several sessions over four weeks fostered participants' awareness for and motivation to engage with sustainability as they “always [had] in the back of [their] mind that there will be another training soon” (Int. #1). Experiencing and experimenting impacted participants' willingness to act: First, getting authentic insights into “lived” sustainability (local farmer) motivated the participants (Doc., T1). Furthermore, the solution-orientation of the training increased participants' motivation: “having dealt with the problems more closely and finding solutions, I found that now I have more desire to pay [...] attention and also to behave more sustainably” (Int. #1).

As a sign of commitment to act, four participants demonstrated an increased willingness to *engage in specific sustainable actions* resulting from the training. Participants mainly referred to proactive monitoring and evaluation, “to be more aware in general, to keep your eyes open [...], to see what you notice and what you can improve” (Int. #4), as well as sustainable practices/routines, “I want to try to pay more attention when shopping and [...] ride my bike more frequently [...], but maybe also save energy” (Int. #1). Five apprentices expressed their willingness to pursue the sustainability ideas that they developed during the training.

5.2 | Effects on the ability to act sustainably

The training had positive effects on the majority (5) of the participants' *ability to act sustainably*, which requires employees to possess theoretical and practical *knowledge* about sustainability, resources, technologies, human behavior, cost, impacts on the environment, and public health, and so forth (Plath, 2002; Sass et al., 2020). The analysis of participants' self-perception and an overall ability assessment shows an increase in all knowledge dimensions.

First, six of the eight participants perceived to have a better *general sustainability understanding* and an increase in their *topic-specific sustainability knowledge* after the training. For example, it was new to them “that sustainability is not just about the environment” (Doc., T1). Differences in employees' corporate sustainability understanding can be bridged by more awareness of the corporation's sustainability practices (Linnenluecke et al., 2009). As a result, participants are more likely to act sustainably if they are familiar with sustainability as a concept of *interlinked* aspects and know corresponding corporate practices, as conveyed in the training. Familiarizing participants with sustainability through “theory in the first training” provided participants with the necessary theoretical knowledge and “made it much clearer [what] to pay attention [to]” (Int. #2). Some participants experienced a slight increase in topic-specific sustainability knowledge through the inputs of the guest speakers (e.g., Int. # 3), informative video clips, and topic-specific group work on waste, mobility, and organic agriculture (e.g., Int. #4) as well as during the practical phases “because you see it every day at work” (Int. #6). For those participants who did not experience an improved understanding, one already had an in-depth understanding beforehand and the other struggled to grasp the basic concept, which may be indicative of a deeper challenge regarding competence acquisition (Oakes et al., 2001).

Second, the analysis revealed a slight increase in their *knowledge about sustainability at the Bohlsener Mühle* and an increase in *general sustainability competencies*, which indicates the acquisition of necessary application skills. The interviews reveal an increased understanding of responsibilities in the domain of sustainability management at the Bohlsener Mühle due to engaging with the sustainability manager during the training. This enhanced participants' knowledge about sustainability measures and also understanding the challenges of implementing measures due to trade-offs (e.g., Int. #7).

Moreover, participants' general sustainability competencies were fostered through opportunities to experiment with sustainability actions, in which participants “learned to incorporate sustainability into everyday life” (Int. #4). This was related to guidance provided on how to develop sustainability solutions and enhanced the overall ability to act as participants understood the sequence from planning to taking action to “getting a good result” (Int. #2). Similarly, the guidance to reflect on the sustainability of actions and processes was perceived as “an impetus to continue” and was “good for working through [...] specific aspects” (Int. #3), which indicates basic assessment skills. Lastly, frequent opportunities to exchange with others were mentioned as a factor that allowed participants to acquire knowledge from various perspectives. This also includes learning from others' experiences and fostering participants' interpersonal competence.

5.3 | Effects on the confidence to act sustainably

The training had positive effects on all participants' confidence to act sustainably, which was assessed on the overarching level. Higher confidence in employees' ability to take action (i.e., self-efficacy) and their ability to reach the desired outcome (i.e., outcome expectancy) increase the ability of a workforce to engage in sustainability actions (Sass et al., 2020). Even though there still is a conflict between thinking “if you do it alone, it is useless” and “if you don't start, no one will do it” among participants, the training strengthened the conviction that everyone “can contribute something” (Int. #7).

First, participants' confidence to act increased through gaining a more realistic perspective on the magnitude of their impact. Managing their expectation and realizing that “you can't go from 0 to 100, you have to develop step by step” (Int. #5) made advancing sustainability appear more manageable. For this participant, it was connected to focusing on the process and letting go of the aspiration to get solutions instantly: “If you do not start somewhere, then you will not get anywhere. Even if the starting point is not perfect, it doesn't mean that you have to give up, but you look for another entry point” (Int. #5).

Furthermore, through the exchanges with others in groups, personal interactions in the practical phases, and insights into sustainable actions of others, the training strengthened participants' compassion and created a sense of cooperation. This includes exchanging directly with the sustainability manager, which made participants feel “being heard”. That the sustainability manager “got insights into things they didn't know and just listened to our [the participants] opinion about it” (Int. #5), helped participants feel more confident in their influence.

Lastly, we discovered participants' success with engaging in actions during the practical phases contributed to their confidence to act. Besides developing ideas during the training, this also includes successfully motivating colleagues to behave sustainably. One participant concluded that “you have to make a start and motivate others” (Int. #1).

5.4 | Effects on Actions for Sustainability

The training program positively impacted participants' *actions for sustainability*, including thoughtful innovation, proactive monitoring, and sustainable practices/routines (Wiek et al., 2018). Although we did not monitor participants' behavior and actions (beyond research scope), the pre-questionnaires and post-questionnaires as well as the interviews included questions about engaging with the aforementioned actions introduced during the training. Four of the participants indicated positive changes (Table 3), including sustainable workplace practices/routines, such as not printing documents, and private behavior, like consumption decisions ("I have a different view now [...] and look more closely at what [I'm] buying"—Int. #1), and mobility behavior ("[It] was good weather, if I do not ride my bike then, I feel guilty. So, [...] the training has influenced me a bit."—Int. #2). Overall, several participants indicated being "more aware in general, [...] and actively search for things that can be improved" (Int. #4). Participant 7, whose action competence for sustainability did not change, stated a strong increase in taking action, which could point to a different cause (e.g., mimicry).

6 | TRAINING SUCCESS FACTORS

The training positively affected all participants in at least one area of action competence for sustainability. For five participants, there were

clear (#1–2) or slight (#3–6) increases in action competence, while two participants (#7–8) did not show any changes. Overall, the training was well-received (satisfaction) by seven participants across all evaluation instruments. Likewise, the learning conditions were evaluated mostly positively despite the online format.

The analysis suggests that *individual factors*, such as participants' starting levels and participation, *training design factors*, such as combining theoretical and practical learning opportunities, and *organizational factors* such as available time, are important for training success.

Individual success factors included two aspects. First, different starting levels did influence the training effects (Table 3, above). Second, while all other participants were able to be present in all training sessions, Participant 7 missed the second session and did not sufficiently engage with the journal in the practical phases (Table 4). This might explain why there was not a measurable increase in this participant's action competence. However, full participation and a fair level of engagement might still not lead to an increase in action competence (#8). While the educational status of participants may have played a role, there are no major patterns in demographic characteristics that can explain the individual differences in learning success.

Success factors also pertained to the training design. While participants would have preferred a training with direct interactions (e.g., site visits), the learning atmosphere was evaluated as positive. Miro as a virtual whiteboard lowered the barrier to engage. Considering some positive aspects of online learning (Davies, 2014), even for

TABLE 4 Participants' presence in the training sessions and active engagement in the practical phases

Participants	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
Present in all three training sessions	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Active engagement in practical phases	High	Fair	High	Low	Low	NA	Low	Fair

TABLE 5 Participants' assessment of organizational factors based on post-training questionnaire (low, rather low, medium, rather high, high)

Participants	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6 ¹	No. 7	No. 8
Δ Action Competence	↑	↑	↗	↗	↗	↗	→	→
Satisfaction at company	rh	h	rh	rh	m	NA	rh	l
Company's emphasis on sustainability	h	h	rh	h	h	NA	h	rl
Department's emphasis on sustainability	rl	h	m	m	rh	rl	m	rl
Organizational support	rh	rh	rh	rh	m	NA	m	l
Support through colleagues	h	h	l	rh	rl	NA	l	rl
Support through supervisor	rh	h	rl	rh	rl	rh	rl	rl
Scope of action for sustainability	rh	h	h	rl	rl	l	rh	l
Time to engage with sustainability	rh	rh	rl	rl	rl	m	rl	l

¹Solely interview data available due to missing pre-training and post-training questionnaires.

in-person trainings, online elements should be maintained. Other factors conducive to learning success were comprehensive content and accessible language.

Most participants were satisfied with the topics covered in the training and enjoyed the opportunity to engage with one of the three focus topics. Participants appreciated the sequence from getting familiarized to experiencing, experimenting, and reflecting on their actions. The journals (practical phases) were mostly perceived as useful for guidance to find connections to sustainability at work. The supporting materials should be as concise as possible to increase engagement. To have enough time to allow for processing and discussion, the training modules could be adapted to specific conditions. Participants appreciated mixed group composition across departments, as this provided richness in perspectives and expertise. However, this diversity challenged the practical relevance of the training, which led participants to suggest also having department-internal group discussions/exercises.

Finally, organizational factors influenced training success. Participants' assessment of organizational factors barely changed throughout the training (Table 5). Participants whose action competence increased assessed the organizational factors as mostly positive (#1–2), participants with a slight increase assessed the organizational factors as mixed (#3–5), and Participant 8 whose action competence barely changed assessed the organizational factors negatively. For Participant 7, an absence and lack of engagement (Table 4) combined with mixed organizational factors might have impaired the effectiveness of the training.

An organizational factor frequently assessed negatively was the (perceived) lack of time to engage with sustainability in everyday work. This corresponds to some participants' limited engagement in the practical training phases (“in-between and every now and then”—Int. #1) and working on the journal after work. Participants called for a broader buy-in and dedicated time slots to engage with the training material. Additional factors for positive training effects seem to be the level of social sustainability and favorable working conditions; level of coherence between communicated and “lived” corporate sustainability; extent to which feedback on sustainability issues is taken seriously and acted upon in the enterprise; level of clarity regarding responsibilities and contact persons pertaining to sustainability issues.

7 | SUSTAINABILITY TRAININGS AS CRITICAL LINK TO CORPORATE SUSTAINABILITY

SMEs are considered more adaptable than larger companies, enabling them to transform their business models and practices more easily (OECD, 2019) and noticing the impact of actions more immediately (Jenkins, 2006). Yet, SMEs often face a restricted steering capacity due to more informal structures and limited resources, making employee engagement particularly important (Sendlhofer, 2020). Thus, SMEs' attempts to develop action competence for sustainability in their workforce through training is a promising intervention point toward holistic corporate sustainability. Below, we explore our findings from the case study on the Bohlsener Mühle through the lens of the workforce and organizational development, as well as indicate study limitations.

7.1 | Workforce development: Action competence and sustainability training

Despite the recognized importance of an action-competent, sustainability-oriented workforce, there are only few studies empirically examining how trainings can enable and empower employees to act sustainably (Bos-Brouwers, 2010; Langwell & Heaton, 2016). While most research on fostering action competence for sustainability has been conducted in school and university contexts (e.g., S.-Y. Chen & Liu, 2020; Piasentin & Roberts, 2018), our study demonstrates that action competence can likewise be fostered in enterprises and highlights particularly effective training elements (Table 6).

The finding that the training program increased the willingness to act of almost all participants supports the claim that creating awareness of sustainable actions motivates employees to pursue sustainability (Grant, 2007). Our training program might be particularly successful since it does not only focus on meaningfulness at work (i.e., sustainability orientation of the Bohlsener Mühle) but also allowed participants to enhance meaningfulness in work (i.e., their jobs' contribution to sustainability) (Glavas, 2012). Contrary to Plath's (2002) conceptualization of action competence, our findings show that participants' willingness to act increased without notable changes in attitudes and values. This does not mean that values and attitudes

TABLE 6 Most important training elements and their effect on action competence for sustainability

Training element	Willingness to act	Ability to act	Confidence to act
Continuity of the training	X		
Inputs on sustainability		X	
Guest speaker, practice examples	X	X	X
Solution-orientation	X		X
Exchange with sustainability management		X	X
Practical phases, including guidance in journals		X	X
Working in groups, exchanging with others		X	X

are unimportant but rather shows the relevance of mediating factors through which values affect actions and behavior (Piasentin & Roberts, 2018). While previous research indicated the link between training and willingness to act (Glavas, 2012; Piasentin & Roberts, 2018), we specify the importance of training through experiencing and experimenting with sustainable actions. Lastly, the solution-orientation through which participants co-develop shared ideas can be assumed to empower and enhance willingness to act (Tariq et al., 2016).

Previous studies have established links between sustainability training and enhanced *ability to act* (e.g., Birou et al., 2019) as well as links between enhanced ability to act and advancements in corporate sustainability (e.g., Engert & Baumgartner, 2016). Our findings highlight that common training elements such as guest speakers and group work help participants to recognize and analyze sustainability problems (Piasentin & Roberts, 2018). Particularly effective seem inputs that directly relate to participants' jobs and activities (Langwell & Heaton, 2016) and hands-on practical learning settings (experimenting) (Piasentin & Roberts, 2018). Experimenting with sustainable actions as part of the training may, in return, lead to further enhanced ability (Plath, 2002).

The positive changes in all participants' *confidence to act* echo and complement findings from a similar study (Piasentin & Roberts, 2018). The link between employees' confidence to act sustainably and corporations' sustainability performance remains unexplored. However, a previous study has established a positive link between self-efficacy and green performance (Y.-S. Chen et al., 2014). Our findings also support the pedagogical insight that guest speakers can enhance confidence by being role models (Chawla & Cushing, 2007).

To achieve these multiple benefits requires a *comprehensive* approach to training in three respects. First, efforts need to go beyond the dominant focus on *green* training and HRM where most emphasis is put on the environmental dimension (e.g., Dumont et al., 2017; Roscoe et al., 2019). In contrast, our training adopted a comprehensive sustainability perspective – and thus, our research offers insights on true *sustainability* trainings. Second, sustainability trainings need to be comprehensive in their approach of empowering employees to act. Even though we did not track and evaluate participants' engagement in *sustainable actions*, this is the ultimate training objective. The connection between training and employees' sustainable behavior, often connected to organizational citizenship behavior for the environment, has been established to some extent (Dumont et al., 2017; Pellegrini et al., 2018). We want to stress the importance of focusing on *actions* in contrast to behavior though. An *action* is consciously decided upon by the individual and aimed at solving an issue (Jensen, 2004). Due to the complexity of sustainability issues, instead of “prescribing the ‘right’ behavior” (Sass et al., 2020, p. 293), individuals should develop the competence to evaluate situations and make informed decisions for a spectrum of actions. Third, a progressive training structure (familiarizing, experiencing, experimenting, reflecting) seems recommendable for competence acquisition, as indicated in other sustainability training studies (Konrad et al., 2021).

The magnitude of positive change achieved through this program is remarkable given the limited time and financial resources invested. However, positive changes are usually greater in training apprentices than regular employees (Jonsson & Thorgren, 2017), due to a higher degree of motivation and cognitive flexibility (Oakes et al., 2001). While this limits the generalizability of our findings to the entire workforce, it highlights why including apprentices in sustainability trainings is important: They bring new perspectives, question established work processes, and thereby might contribute to sustainability innovation. At the same time, apprentices often do not yet have a “mental contract” with the organization (Jonsson & Thorgren, 2017), likely leading to lower levels of commitment and engagement (Rodríguez & Gregory, 2005). Thus, sustainability trainings should target the entire workforce under consideration of bottom-up and top-down dynamics as well as different needs of employee groups.

7.2 | Organizational development: Holistic corporate sustainability and SHRM

Our study supports and nuances findings that sustainability training is an effective and direct SHRM measure to advance corporate sustainability (Langwell & Heaton, 2016; Pellegrini et al., 2018) through enhancing employee engagement in sustainability actions, particularly innovation behavior (Xie & Zhu, 2020). Participants' reflections, engagement, and ideas showcase this potential. At the same time, we shed light on the often-neglected need for employees to possess sustainable action competence to act sustainably and enhance corporate sustainability (Redman & Wiek, 2021).

SHRM measures foster a culture of corporate sustainability that enables and empowers employees to co-design their workplace to be environmentally and socially friendly while contributing to the businesses' economic viability (Pellegrini et al., 2018; Roscoe et al., 2019). This positively affects the workforce's well-being, which, in turn, fosters the corporate sustainability performance (Aguinis & Glavas, 2012). Our research supports these insights by exploring sustainability training as a key SHRM measure. However, Pellegrini et al. (2018) highlight that training is not a universal solution to advancing corporate sustainability and is most effective when accompanied by reinforcing measures. This is in line with our findings that organizational factors mediate training effects (Table 5). These factors set the stage for participants to engage in sustainable actions (Roscoe et al., 2019). Aligning organizational factors with sustainability signals organizational commitment and, thus, may positively influence employees' sustainability orientation and behavior (Pellegrini et al., 2018). In contrast, under suboptimal organizational factors training may fail to foster action competence and sustainable actions despite following all other recommendations. While some of the organizational factors were already considered in the theoretical model (Figure 1), the process of conducting the training did not only reveal more factors but also exposed if the respective factor is in alignment with a corporate sustainability culture. Aligned with insights from Langwell and Heaton (2016) and Pellegrini et al.

(2018), the following examples show how SHRM may contribute to training success:

1. Allocating sufficient time to assure full engagement with the training compatible with regular work obligations: To this end, buy-in should be secured early, provided contents should be as concise as possible, and flexible engagement should be maximized for specific departments.
2. Streamlining internal communication and coordination to anchor sustainability learning across all departments: Therefore, the sustainability office needs to be able to directly communicate with all employees. Additionally, SHRM should offer opportunities for employees to engage directly in decision-making on sustainability, for example, through a sustainability workforce team that cooperates with leadership on sustainability ideas and pilot projects.
3. Assuring supervisor support and sufficient buy-in on the management level to avoid amplifying reservations against sustainability training or sustainability in general: Without supervisors leading by example, resources invested in workforce training may not pay off.
4. Aligning communicated and “lived” sustainability to enhance a corporation's credibility and avoid perceptions of hypocrisy among the workforce: Even though training measures signal to employees that the corporation values sustainability, our findings show that this ought to be echoed and matched throughout the organization.

Our findings highlight that several HRM measures need to be combined in a coherently implemented SHRM strategy to anchor sustainability in a corporation. For this, the sustainability office should consider the HR department as a strategic partner, aligning expertise on sustainability issues with substantive knowledge on training and other SHRM measures (Langwell & Heaton, 2016; Sánchez-Marín et al., 2021).

7.3 | Study limitations

This study displays some limitations. Even though we gained extensive qualitative insights into the participants' perceptions of the training and their work environment, we are not able to share specific examples from departments due to the small sample size to assure anonymity. Further, the small sample is not representative of the entire workforce, let alone beyond this specific enterprise. For example, participants were not selected randomly. Thus, the insights may not be valid for individuals with an attitude that is opposed to sustainability. Furthermore, the participants were apprentices through which the magnitude of effects is expected to be larger.

While there are limitations in generalizing the findings, we are confident that SMEs can learn from this case. The study shows which elements SMEs should consider when setting up sustainability trainings and which organizational factors they should pay attention to. Due to the complex net of factors that influence sustainability learning, we do not suggest single causes or rule out additional influences. Referring to the theoretical model (Figure 1), this research

focused on the connection between the training and employees' action competence for sustainability. The other causal relations assumed in the model were either not at all or only slightly touched upon. Finally, the principal researcher (S.Sch.) did design, deliver, and evaluate the training. While this allowed for deep insights, it also means that this researcher partly evaluated her work, despite regular “distancing” reflections with the co-investigators and co-authors.

8 | CONCLUSIONS

This study demonstrates that SMEs can foster their employees' action competence for sustainability through training. The identified training elements that mainly contributed to the positive effects stem from the training structure that combines familiarizing employees with sustainability in a workshop format with opportunities to experience and experiment with sustainable actions at work. Important organizational factors to successfully foster action competence include sufficient time and opportunities to engage with sustainability, organizational support, and good overall working conditions. This calls for an alignment of human resource management with sustainability efforts, aiming for a human-centered approach that creates a work environment and corporate sustainability culture in which employees can thrive and realize their full potential—for themselves and for sustainability. Providing these conducive organizational factors, in addition to high-quality training, is a significant challenge considering that even a pioneering SME, like the Bohlsener Mühle, struggles to do so due to common constraints (time, expertise, resources) but also, at times, due to accelerated success. In these situations, sustainability trainings are a critical means to fully seize the potential of an action-competent, sustainability-oriented workforce. Additionally, SMEs' resource constraints do not have to put a halt to the advancement of corporate sustainability if they focus on their strengths. SMEs should utilize the higher responsiveness to change and more informal structures to experiment with SHRM measures which may enable them to develop the training approach that best suits them. This could be done through similar projects like the one presented here. Further research is needed to substantiate and generalize the presented findings, including experimental research with larger sample sizes that track employees' learning processes in longitudinal study settings; comparative research with several corporations to account for the diversity of structures and challenges that SMEs face; expanded research that explores how action competence translates into sustainability actions, and how those influence corporate sustainability; and research with larger research teams to distribute responsibilities for design, delivery, and evaluation of sustainability trainings.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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APPENDIX A

A.1 | Structure of the Miro white board for training session T1

(1) Introduction	
(2) Introduction to sustainability	Groupwork
(7) Sustainability activities along Bohlsener Mühle's value chain	
(6) Guest speaker: Local farmer	
(3) Guest speaker: Managing owner	
(5) Wrap-up and initial feedback	
(4) Introduction to observational phase	

A.2 | Journal with texts and tasks for observational phase P1 (Exemplary pages)

Introduction, Explanation, Overview (pp. 1-4)

Liebe Auszubildende,


ihr habt im ersten Teil des Trainings bereits einige Nachhaltigkeitsthemen und Aktivitäten kennengelernt und erlebt. Dabei habt ihr gesehen, dass die Bohlsener Mühle schon vieles im Bereich Nachhaltigkeit angestoßen hat.

Als Mitarbeitende der Bohlsener Mühle und nächste Generation in der Berufswelt, könnt ihr einen entscheidenden Beitrag zur nachhaltigen Entwicklung leisten und die Bohlsener Mühle dabei unterstützen, noch mehr zu bewegen!

Niemand ist näher an den einzelnen Abläufen und Tätigkeiten als ihr. Innerhalb eures Arbeitsalltages begegnet ihr vielen Nachhaltigkeitsthemen mit Auswirkungen auf eure Mitmenschen und die Umwelt.

Wir möchten euch dazu ermutigen, diese Nachhaltigkeitsthemen in den nächsten Wochen aktiv wahrzunehmen und erfinderisch auf die Suche nach Lösungen zu gehen.

Dabei liegt der Fokus auf drei Themenbereichen:

-  **ABFALL**
-  **MOBILITÄT**
-  **BIO**

BEGIB DICH AUF EINE ERKUNDUNGSREISE IM AUFTRAG DER NACHHALTIGKEIT

Dieses Log-Buch möchte dich auf dieser Erkundungsreise begleiten und ist folgendermaßen aufgebaut:



Texts and tasks for the topic waste (pp. 5-13)

FOKUSTHEMA:

ABFALL**WORUM GEHT'S?!**

Bestimmt hast du schon einmal festgestellt, dass bei der Produktion von Lebensmitteln nicht immer alle fertigen Endprodukte verwertet werden können.

So entstehen dabei auch Erzeugnisse, die für den vorgesehenen Zweck nicht mehr brauchbar sind – sogenannte Ausschussware. Diese kann meist nicht verkauft werden, da sie der idealen Produktqualität nicht entspricht.

Häufig wird diese Ausschussware dann minderwertigen Prozessen zugeführt oder landet auf dem Müll. Hierdurch gehen kostbare Rohstoffe verloren.

Für die Bohlsener Mühle entstehen durch die Fehlproduktion Mehrkosten, da die Produktionskosten der Ausschussware nicht durch Erlöse gedeckt werden können.

Gerade in der Lebensmittelindustrie spielen aber auch Verpackungen eine zentrale Rolle, denn die meisten Lebensmittel gelangen nicht lose ins Verkaufsregal, sondern verpackt. Dabei kann eine Verpackung vielfältige Funktionen erfüllen, z. B. zum Schutz, für den Transport, als Fläche für Produktinformationen oder als Garantienachweis.

Die meisten Verpackungen bestehen aus Kunststoffen, welche die Umwelt stark belasten – z.B. die Weltmeere. Kunststoffe sind oft gar nicht abbaubar oder zersetzen sich erst nach mehreren Jahrhunderten in gesundheitlich bedenkliches Mikroplastik. Zudem sind häufig Weichmacher enthalten, welche Krankheiten hervorrufen können.

4

UND WO FANGEN WIR DA JETZT AN?

Die Reflexionsfragen führen dich Schritt für Schritt an die Suche nach Lösungen heran. Die Reihenfolge ist ein Vorschlag. Vielleicht machst du auch ganz andere Beobachtungen, die in den Fragen nicht enthalten sind - Super!

**WO FÄLLT ÜBERHAUPT ÜBERALL ABFALL AN?**

Wo sehe ich in meinem Alltag Abfall oder Müll?
Welche Abfallarten fallen mir dabei auf?

Und welche Ressourcen stecken in diesem Abfall?
Wo kommen diese her?

5

A.3 | Sections, sources, scales, and exemplary items in the pre-training and post-training questionnaires

Section	Sub-Section	Source	Items	Type of Scale	Exemplary Item
Ability to act	Overarching assessment	Olsson et al., 2020	3	4-point Likert scale	I know how one should take action at work to contribute to sustainability.
	General sustainability understanding—perception	Craig & Allen, 2013	1	5-point Likert scale	How would you rate your overall knowledge about sustainability?
	General sustainability understanding—test	Chulián, 2011; Perrault & Clark, 2017; Pranger & Hantke, 2020	2	5-point scale (instructor)	What is sustainability? What does sustainability encompass?
	Topic-specific sustainability knowledge—perception	Rodriguez-Andara et al., 2018	16	5-point Likert scale	To what extent are you familiar with the following topics?—Climate change
	Topic-specific sustainability knowledge—test	Self-developed, based on Mau, 2020	20 3 2	Statements (r/w) Open questions (rated) Sorting questions (r/w)	Currently, it is not possible to dispose of compostable packaging as organic waste. [right]
	Knowledge about sustainability at Bohlsener Mühle—perception	Craig & Allen, 2013	1	5-point Likert scale	How would you rate your overall knowledge about sustainability at Bohlsener Mühle?
	Knowledge about sustainability at Bohlsener Mühle—test	Self-developed	2	4-point scale (instructor)	Which sustainability activities of Bohlsener Mühle do you know? Please indicate for each activity how familiar you are with it.
	Key competencies for sustainability	Savage et al., 2015	10	4-point Likert scale	I am able to motivate positive change in others.
Willingness to act	Overarching assessment	Olsson et al., 2020	4	4-point Likert scale	I want to engage in changing society towards sustainability.
	Personal interest in and importance of sustainability	Self-developed	2	4-point Likert scale	How important is sustainability to you personally?
	Attitudes toward sustainability	Murray, 2011; van Liere & Dunlap, 1981	12	4-point Likert scale	The earth is like a spaceship with only limited room and resources.
	Altruistic, biospheric, egoistic motives	de Groot & Steg, 2008	9	4-point Likert scale	It is important to the person to live in harmony with nature and to fit in with nature.
Confidence to act	Overarching assessment	Olsson et al., 2020	4	4-point Likert scale	I believe I can influence global sustainability through my actions.
Sustainable actions	Overarching assessment	Self-developed, based on Wiek et al., 2018	12	4-point Likert scale	I contribute suggestions on how work processes at Bohlsener Mühle can be made more sustainable.

(Continues)

Section	Sub-Section	Source	Items	Type of Scale	Exemplary Item
Contextual factors	Importance of sustainability for Bohlsener Mühle	Craig & Allen, 2013	2	3-point Likert scale	How important do you perceive sustainability is to the long-term success of Bohlsener Mühle
	Importance of sustainability at the workplace	Pranger & Hantke, 2020	8	4-point Likert scale	How important is the knowledge of various certifications and labels for organic products for your work?
	Organizational support toward sustainability	Lamm et al., 2015	5	4-point Likert scale	My commitment to sustainability is valued by Bohlsener Mühle.
	Job satisfaction	Oshagbemi, 1999	5	4-point Likert scale	In general, how satisfied are you with your salary?
	Organizational commitment	Coyle-Shapiro & Kessler, 2000	6	4-point Likert scale	I feel a strong sense of belonging to Bohlsener Mühle.
	Meaningful work	Steger et al., 2012	3	4-point Likert scale	I know that my work at Bohlsener Mühle has a positive impact on the world.
	Intention to stay at Bohlsener Mühle	Self-developed	1	3-point Likert scale	Can you imagine staying at Bohlsener Mühle after your apprenticeship?
Additional post-questions	Perception of training quality	Ritzmann et al., 2014	10	4-point Likert scale	Overall, I liked the sustainability training.
	Impact of the training on action competence	Ritzmann et al., 2014	9	4-point Likert scale	I have the impression that my knowledge has expanded on a long-term basis.
	Perception of the quality of the practical phases and journals	Self-developed	7 per phase	4-point Likert scale	Through the explanation in the first training and the instructions in the journal, I knew what to do in the observation phase.
	Impact of the practical phases on action competence	Self-developed	7 per phase	4-point Likert scale	During the observation phase, I was able to acquire knowledge with the help of the journal.
	Assessing the training structure	Self-developed	3	Select. training elements	Which part of the sustainability training did you like best?
	Contextual factors	Self-developed	5	4-point Likert scale	I have time to engage with sustainability in my day-to-day work.



A.4 | Interview structure

1. Welcome and thank you

2. Information on the interview logistics

3. Personal codeword

4. Questions from interviewees

5. Information on the interview aim

6. Reflecting on the training and its effects

Ability to act

- Sustainability knowledge: General sustainability understanding, topic-specific sustainability knowledge, knowledge about sustainability at Bohlsener Mühle
- Competencies

Willingness to act

- Attitudes toward sustainability
- Personal interest in sustainability

Confidence to act

Sustainability actions

Including the transfer of training contents to the workday and the usefulness of the training in doing so

7. Reflecting on the practical phases and perceived contextual factors

- Working with the journals
- Experiences from practical phases
- Contextual factors, particularly time and support
- Further contextual factors

8. General training feedback

9. Additional comments
