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REVIEW ARTICLE

Towards coherence on sustainability in education: a systematic review of Whole Institution Approaches

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Abstract

Orienting societies towards sustainability requires comprehensive learning of how to think, act and live within a safe and just space for humanity. Approaching sustainability as a core paradigm of quality education in the twenty-first century, Education for Sustainable Development necessitates an integrated view on learning. For educational organizations, Whole Institution Approaches (WIAs) to sustainability emphasize that all learning is embedded within its socio-physical contexts. Although the core objective—to "walk the talk" on sustainability—is theoretically well established, questions remain regarding its specific conceptualizations. Based on a systematic qualitative analysis of 104 international documents from scientific and grey literature, this article offers a conceptual synthesis of the core elements of WIAs to sustainability in education. Based on the literature analysis, WIAs are described as continuous and participative organizational learning processes aimed at institutional coherence on sustainability, consistently linking the formal and informal (hidden) curricula. While specific pathways are necessary for diverse organizations, the article synthesizes a joint framework. Key characteristics of WIAs are clustered within five core principles (*coherence, continuous learning, participation, responsibility, long-term commitment*), seven highly integrated areas of action (*governance, curriculum, campus, community, research, communication, capacity building*), the underlying organizational culture, and critical conditions for successful implementation. As becomes clear from the synthesis, following a WIA means to collaboratively switch the default mode of all rules-in-use to sustainability. The concept of WIAs may thus both be approached as an instrument for consistent organizational development in light of (un-)sustainability and as a keystone of integrated high-quality sustainability learning.

Keywords Whole institution approach · Whole school approach · Education for sustainable development · Institutional coherence · Hidden curriculum · Sustainability

Introduction

Rapidly accelerating changes in the Earth system (e.g. Steffen et al. 2015) have resulted in an unprecedented need for humanity to change its course of action. As Sterling (2016, p. 212) points out, a deeply rooted transformation towards sustainability—as aimed for in the Sustainable Development Goals (SDGs)—implies "an unprecedented and huge learning challenge at every level". Aiming to empower *everyone* with competencies, knowledge and values required to co-create a sustainable future (UNESCO 2014, 2021), Education for Sustainable Development (ESD) addresses this learning challenge. Responding to the imperative to rethink education systems in ways that empower people to navigate through the challenges of our time, a systemic implementation of ESD requires a redesign of policies, curricula and funding (*macro-level*), rethinking of goals, contents and didactics of learning situations (*micro-level*) as well as a transformation of learning environments within local communities and networks (*meso-level*). Specifically addressed in SDG 4.7, UNESCO describes ESD as "an integral element of the ambitious SDGs", connecting "SDG 4 with all other SDGs" (UNESCO 2020, p. 14). In practice however, ESD is often approached as an "add-on" to other educational tasks (e.g. Benavot 2014; Wals and Benavot 2017), falling short of its transformative and cross-disciplinary ambition.

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One reason for this is that, while much attention has been focused on the development of competencies (e.g. Brundiers et al. 2021; Haan 2010; Rieckmann 2012) as well as the integration of ESD in education policy (e.g. in Germany, Singer-Brodowski et al. 2019; Holst et al. 2020), the consistent transfer of ESD into learning environments through whole system approaches within specific educational organizations remains a considerable challenge.

Acknowledging the critical importance of socio-physical environments for learning, UNESCO (2014, p. 18) dedicated a "Priority Action Area" of the Global Action Programme on ESD and its follow-up programme "ESD for 2030" to "Transforming learning and training environments", calling for "whole-institution approaches to ESD in schools and all other learning and training settings". Connecting the socio-physical contexts of learning with the learning processes, Whole Institution Approaches (WIAs) "encompass mainstreaming sustainability into all aspects of the learning environment" (Buckler and Creech 2014, p. 30). This means that aligning all functional components of educational organizations (e.g. campus management, curriculum design, or community partnerships) with sustainability becomes a core objective of organizational development. In terms of learning processes, WIAs directly link to the notion of "hidden" curricula, referring to "the divergence between what is overtly taught in educational institutions and what students actually learn" (Winter and Cotton 2012, p. 785 with reference to Jackson 1968). Such informal learning occurs, for example, through self-directed, unintended, and tacit learning outside of curricular planning (Livingstone 2001; Schugurensky 2000), e.g. when learners experience or co-shape the daily (un-)sustainable practices at an educational organization (see e.g. Hopkinson et al. 2008; Gramatakos and Lavau 2019).

Early references to WIAs can be found among others by Sterling (2003, p. 344), who describes sustainable institutions as institutions "attempting to be a reflective 'microcosm of a sustainable society'". While Sterling relates this to a general paradigm shift in education (e.g. Sterling 2001, 2003), Henderson and Tilbury (2004) take a pragmatic approach in systematizing approaches by certification programmes for eco-schools, highlighting key components in school education (SE), e.g. curriculum links, funding and management, partnerships, or professional development (ibid.). Related discourses can also be found in other areas of education (e.g. on higher education (HE), McMillin and Dyball 2009; Kohl et al. 2021), which are jointly referred to here as WIAs. Yet, though the main objective of WIAs—"living what we learn" (Buckler and Creech 2014, p. 89)—is well established as one of the core concepts in ESD, it is repeatedly being diagnosed that organizations who systematically follow a WIA are still scarce (e.g. Wals 2012; Hargreaves 2008) and, that compartmentalized approaches—i.e. developing only specific parts of educational organizations in line with sustainability—are often preferred to more holistic and integrative approaches (in HE, McMillin and Dyball 2009; Lozano et al. 2015). Moreover, the term "WIA" is used in a variety of ways (e.g. in guidelines, reports, or articles) across all areas of education (from early childhood and school education to vocational and higher education and non-formal/informal learning). At present, no systematic conceptual synthesis of the core characteristics of the approaches in-use across these different contexts seems to exist. As such, there is a lack of clarity on whether the concepts in-use are convergent and, what policy decisions and further research would be useful to strengthen WIAs in practice. Keeping in mind that organizations require context-specific pathways towards sustainability, this review responds to this gap: in systematically assessing the international literature on WIAs, the article provides an overview of the conceptual debate on WIAs, and synthesizes core characteristics as well as conditions for successful implementation in a joint framework.

Materials and methods: systematic qualitative literature analysis

Literature search

The inclusion of documents for systematic analysis was carried out in five steps. First, a standardized literature search was conducted, using a Boolean operator to identify sources from *Web of Science* (206 results) and *ERIC* (Education Resources Information Center; 119 results) (November 2020): "*ALL* = ((*"whole school" OR "whole-school*" OR "whole institution" OR "whole-institution*" OR "whole System" OR "whole-system**") *AND* (*"education"*) *AND* (*"sustainable" OR "sustainability"*))". Secondly, doubles were deleted and two mutually inclusive content-related criteria were applied during abstract screening: (i) *content related to sustainability* and (ii) *content related to design and/or development of educational organizations*. 71 articles fulfilled both criteria, of which 65 were digitally available (formal criterion due to the digital analysis). Thirdly, an online search was conducted (Google) to screen for grey and further relevant scientific literature, using two sets of keywords: "*Whole Institution Approach Education for Sustainable Development*" and "*Whole School Approach Education for Sustainable Development*", resulting in an addition of 36 documents (first three result-pages, archived). During analysis, 16 documents were fourthly added based on in-text citations, and 13 sources were excluded in a fifth step as they did not fulfil the above-mentioned criteria in the full texts or, because they constituted specific action plans. In total, 104 documents were analysed (65 + 36 + 16 − 13). As

only documents in English were considered due to language constraints, further research may focus on how WIAs are referred to differently across the globe. A list of all documents with further information is provided in the supplementary material (S1).

Qualitative analysis

Tailoring the approach of qualitative content analysis (Kuckartz 2014, 2019) to the literature analysis, a rule-bound procedure was developed to systematically analyze the 104 retrieved documents, differentiating between three steps: preparation, inductive coding and clustering, and consolidation (Fig. 1). In preparation (1), units of analysis were defined, namely concepts related to implementing a WIA, which were assessed through identification and description of thematic categories (see Kuckartz 2014, 2019) at different levels. For analysis, all material was inductively coded (2), implying that codes in MAXQDA pool text segments referring to similar or the same concepts. Through clustering in different abstraction levels, a system of nested thematic categories results from the content analysis (e.g. categories for different areas of action/core principles of WIAs, facets and sub-facets therein). After coding and clustering, all text segments were reassessed, recoded and reorganized (3) to strengthen the internal conceptual consistency of the framework. As part of this second round of coding, also doubles were eliminated, and boundaries of categories defined. Definitions were developed based on the primary literature for each category representing a concept, which serve as the basis for reporting in the results section.

Expert review

While the literature analysis followed a systematic and rule-bound procedure, it was conducted by one researcher only. A written expert review (Olson 2010; Artino et al. 2014) was used to further substantiate the conceptual validity and comprehensiveness of the findings. Ten high-profile experts on ESD and WIAs were invited to participate in the online survey (nine participated), representing different sectors from one exemplary national education system (Germany): politics, administration (ministries), education practice (secondary school, higher education), academia (researchers on ESD in school and higher education), and youth participation. While experts from Germany were consulted, the review followed the literature analysis in focusing on the overall concept of WIAs. For review, the concepts from the literature analysis were translated into 53 statements, each starting with "*At our educational organization, …*". Each statement was assessed by the experts using a five-point Likert scales on (1) how well it represents the underlying concept (*representativeness*) and (2) how relevant it is for WIAs and their assessment (*relevance*). Additionally, the experts were asked after each thematic category and at the end of the survey whether important aspects were missing (*comprehensiveness*). Across all 53 facets, the expert review showed very high mean scores for relevance (4.68; SD = 0.26) and representativeness (4.66; SD = 0.23). While the experts saw the relevant concepts covered and suggested no changes at the level of thematic categories (areas of action, core principles; see results), few facets were added based on the feedback (e.g. foci on inclusive communication, mental health). For details on the national context of the explorative expert review, the used scales, mean responses and the list of revised statements, see the supplementary material (S2).

Results: conceptual synthesis of Whole Institution Approaches

In the following, the conceptual synthesis of the literature on WIAs is reported upon, providing exemplary references. After a short descriptive overview of the data ("International literature on WIAs: descriptive overview"), a framework for WIAs is introduced ("Towards organizational sustainability: introducing the WIA-framework") and laid out within

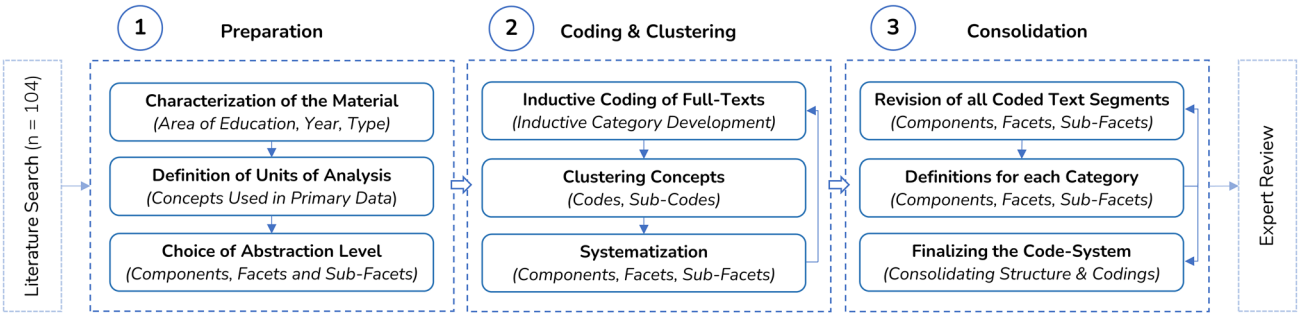

Fig. 1 Three steps of the systematic procedure for qualitative analysis of the international literature on whole institution approaches (based on Kuckartz 2014, 2019)

three main chapters on the core principles of WIAs ("Core principles"), organizational areas of action ("Jointly towards sustainability: integrated organizational areas of action"), and the underlying organizational culture ("Organizational culture"). Subsequently, critical conditions for successful WIAs are highlighted ("External conditions: priority in policy, funding and access to expertise"). The results end with a synthesis ("Synthesis: conceptual framework for WIAs to sustainability"), including an illustrative overview of the conceptual framework for WIAs.

International literature on WIAs: descriptive overview

Of the 104 assessed documents, 83 were classified as scientific literature (journal articles, chapters, project reports), and 21 as grey literature (reports, frameworks, guidelines, handbooks). Regarding areas of education, 50% primarily referred to SE, 34.6% to HE, and 12.5% set an overarching focus (e.g. UN reports). With one document each primarily focusing on early childhood education and non-formal education, and no documents with specific focus on vocational education and training, these areas of education seem underrepresented in the current international discourse. While the numbers point to a strong concentration on SE and HE, it should also be noted that cross-references were made to other areas (e.g. non-formal organizations as partners) and that different wordings for WIAs may be used in different contexts (Didham and Ofei-Manu 2018). Regarding date of publication (range 1999–2020), an overall increase was observed with over half (57.7%) of all documents having been published since the start of the Global Action Programme on ESD in 2015. In summary, the literature primarily focuses on SE and HE and, considering the increase in publications, some of the findings may be subject to change as the discourse evolves.

Towards organizational sustainability: introducing the WIA framework

As a starting point, it is recurrently described that WIAs aim at "mainstreaming sustainability into all aspects of the learning environment" (Buckler and Creech 2014, p. 30) through a systematic, strategic, and holistic process (similarly e.g. UNESCO 2017; Rieckmann et al. 2017; Henderson and Tilbury 2004; Hargreaves 2008; Ferreira et al. 2006). In approaching sustainability as a fundamental paradigm of education (Sterling 2003), organizations which implement a WIA seek to enhance the overall sustainability-related learning experience (e.g. Breiting et al. 2005; McMillin and Dyball 2009). Integrating the socio-physical context into sustainability learning, WIAs imply that particular attention is put on the informal learning processes within organizations, regularly described as "non-formal", "hidden", "shadow", or "living" curriculum (e.g. McMillin and Dyball 2009; Shallcross et al. 2006; Henderson and Tilbury 2004). Through WIAs, informal and formal learning is consistently connected within a sustainable organizational environment, both contributing to sustainable learning (process) and practice (output and impact). Described as processes of "whole system redesign" (Wals and Benavot 2017, p. 6, reference to Sterling), WIAs adopt a holistic approach to sustainability in organizational development (e.g. Mogren et al. 2019). In this sense, Birney and Reed (2009, p. 23) describe the practice in SE as "not about adding on to what they [schools] do already but about changing and reordering the relationships between learning, leadership and change that are being created for sustainability in pupils, schools and community". In line with Sterling (e.g. 2003), WIAs may therefore be considered as the organizational manifestation of an integrative view on sustainability in education. In practice, this takes shape "in a variety of ways, differing from place to place" (UNESCO 2012, p. 46), given that every organization is grounded within specific social, cultural, environmental, and economic contexts.

Keeping in mind that various pathways are possible towards WIAs, the following sections provide an overview of the key characteristics highlighted in the international literature. Based on the nested system of thematic categories inductively developed as part of the content analysis and refined after the expert review, the characteristics of WIAs are clustered within five core principles, seven organizational areas of action, the underlying organizational culture, and conditions for successful WIAs. After the five core principles (coherence, continuous learning, participation, responsibility, long-term commitment) are introduced, the following seven organizational areas of action are laid out:

- Governance
- Curriculum and formal learning
- Operations and campus management
- Community and networks
- Research (in higher education)
- Human capacity building
- Communication

While an overview is provided for each component independently, it is important to note that their introduction follows no specific order given that in practice the boundaries are not sharp—instead, their overlaps and interactions are a key feature of WIAs. After each individual component of the framework is introduced, the last section of the results synthesizes the core results and provides an illustrative overview of the overall framework.

Core principles

Coherence

Referred to with various wordings, institutional *coherence* (to "walk the talk"/"live what is learned") may be considered as *the core* of WIAs (similarly, e.g. McKeown and Hopkins 2007; Mogren et al. 2019; UNESCO 2020; Whitby 2019; Ferreira et al. 2006). Implying that individuals learn "from the entire experience (…), not just from what is taught within the classroom-walls" (McMillin and Dyball 2009, p. 63), coherence relates to a process of consistently integrating the different subsystems, components or elements of institutions (e.g. Giesenbauer and Müller-Christ 2020; DCSF 2009). One way to describe this is to assess the interconnectedness of different components within educational organizations (e.g. Warner and Elser 2015). Among others, this includes consistency between formal, non-formal and informal sustainability learning inside and outside of classrooms (e.g. Shallcross et al. 2007; Shallcross and Robinson 1999; McMillin and Dyball 2009; UNESCO 2012; Birney and Reed 2009). Through this, it is suggested that "the institution itself functions as role model" (Rieckmann 2018, p. 46) for sustainability within all of its practices (e.g. McMillin and Dyball 2009; Shallcross et al. 2006; Whitby 2019; McKeown and Hopkins 2007; Gibb 2016).

Continuous learning

Implementing a WIA implies a *continuous learning process* for the organization and its internal and external stakeholders. As such, educational organizations are viewed as learning organizations (e.g. Shallcross and Robinson 1999; Sterling 2003; Breiting et al. 2005), learning communities (e.g. Potter 2007), dynamic (e.g. Koester et al. 2006; Beringer and Adomßent 2008) or living systems (e.g. Kensler 2012; Kensler and Uline 2019), and as facilitating learning for everyone (e.g. Birney and Reed 2009). Understanding sustainability as much as a process as an outcome (e.g. Bosevska and Kriewaldt 2020; Mathar 2013; Mogren et al. 2019), WIAs not only point to what an "institution does, but also what it is trying to become" (Scott 2015, p. 952). This implies continuous collaborative redesign, improvement (Gough 2006) and adaptation according to capacities and needs (Schröder et al. 2020) at a rate which considers an institution´s inherent "ability to change" (Gough and Sharpley 2005, p. 12).

Participation (organizational capacity)

In terms of an organizational capacity, *participation* implies that an organization functions in a way that all individuals, regardless of their role, are "encouraged and enabled" (Fischer et al. 2015, p. 792) to participate in design, decision-making, implementation, monitoring, and readjustment of sustainability-related efforts. In this, WIAs are described as aiming for an inclusive and equality-oriented learning environment (e.g. UNESCO 2020; SEdA 2007), providing a "welcoming atmosphere that values everyone's participation and contributions—irrespective of background, culture, age, religion or ability—and challenge[s] prejudice and injustice in all its forms" (DCSF 2009, p. 63). Apart from learners, this refers to teaching and non-teaching staff as well as families (e.g. in SE) and partners in the community. Regarding student participation, it implies sharing ownership over the process (Breiting et al. 2005), which empowers learners for agency (e.g. McMillin and Dyball 2009; O'Donoghue et al. 2018). Authentic participation thereby means both real opportunity for needs, interests and contributions (e.g. Schröder et al. 2020; Shallcross et al. 2007) and, at the same time, transparency and honesty about levels of power and responsibility to manage expectations and avoid frustrations (e.g. Gibb 2016).

Responsibility (of individuals)

While participation refers to the capacity of an organization to enable and encourage stakeholders to be part of a process of change, *responsibility* (of individuals) refers to the notion that engagement for sustainability is necessary not only by a single or a few individuals (e.g. a principle, engaged learners or educators), but by various actors within the organizational community (e.g. Henderson and Tilbury 2004; Birney and Reed 2009; Ferreira et al. 2006; UNESCO 2012; Whitby 2019). In this sense, responsibility can be viewed as an individual complement to the organizational capacity to facilitate participation by pointing out that, if an organization is to become sustainable, members of the organizational community also have a responsibility to jointly act for it.

Long-term commitment

Long-term commitment to change towards sustainability was synthesized from the literature as a fifth core principle (e.g. Pittman 2004; Koester et al. 2006; Goldman et al. 2018; Hargreaves 2008). While sustainability by definition requires committed long-term effort, WIAs are described not only to need time and patience, but also flexibility, creativity and, to some extent, risk-taking (Birney and Reed 2009). While transformative actions are required to trigger systemic changes at all levels, Davis and Ferreira (2009, p. 60) also argue that "deep and wide change is more likely to be evolutionary rather than revolutionary, taking into account the complexities of educational settings".

Jointly towards sustainability: integrated organizational areas of action

Reporting on the main conceptual clusters from the international literature, the following sections introduce seven different but highly integrated organizational areas of action for WIAs.

Governance

In terms of coordination, an active interplay between bottom-up change processes and supportive top-down structures is viewed critical for WIAs (e.g. Bohunovsky et al. 2020; Barrett et al. 2019; Shallcross et al. 2006). While top-down support and engagement is important for systemic change (e.g. Whitby 2019; Henderson and Tilbury 2004; Gough and Sharpley 2005), leadership and institutional agency may be distributed collaboratively and in decentral ways (e.g. Birney and Reed 2009), strengthening ownership and responsibility of stakeholders. In this, a participatory integration of mostly all relevant stakeholders is seen as vital to WIAs (e.g. Niedlich et al. 2020; Sterling 2003; UNESCO 2017; Gibb 2016). In fostering democratic and distributed decision-making (e.g. Henderson and Tilbury 2004; Higgs and McMillan 2006; Sterling 2003; Whitby 2019; Tilbury and Wortman 2005), organizations may cultivate a sense of participative leadership for SD and divide tasks across groups of stakeholders (e.g. Mathar 2016; Birney and Reed 2009). To organize this, multi-stakeholder SD steering bodies are suggested, including committees, working groups or councils (e.g. Birney and Reed 2009; Farinha et al. 2020; Ferreira et al. 2006; Henderson and Tilbury 2004; WWF 2011), which should ideally be supported by designated employees (e.g. coordinators, sustainability offices) as permanent facilitators (e.g. McMillin and Dyball 2009; Gibb 2016; Ferreira et al. 2006; Niedlich et al. 2020).

Governance instruments As an early milestone, organizations may anchor sustainability and ESD within their vision and mission statement (e.g. Lozano et al. 2015; Mogren and Gericke 2019; Breiting et al. 2005; DCSF 2009). According to the literature, such vision should ideally be jointly developed, agreed upon, and shared by and with as many stakeholders as possible (e.g. UNESCO 2014; Birney and Reed 2009; WWF 2011; Henderson and Tilbury 2004), among others, to make sure it becomes context specific to the "history, culture and needs" of an organization and its community (Gibb 2016, p. 5). Likewise, an integration of sustainability is suggested within various further institutional policies such as strategic, improvement or development plans (Gibb 2016; WWF 2011; DCSF 2009; SEdA 2007), declarations and public statements (e.g. Pittman 2004; Lozano et al. 2015; Aleixo et al. 2018) or guidelines and codes of conduct (e.g. Aleixo et al. 2018; Gibb 2016), ideally with binding character (Niedlich et al. 2020). Outlining "commitment to sustainability goals and direct areas for action" (Henderson and Tilbury 2004, p. 36), such policies may have both internal ("motive for reflection and innovation") and external effects ("clear future-oriented profile") (Breiting et al. 2005, p. 34 on SE). Also, comprehensive sustainability audits play a critical role (e.g. UNESCO 2017; Henderson and Tilbury 2004; WWF 2011; Tilbury and Wortman 2005), providing a valuable basis for goal-setting and future evaluations, and may ideally be performed collaboratively (e.g. Birney and Reed 2009; Breiting et al. 2005). Sustainability plans and action plans are suggested to organize the process of comprehensively integrating SD and ESD (e.g. Gibb 2016; Henderson and Tilbury 2004; WWF 2011; UNESCO 2017). Lastly, critical collaborative internal as well as external monitoring and evaluation of goals and activities are important for WIAs (e.g. Mathar 2016; Henderson and Tilbury 2004; O'Donoghue et al. 2018), enabling organizations to reflect on actions, review on-going progress, celebrate successes and derive new goals.

Curriculum and formal learning

For consistent sustainability learning, *curricula* need to reflect "knowledge, skills, perspectives and values related to sustainability" (UNESCO 2012, p. 46). While national curricula are typically not influenced by individual organizations, they have (varying) degrees of freedom regarding institutional curricula. Instead of approaching ESD as an "add-on" or "bolt-on" to some subjects or courses (see Benavot 2014), the literature on WIAs calls for a cross-cutting and cross-disciplinary integration of ESD (e.g. Laurie et al. 2016; Shallcross et al. 2007; Hargreaves 2008; Henderson and Tilbury 2004; SEdA 2007; DCSF 2009), strengthening also the interconnectedness between disciplines (e.g. Warner and Elser 2015; Breiting et al. 2005; Shallcross and Robinson 1999). Fostering real-world and place-based sustainability learning, organizations following a WIA attempt to link learning to all other activities, e.g. campus management, community engagement, research (in HE), or governance (e.g. McMillin and Dyball 2009; Simovska and Prøsch 2016; Buckler and Creech 2014; Wals and Benavot 2017). In terms of participation, some authors also view institutional curricula as an opportunity for co-design with learners (examples in Block et al. 2016; Shallcross et al. 2007), non-teaching staff and community partners.

Learning processes As the educational concept of ESD is elaborated upon elsewhere (e.g. Vare and Scott 2007; Rieckmann et al. 2017; Leicht et al. 2018), this section solely focuses on aspects highlighted in the literature on WIAs. Among others, learning is here described as holistic (e.g. Mogren et al. 2019), e.g. implying that it is consistently embedded within the socio-physical context (hidden

curriculum) and, that the different cognitive, emotional and social aspects of learning are viewed as integrated (e.g. Badjanova and Iliško 2015). Offering a place of experimental and engaged learning *as* sustainable development (e.g. Buckler and Creech 2014; McMillin and Dyball 2009; Rieckmann 2018), organizations act as a facilitating environment for transformative learning. As an action-oriented (e.g. O'Donoghue et al. 2018; Rieckmann 2018) and situated process (e.g. O'Donoghue et al. 2018; Shallcross et al. 2006), learning in WIAs is implanted in contexts familiar to the learners (O'Donoghue et al. 2018), building upon practical real-world experiences (e.g. UNESCO 2012; DCSF 2009) as well as local and place-based sustainability issues (e.g. Birney and Reed 2009; Shallcross and Robinson 1999). As such, it involves problem and project-based learning (Kensler and Uline 2019; Warner and Elser 2015), in which learners may instigate real-world changes (e.g. Lewis et al. 2014; Shallcross et al. 2007; Potter 2007). Highlighting the role of participation (Sterling 2003; Potter 2007; Rieckmann et al. 2017; Henderson and Tilbury 2004), learning itself is viewed as co-designed between learners and educators, implying a shift "from doing to students, to doing with students" (Kensler and Uline 2019, p. 1202). In this, instruction is "replaced by co-construction between students, teachers, parents, partner and experts from outside schools" (Mathar 2013, p. 1). The educator takes on a role of a facilitator (e.g. UNESCO 2020), acting as a "mediator of co-engaged learning" (O'Donoghue et al. 2018, p. 118), requiring a close learner–educator relationship (e.g. Higgs and McMillan 2006), in which "learners and educators jointly figure out and address solutions together" (O'Donoghue et al. 2018, p. 131).

Operations and campus management

For operations and campus management, WIAs imply strongly reducing the use of resources (e.g. waste, water, energy) (e.g. Henderson and Tilbury 2004; Lozano et al. 2015; Gough and Sharpley 2005; Gibb 2016; Whitby 2019) by means of sufficiency, efficiency and consistency, including both changes in behaviour and the use of sustainable technologies and materials. To reach targets such as net-zero emissions, sustainability in operations and campus management spans across all fields of action (e.g. buildings, grounds, mobility, procurement). Aside from drastically reducing the environmental footprint, it includes social aspects, e.g. to foster inclusiveness, diversity and equality (Lozano et al. 2015), as well as physical and psychological well-being (e.g. Posch 1999; Kensler 2012; DCSF 2009). As an example, sustainable procurement (e.g. Fischer et al. 2015; Sterling 2003; SEdA 2007) implies a consequent use of socially and environmentally responsible products (e.g. eco, fair trade, local, see e.g. Aleixo et al. 2018, UNESCO 2012, 2020, Gibb 2016, Buckler and Creech 2014), and overall reduced consumption.

Given that the "learning experience of students is influenced by more than what is taught in the classroom" (McMillin and Dyball 2009, p. 58) and that educational organizations have a socializing effect on learners through informal learning (e.g. Barth et al. 2012), the socio-physical environment of learning is critical for coherent sustainability learning. Therefore, organizational structures can be considered as "facilities that teach sustainability practices" (SEdA 2007, p. 4), offering a learning laboratory for sustainability (e.g. McMillin and Dyball 2009; Gibb 2016). In the context of HE, McMillin and Dyball (2009) suggest linking the curriculum with research and operations as a way to engage students as stakeholders, who take ownership over the process of learning sustainability. Similarly, other authors suggest that learners may directly be involved in or even to some extent in charge of sustainable operations (Higgs and McMillan 2006; Shallcross et al. 2007; McMillin and Dyball 2009). In short, operational activities are described in the literature as an opportunity for real-world sustainability learning.

Community and networks

Realizing WIAs, educational organizations actively engage in partnerships and networks with diverse (cross-)regional stakeholders (e.g. NGOs, businesses, authorities, individuals), involving "members of the community and their enthusiasms in situated real-world issues" (Sterling 2003, p. 343). Through such embeddedness, communities may become co-learning grounds for sustainability (e.g. Gibb 2016; Shallcross et al. 2006), allowing for learners to develop both "meaningful relationships with their immediate environment" and "the skills to design and implement solutions to the problems they may encounter there" (McMillin and Dyball 2009, p. 62; ref. to Orr 1992). Organizations following a WIA are considered "active in the society" and "recognized as relevant stakeholders in the development of the community" (Breiting et al. 2005, p. 42). Not only referring to solely educational collaboration, but also transfer activities in HE (e.g. Nölting et al. 2020), community cooperation is described as two-way engagement and co-learning (e.g. Henderson and Tilbury 2004; Tilbury and Wortman 2005). Such learning and contribution implies a reciprocal process (e.g. Warner and Elser 2015; Nölting et al. 2020) based on dialogue and focused on real-life action along real-world challenges (e.g. Gibb 2016; Rieckmann et al. 2017; Whitby 2019; Rieckmann 2018). Often manifested through collaborative projects (e.g. Koester et al. 2006; Mathar 2016), two-way collaboration may also lead to shared visioning (e.g. Henderson and Tilbury 2004; Rieckmann 2018). While Davis and Ferreira (2009) and Ballantyne and Packer (2006)

recognize the role of external programs, both suggest that network-based approaches (power-sharing, capacity-building, integration into institutional curricula) would be beneficial to holistic ESD. From a bird's-eye perspective, this may be described as a learning network (e.g. O'Donoghue et al. 2018), which facilitates practice-based co-learning, empowering learners and partners as agents of change (Rieckmann et al. 2017). Using similar terminology, Mathar (2016, p. 403) refers to "local learning landscape[s]", where learning is situated outside the boundaries of the organization (Henderson and Tilbury 2004). Here, networks are not only viewed as vital support structures for organizations in "navigating their way through change" (Shallcross et al. 2006, p. 295), but also help to avoid duplication of resources, or open up access to new ones (e.g. Davis and Ferreira 2009; Gough and Sharpley 2005; Henderson and Tilbury 2004). Also, networks with other organizations of the same type (e.g. schools, universities) are described as essential (e.g. Giesenbauer and Müller-Christ 2020; Kahle et al. 2018; Henderson and Tilbury 2004), among others, for mutual support, peer-to-peer learning, and to expand the visibility of WIAs "as a model for adaptation" (UNESCO 2014, p. 35).

Research (in higher education)

As Sterling (2003, p. 343) puts it, HE institutions following a WIA aim to "develop an ethical and responsible research agenda", considering sustainability as an important factor in research projects, publications, and the way in which knowledge is generated. Vogt and Weber (2020, p. 17) even argue that it is the responsibility of free and autonomous science to act as agents of change towards sustainability, given that "universities are part of the problem and part of the solution" (ibid.). In practice, a focus on sustainability in research requires structural changes (e.g. in funding, departments, incentives), and often involves new collaborations and partnerships (Fischer et al. 2015; Lozano et al. 2015; Aleixo et al. 2018). Apart from approaching sustainability as a cross-disciplinary compass, HE institutions may actively conduct research activities on sustainability and ESD (e.g. Bohunovsky et al. 2020; Fischer et al. 2015) and, for example, set up new research units to institutionalize these efforts (e.g. Aleixo et al. 2018; Lozano et al. 2015). Given the complex embeddedness of SD into social processes, inter- and transdisciplinary approaches are particularly described as fundamental for SD (e.g. Aleixo et al. 2018; Giesenbauer and Müller-Christ 2020). Yet, Giesenbauer and Müller-Christ (2020, p. 12) also point out that "not all subsystems have to embrace complexity and transdisciplinary research", stressing that different types of research require different approaches. Regarding the integration of research and learning, it is widely suggested to more strongly involve students within research processes (e.g. McMillin and Dyball 2009; Giesenbauer and Müller-Christ 2020).

Human capacity building

Having designated a priority action area of the global ESD programs on building capacity of educators, UNESCO (2020, p. 30) stresses that "[e]ducators remain key actors in facilitating learners' transition to sustainable ways of life". Yet, they themselves "need to be empowered and equipped with the knowledge, skills, values and behaviours that are required for this transition" (ibid.). While professional development of staff and leadership on ESD and SD is considered decisive (e.g. Kadji-Beltran et al. 2014; Henderson and Tilbury 2004; Shallcross et al. 2006; Rieckmann 2018; Mathar 2016; SEdA 2007), many have not yet been involved in such training (e.g. Amado et al. 2017; Rieckmann et al. 2017) and systematic provision of professional development programs on ESD is still lacking globally (e.g. Gough 2016). Such training focuses particularly on competencies, knowledge and attitudes as well as practical experience with regard to ESD (e.g. UNECE 2012; UNESCO 2020; Rieckmann et al. 2017), enabling educators to transfer (E)SD into practice (e.g. DCSF 2009; Ferreira et al. 2006; Henderson and Tilbury 2004). Aside from cognitive skills, emphasis may be put on emotional competencies, which are fundamental to facilitate a motivational and empowering institutional climate (e.g. Schröder et al. 2020). Also, programmes may focus on facilitating active reflection on pedagogical practices and self-conceptions (e.g. Ferreira et al. 2006; UNECE 2012), given that educators act as role models (e.g. Higgs and McMillan 2006), coaches and/or change agents (e.g. Laurie et al. 2016; Henderson and Tilbury 2004), empowering learners to become agents of change themselves (e.g. Shallcross et al. 2006; Wals 2012). For such professional development, sufficient time needs to be allocated (e.g. Henderson and Tilbury 2004; Amado et al. 2017), and organization-specific trainings are suggested for context-specific learning (e.g. in SE, Shallcross et al. 2006). Yet, exchange between practitioners is also referred to as critical for collaborative peer-to-peer learning (e.g. Kadji-Beltran et al. 2014; UNESCO 2020), e.g. through mentoring-systems (Kadji-Beltran et al. 2014) or in networks (e.g. Ferreira et al. 2006; Wals 2012).

Aside from professional development, the literature addresses various aspects related to the management of human resources (HR). For example, SEdA (2007, p. 2) summarizes: (i) integration of ESD-competencies in appraisals and hiring, (ii) development of HR policies that "support

ESD capacity building, mentoring, collaborative and lifelong learning", (iii) celebration of diversity and (iv) recognition for staff who show leadership with regard to (E)SD. While these aspects target either individuals outside (to be hired) or inside an institution (e.g. staff support, recognition), Gibb (2016) also mentions the importance to involve recently hired staff into the process. Moreover, WIAs also imply a deliberate focus on social sustainability, e.g. through support systems and initiatives for healthy lifestyles (e.g. Aleixo et al. 2018). Regarding quality working conditions, the literature addresses the availability of high-quality teaching materials and guides (e.g. Mathar 2013; SEdA 2007; Buckler and Creech 2014), and sufficient space and time for reflection and clarification (e.g. Gibb 2016; Breiting et al. 2005; Warner and Elser 2015) as well as support for educators (e.g. Warner and Elser 2015; Henderson and Tilbury 2004).

Communication

Communication is considered a critical and highly integrated cornerstone of WIAs. For example, Awuzie and Abuzeinab (2019, p. 14) conclude from assessing the relationship between organizational factors in HE that "the absence of the effective communication of SD will serve to undermine all the other efforts". Yet in practice, communication within organizations and towards the outside faces various difficulties. Based on a case study in HE, Djordjevic and Cotton (2011, p. 386) point to a number of issues such as contested definitions of sustainability, conflicts with the organizations mission, and resistance towards change as well as different values, needs, and expectations. Grounded in a review of literature, the authors recommend that communication on SD (i) "must be clear, precise and coherent, yet tailored to the different contexts of recipients", providing and following a "working definition of sustainability", (ii) requires high-level support, yet at the same time follows a dialogical and democratic approach and (iii) should be "highly consistent" and supportive for the specific change processes at a given institution (ibid.:392). Also, as pointed out during the expert review, organizations following a WIA may put attention to inclusive communication (e.g. gender neutral, simple language). Practically, it is highlighted in the literature across different areas of education that organizations who follow a WIA foster visibility and transparency of SD activities (e.g. Bauer et al. 2020; Higgs and McMillan 2006; Lozano et al. 2015), both internally and towards the public. Such visibility, i.e. showing sustainability as a core feature of an organization (e.g. Niedlich et al. 2020) not only attracts partners and students (e.g. Bauer et al. 2020), but the sharing of results and lessons learned is also suggested to foster participation and awareness (Bauer et al. 2020), build accountability, bring about commitment (Awuzie and Abuzeinab 2019), and motivate further action (Gibb 2016). In terms of active interaction with stakeholders, Breiting et al. (2005, p. 37) suggest on SE that it is "important that all the members of the school community are aware of their mission and their contribution", pointing to their importance for sustainability practice. Aside from sharing vision and progress (e.g. Gough and Sharpley 2005; Henderson and Tilbury 2004; SEdA 2007), this involves strengthening effective internal communication (e.g. Djordjevic and Cotton 2011; Warner and Elser 2015).

Organizational culture

Strongly affected by and affecting all core principles ("Core principles") and areas of action ("Jointly towards sustainability: integrated organizational areas of action"), aligning the organizational culture (shared beliefs and values, social rules-in-use) with sustainability is at the core of WIAs. Yet though various authors refer to its importance for WIAs (Warner and Elser 2015; Pittman 2004; Roos et al. 2020; Ferreira et al. 2006), fewer sources address specific dispositions of an organizational culture in line with sustainability (e.g. for HE, Bauer et al. 2020; Niedlich et al. 2019). In the context of WIAs, organizational culture is decisive in at least two ways: firstly, existing culture manifests through informal procedures and rules-in-use, which may act as drivers or hurdles (e.g. Warner and Elser 2015). Secondly, the continuous process of co-designing and co-implementing WIAs may lead to cultural shifts within the organizational community (e.g. Henderson and Tilbury 2004; Niedlich et al. 2019), implying that a culture of sustainability can also be considered part of the process, and an overarching output of a WIA. Considering this iterative and integrating double-role, organizational culture may be viewed as a critical proxy for the extent to which an organization is practically living sustainability.

Constituting the hidden profile of an organization, culture refers to the shared values and rule-systems that act as a "collective 'memory'" (Breiting et al. 2005, p. 35), which is the basis for the "way people interact, discuss and do things" (ibid.). As such, aligning organizational culture with SD strongly ties to developing a sustainability ethos (UNESCO 2012; Wals 2012) and, to addressing organizations as models practicing sustainability (e.g. Higgs and McMillan 2006). As Shallcross et al. (2007, p. 73) state, WIAs "are education as a way of life in which sustainable actions become second nature—culturally intuitive normative responses". Yet, as Bauer et al. (2020, p. 17) point out, "sustainability processes are no 'optimized production lines'; they are

instead complex social processes", implying that there are various cultural orientations which, dependent on contexts, may or may not contribute to sustainability learning. At the same time, the authors argue that this "is precisely why consideration of organizational cultures is so relevant and why it is worth attempting to identify patterns hampering or supporting fundamental change" (ibid.). Among the patterns of cultural dispositions frequently referred to in the literature on WIAs, integration and holism describe a culture of comprehensively viewing sustainability as an intertwined field of action for all parts of an organization (e.g. Bauer et al. 2020; Niedlich et al. 2019), manifesting, e.g. in what an organization does (e.g. Higgs and McMillan 2006), how its organizational climate develops (e.g. Breiting et al. 2005), and how it perceives itself as part of a greater change process (e.g. Niedlich et al. 2019). Aside from this consistency-oriented perspective, various authors refer to a culture of collective learning (e.g. Sterling 2003; Niedlich et al. 2019; Bauer et al. 2020), in which space is provided for reflection and reflexivity (e.g. Giesenbauer and Müller-Christ 2020; Henderson and Tilbury 2004; Sterling 2003). Viewing "sustainability not as an externally defined goal, but as an open search process" (Vogt and Weber 2020, p. 17), this also implies a culture of complexity (e.g. Breiting et al. 2005; Mathar 2013), in which individuals critically reflect upon assumptions, values, and actions. Relatedly, various authors describe a culture of co-design and collaborative actions (e.g. Bauer et al. 2020; Shallcross et al. 2006, 2007; UNESCO 2020). Lastly, the literature refers to the importance of social interaction by facilitating and living solidarity (e.g. UNESCO 2020), diversity (e.g. Wals 2012; SEdA 2007), inclusiveness (e.g. UNESCO 2020; Sterling 2003), and care (e.g. DCSF 2009; Mathar 2016; Sterling 2003) as well as respect and mutual recognition (e.g. Posch 1999), emphasizing emotional and physical well-being (e.g. DCSF 2009).

External conditions: priority in policy, funding and access to expertise

While there are many ways through which organizations can autonomously develop towards sustainability, the literature also points to contextual factors which may foster or hinder WIAs. As a first, prioritization within regional, national and international policies is decisive (e.g. Wals and Benavot 2017; UNESCO 2020; Henderson and Tilbury 2004). As such, UNESCO (2020, p. 28) calls on policymakers to “create enabling environments for educators to integrate the whole-institution approach on ESD”. According to UNESCO, this “includes, for example, placing emphasis on ESD among other competing priorities, allowing more flexibility, facilitating partnership, and reflecting the whole-institution approach to ESD in the performance of learning institutions” (ibid.). Secondly, availability of sufficient and long-term funding is essential. Mentioned by Henderson and Tilbury (2004, p. 6) as one of several “critical success factors”, significant funding (e.g. UNESCO 2014) is important, for example, to redesign the campus or buildings, to facilitate high-quality in-service professional development or to designate specific staff as facilitators for the process. As a third, access to expertise on ESD through external support (e.g. in multi-stakeholder networks, see Tilbury and Wortman 2005) and pre-service education of educators on ESD is fundamental (e.g. Henderson and Tilbury 2004; UNESCO 2014; Gibb 2016). As various authors point out, transformative change within education not only requires in-service training and support, but also considerable changes in pre-service education of educators (e.g. Ferreira et al. 2006, 2007; Gough 2016; Gibb 2016; Henderson and Tilbury 2004; UNESCO 2020). Though this is widely acknowledged, Gough (2016, p. 109) describes an "almost universal lack of success in introducing coherent or consistent programs of EE [environmental education]/ESD into teacher education courses". Given that educators are "key actors in facilitating learners’ transition to sustainable ways of life" (UNESCO 2020, p. 30), a systematic integration of sustainability and ESD in pre-service education of all leaders, educators and non-teaching staff is critical also for WIAs to sustainability.

Synthesis: conceptual framework for WIAs to sustainability

In a nutshell, WIAs are described in the international literature as continuous individual and institutional learning processes to coherently mainstream sustainability as a fundamental principle within all activities of an educational organization. Through WIAs, all formal and informal learning *as* and *for* sustainability is embedded within its socio-physical surrounding, implying that both social processes (e.g. governance, communication) and physical contexts (built and natural environment) consistently practice sustainability. Such an orientation of both the visible and the hidden curriculum towards sustainability aims to link formal and informal learning, ideally creating an authentic sustainable learning environment in which *everyone* involved is empowered with the abilities to design and create sustainable futures. While different organizations may follow different pathways towards sustainability in their specific context, a joint framework could be synthesized for WIAs from the international literature (for an illustrative overview, see Fig. 2). On the operational level, the framework consists of a set of core principles (*coherence*, *continuous learning*,

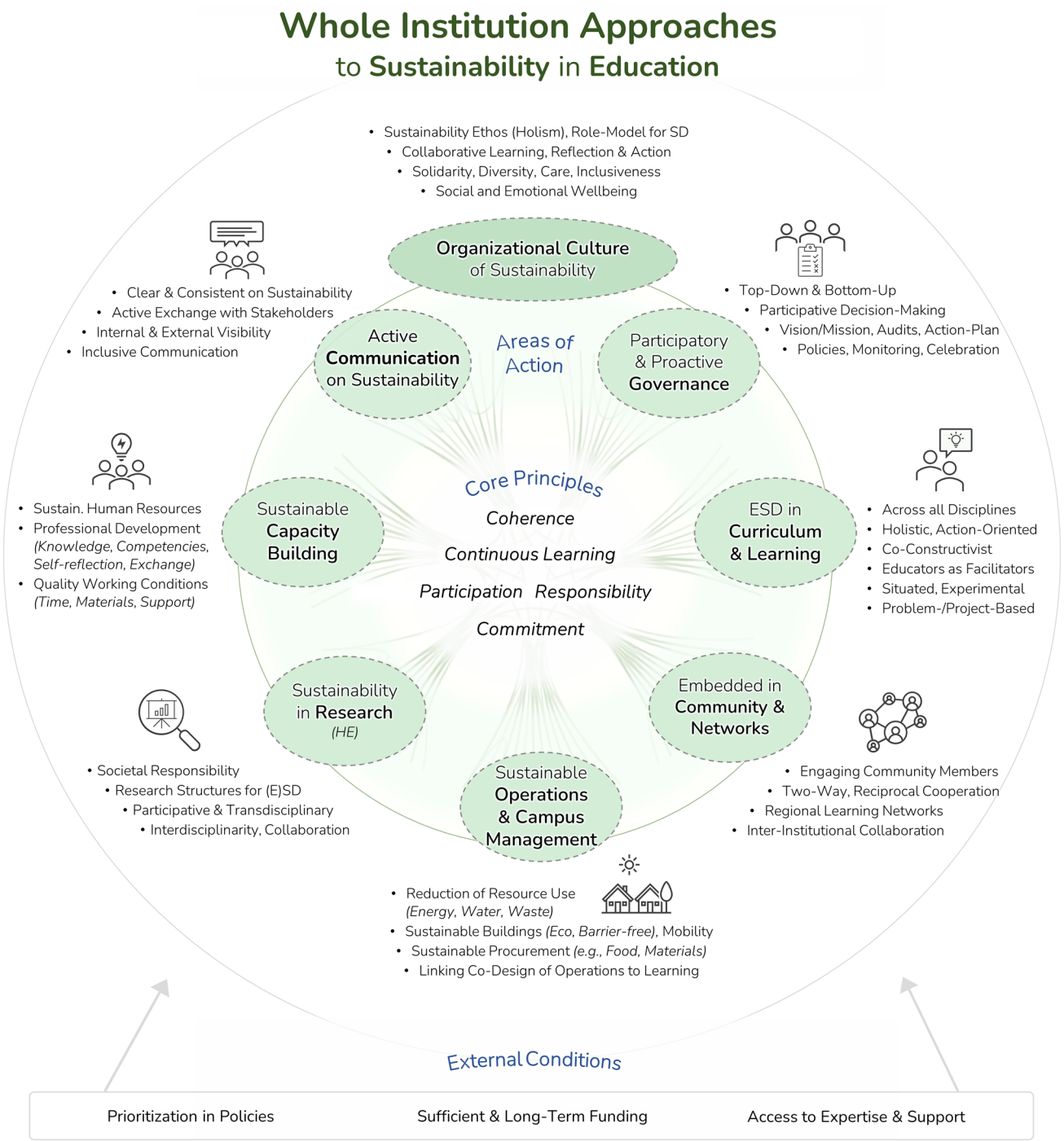

Fig. 2 Illustrative framework for whole institution approaches (WIAs) to sustainability in education, containing core principles (coherence, continuous learning, participation, responsibility, long-term commitment), seven integrated areas of action (governance, curriculum, community and networks, operations and campus management, research (in higher education (he)), capacity building, communication), organizational culture and external conditions for successful WIAs. Areas of action are displayed in order of their introduction in the chapter "Jointly towards sustainability: integrated organizational areas of action". Key defining concepts from the literature analysis are clustered in the outer circle (for organizational culture, areas of action). *ESD*: Education for Sustainable Development, *SD*: sustainable development

participation, *responsibility*, *long-term commitment*), and seven highly integrated areas of action, including:

- an integrative and participative **governance** that proactively supports and empowers an institutional (re-)orientation towards sustainability driven by individuals at all levels,
- an encompassing and cross-disciplinary orientation of **curriculum** and **learning** towards sustainability, following a holistic, emancipatory, situated and action-oriented approach to pedagogy,
- a process of (re-)designing **operations** and **campus management** in line with sustainability, providing an opportunity to collaboratively learn how to live sustainably,
- a strong embeddedness within the surrounding **communities**, regional educational landscapes and inter-organizational **networks**,
- in HE, a strong and institutionalized emphasis on sustainability in **research**, including an active involvement of learners,
- fostering of competencies, knowledge, attitudes and practical experience of educators and non-educating staff on sustainability and ESD through **capacity building**, as well as
- clear and consistent internal and external **communication** on SD.

Underlying all areas of action, **organizational culture** refers to the shared values and social rules-in-use within an organizational community. It is thus critical for WIAs as a condition (driver, or hurdle), characteristic of the process (e.g. collaboration, holism), and as overarching output ("Culture of Sustainability"). Notably, WIAs are about consistency in co-shaping sustainability in the different yet interacting parts of the organization. To foster such an integrative approach, the literature points to high prioritization in policy, adequate long-term funding, and availability of expertise, including a consequent integration of sustainability into the training of educators.

Discussion: towards coherence on sustainability in education

In light of the critical importance of socio-physical environments for sustainability learning, the here presented systematic literature review offers a synthesis of the key concepts that characterize WIAs. Overarchingly, WIAs are described as participatory and integrative processes of learning how to live, act, and co-create sustainability within and around educational organizations. In viewing sustainability as a defining paradigm of quality education (Sterling 2003), WIAs move beyond a compartmentalized integration of sustainability ("cherry-picking") (see Lozano et al. 2015; McMillin and Dyball 2009), in which sustainability learning is frequently approached as an "add-on" or "bolt-on" (Benavot 2014; Wals and Benavot 2017). Instead, WIAs call for whole-system approaches, which—in essence—are not limited to education organizations but may also be applied to various other institutional arrangements (e.g. NGOs, businesses). Building on core results of the analysis, the following sections reflect upon the methods used for analysis, gaps in our current understanding of WIAs, and opportunities for further research.

As the literature analysis shows, core characteristics of the concept of WIAs (core principles, organizational areas of action, organizational culture) converge across the literature from different areas of education. At the same time, the practical implementation requires specific pathways and adaptations according to age groups, social, cultural and environmental contexts. Also, it was found that the current literature on WIAs puts a considerable focus on school and higher education. Acknowledging that other wordings may also be in-use here, future studies could put additional emphasis on WIAs in vocational education and training, early childhood education and non-formal learning. Regarding publication dates, a considerable increase was observed since 2015, implying that the analysis characterizes a status, and that the concepts under debate are expected to further evolve. As the literature analysis was limited to English, and the expert review was conducted within one exemplary education system (Germany), further context-specific studies on both conceptual understanding and practical implementation of WIAs across the globe are moreover viewed as an important field for further research. Regarding the qualitative content analysis, conducting the analysis as a single researcher implied the methodological challenge to mediate potential researcher biases. Aside from following a rigorous systematic and rule-bound procedure, the exemplary cross-sectoral expert review was conducted to further substantiate the findings.

Concerning the key concepts that characterize WIAs in the international literature, the analysis points to a need to better understand the specific ways in which the hidden curriculum affects learning, e.g. through socializing effects of informal communication or (co-)design of learning environments (on HE, Winter and Cotton 2012; Hopkinson et al. 2008; Gramatakos and Lavau 2019). Particularly, the fields of organizational culture and communication are repeatedly referred to as critical to WIAs (e.g. Niedlich et al. 2020; Roos and Guenther 2020; Shallcross et al. 2007), yet relatively few studies offer precise operationalizations and in-depth analyses of the related learning processes. Also, interactions between the organizational areas of action require further attention, given that they constitute important intermediate spaces for social learning and transformative action. In terms of assessing the implementation of WIAs, various self-evaluation tools exist, yet little non-self-reporting biased data is currently available.

Moreover, future research may put additional emphasis on patterns of organization-specific pathways towards sustainability (e.g. Weiss et al. 2021), both identifying positive examples and highlighting inherent challenges and tensions in organizational change processes (e.g. Hoover and Harder 2015).

Conclusion

As becomes clear from the synthesis, following a WIA means to collaboratively switch the default mode of all social rules-in-use to sustainability. WIAs may thus be approached both as an instrument for coherent organizational development in light of (un-)sustainability, and as a keystone of integrated high-quality sustainability learning.

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Declarations

Conflict of interest The author declares that there is no conflict of interest.

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