Educator Competences in Sustainability Education

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A systematic literature review on the Frameworks of Educators Competences in Sustainability, designed by different experts in the field with the purpuse of identify, examine, put in pracice and assess such competences addressed to educators in Sustainability Education.

1. Introduction

In the face of current socio-environmental challenges, being an educator is a complicated task. It entails the mastery of diverse competences that include a variety of skills and types of professional knowledge but also being critically aware of the factors causing unsustainable lifestyles and social and environmental injustice inside and outside school [1]. International education institutions argue that educators' role should be far from promoting unreflective conformity about these concerning issues among students. Instead, educators should develop students' critical thinking and independent judgment [2]. Following this view, contemporary education has been trying to make the transition from the traditional understanding that learning is about acquiring specific knowledge as a result of a process of transmitting-receiving information. In recent years, constructivist and sociocultural approaches have gained ground. These approaches state that learning is a process of construction of meaning through the acquisition of competences, in which the social and dialogic aspects are essential [3].

In this line, it has been argued that competence-based education and associated transformational education perspectives have the potential to promote students' dialogue and openness toward others. These perspectives can generate deep learning processes based on discussion and reflection to educating them to be autonomous, critical and active citizens, able to deal with social-ecological challenges [4]. However, on occasions, competence-based approaches pretend to be established as technique prescriptions without conceptual reflection and theoretical frameworks around how learning is conceived, tending to bare in a pragmatic and reductionist vision. Such vision can limit competences design and evaluation to the domain of "knowing how to do", which is punctual and procedural, out of context, as a way to define and register discrete and fragmented behavioral tasks [5]. By contrast, it is argued that the very core of the competence-based approaches should be: "self-regulated action, involving know, know to do and be, with social relevance, building situations of constructive, complex and collaborative learning towards real problem solution" [5] (p. 52). Thus, competences can be understood as "individual dispositions to self-organization which include cognitive, affective, volitional (with deliberate intention) and motivational elements; they are an interplay of knowledge, capacities and skills, motives and affective dispositions." [6] (p. 129).

Additionally, for decades, one of the clearest goals of education has been in line with ensuring growth, growth that has been linked to well-being for all [2]. However when patters of production of these attempts to grow are unsustainable and inequitable, like the ones causing the current environmental crisis and climate emergency, contradictions emerge in the core of education, and consequently, also within Sustainability Education. Referred to also as Education for Sustainability (EfS), Education for Sustainable Development (ESD) and, earlier, Environmental Education (EE), Sustainability Education aims to help learners develop the necessary knowledge, skills, values, capabilities and overall competences to respond to the complex socio-ecological issues of the 21st century [7]. Nevertheless, there has been considerable debate around the conceptualizations behind these different terminologies. For instance, some scholars have argued that EE and ESD emerged from diverse streams of thought and practice, holding ideological and ethical roots that are related to different focuses of attention and representations of environmental and development issues [8][9]. Under this view, the hegemonic concept of ESD conceives that development and growth are possible in terms of sustainability whereas more transformative EE and ESD approaches ask for an economic system acknowledging the bio-physic limits of the planet [8]. In this same line, it has been specifically pointed out that:

"(…)Ameliorating issues of sustainability involves addressing ethical questions, for instance, regarding the injustice in sharing the use of the world's resources (…) looking at issues of development, justice peace and conflict, human rights and dignity, and intrinsic value of other special, and indeed, whole ecosystems." [9] (p. 223).

More recent post-sustainability debates have launched the idea that any form of Sustainability Education is an opportunity for enhancing ethical reflection on growth, development and other socio-economic, political, cultural, and ecological issues shaping sustainability. For instance, it has been argued that "(…) Sustainability Education does not signify an a priori image of sustainability nor defines what the education pathway towards achieving sustainability should be. Instead, it opens up possibilities for critical discussions on sustainability and suggests a process that is always in-becoming" [10] (p. 96). Consequently, regardless of the use of ESD or EE in the literature, it takes relevance to look at how any form of Sustainability Education aims to embrace critical approaches towards sustainability itself. Furthermore, it is interesting to explore to which extent they provoke transformative changes towards the current unsustainable reality through developing emancipatory qualities among educators, and finally among students. In other words: "(…) what will be needed are ultimately competent and committed multipliers who act as change agents and not only have the wish but are able to bring about change in the different educational sectors" [11] (p. 821). These emancipatory qualities are linked to competences providing teachers and other educators, as well as their students, with a way of both understanding complexity and transforming their realities while enabling them to make responsible decisions towards more sustainable futures [9][12].

Educators who make Sustainability Education transformational frames their teaching needs within an action-oriented, transformative pedagogy, characterized by elements such as self-directed learning, participation and collaboration, problem orientation, inter- and transdisciplinarity, while carrying out alliances with formal and informal education [13][14]. In this regard, different pedagogies in Sustainability Education are highlighted as facilitating these transformations, such as "(…) child-centered learning, holistic approaches and head/hands/and heart; rounded education; collaborative and active pedagogies (…)."[15] (p. 69). For instance, holistic approaches including innovative aspects related to emotional management have shown to be of great importance in climate change education due to considering feelings such as guilt, hopelessness, helplessness and anger as relevant to make this education more transformational [16]. To explore how these emotional aspects as well as other knowledge, skills and values can lead to such transformations is critical for understanding and enhancing educators' competences in the context of Sustainability Education.

Academics and practitioners, particularly in Europe, have been working on developing frameworks and models of educator competences in Sustainability Education to identify, examine, put in practice and assess such competences. For instance, a recent review [17] on higher education highlights that the UN Economic Commission for Europe (UNECE) framework identifies educators' competences for ESD organized into four pillars of learning (i.e., Learning to Know, Learning to Do, Learning to Live Together and Learning to Be) and three principles (i.e., a Holistic approach, Envisioning change, and Transforming learning systems) [18]. The review concludes that professional development in ESD "should be informed and shaped by these competences [the UNECE competences]" [17] (p. 805). This review also suggests the need of promoting broader changes into educators' thinking and practice to deliver sustainability-related content, as the first step toward their professional development, through critical reflection and more participatory, action and transformative learning pedagogical strategies, for naming some [17]. Another relevant competence model developed to meet the call of the Ministers in the UNECE region to offer curriculum models on sustainability to teacher training centers is the CSCT (Curriculum, Sustainable development, Competences, Teacher training) model created by the Comenius-2 project [19]. This model focuses on the teacher as an individual agent in an educational institution and a member of a particular society. The model identifies ESD competences under three dimensions of competences (i.e., teaching/communicating; reflecting/visioning; networking) and five domains (i.e., knowledge, systems thinking, emotions, values and ethics, action) [19]. Even though the CSCT model offers comprehensively defined competences, there is still a need for clarification on several gaps. For instance, neither the operationalization of the emotional domain that "(…) plays a role as a concomitant in all the other domains" [20] (p. 5069) nor the professionalization process of teachers are well-addressed.

These examples represent only two of the leading competence frameworks for educators used in Sustainability Education, but there is a broader diversity. It thus turns interesting to look at the existing frameworks and models in the scientific literature in a systematic way and analyze how sustainability and competences are understood, characterized and problematized in terms of potential capacity for transformation to contribute to the above mentioned debates surrounding educators' competences in sustainability.

2. Discussion

First, all the studies included in our sample through a systematic review process of academic literature came from the European arena and most of them were developed in formal education and particularly in higher education contexts. This result might suggest that the specific research approach towards competences exploring how models and frameworks are

conceptualized and implemented could have been mainly developed by academics working in European institutions. Still, some reviewed studies relied on North-American models such as the one from Wiek et al. [21] and the guidelines produced by the North American Association for Environmental Education (NAAEE) [22], which also highlights the relevance of the research produced in this world region. These results are consistent with the general Western dominance in this research area within the field of Sustainability Education that has been already found by previous studies [23]. However, the observed geographical trend could also be due to limitations in our research design. As mentioned earlier, our search was guided by a set of pre-established keywords, so some other studies may have been included in our sample if we had added other synonyms to our search, such as "guideline". Besides, since we conducted the search in English and within SCOPUS, we excluded academic literature published in other languages and through other databases from our review (e.g., Latin-American or French-speaking African countries). Thus, to enrich our understanding about how educators' competences are being conceived in the field of Sustainability Education worldwide, further research could address these caveats to complement and discuss our findings on the competences addressed in the frameworks reviewed, the pedagogical strategies applied to promote them and the implications for fostering transformation.

Second, concerning the initial EE/ESD debates about the different understandings of the sustainability concept in terms of its relation to development and growth [8], it seems that the reviewed body of literature about competence frameworks for educators has overcome this debate. When looking at our findings in terms of the types of competences for educators in Sustainability Education, only one study explicitly includes in its framework a competence focused on economic growth and development (D6). Sustainability then seems to be conceived by the authors of these competence frameworks as it is in the "post-sustainability" debates [10]: as an empty signifier that let us opening new spaces for critical discussion and transformation and a process that permanently is in-becoming rather than a close concept mainly related to growth. Accordingly, the reviewed frameworks have relied on the ESD approach by understanding sustainability as "(…) both an explorative process and a broad direction" [24] (p.512).

Beyond the understanding of sustainability, the transformative potential of the reviewed frameworks is also related to the way they conceive and theoretically address educator competences in Sustainability Education. Our results suggest that a limited theoretical foundation in this last regard might exist since only half of the reviewed studies include a definition of the concept of competence. This apparent lack of theoretical foundation can also be associated with the fact that some of them use Wiek et al.'s framework of competences [21] as a reference, although this has been developed for students and thus it does not describes educators' competences. It might lead to some bias when applied to educators since the way that competences in Sustainability Education are conceived for students should differ from the case of educators. Furthermore, some frameworks consider theoretical and pedagogical approaches as competences, such as Learner Centered, or include competences not explicitly related to Sustainability Education, such as Scientific Thinking, which might lead to conceptual confusion and misguide educators' practice. We thus wonder whether it is theoretically and practically suitable to include these types of competences in a framework. Different answers will evolve from the two main conceptualizations of sustainability competences showed in our results: one that specifically addresses the role of educators and another that relates these competences to generic ones that could also apply for students or other actors. Previous research [20] has suggested that frameworks should emphasize those competences linked to the professionalization of educators, which follows the first conceptualization. This approach is of special consideration for curriculum developers in pre-service training institutions who pursue to train future teachers by using the existing frameworks and models found in this review. It is not the same to prepare educators for enhancing their competences in sustainability issues (i.e., teaching future teachers to recycle) than training for improving their competences in Sustainability Education (i.e., teaching future teachers to know how to handle contradictions within sustainable dilemmas exposed in a class). In this sense, further research can comparatively analyze the transformational impact of each approach in terms of educators' development of competences in Sustainability Education.

Further, our results show that those competences more present across frameworks particularly address knowledge, skills, values and attitudes that have been identified as those that educators need to face current sustainability challenges from a critical and transformative perspective [4][9][11], such as Critical Thinking, Connections and Participation in Community. However, the fact that the most frequently addressed competences in the reviewed frameworks belong to the group of LtD might be a sign of applying the competence-based approach with an excess of pragmatism and reductionism [5]. It is argued that other sets of competences are also needed for fostering transformation [25], as the ones in the LtB group. For instance, handle with controversial topics in Sustainability Education involves knowing how to embrace and deal with related values and attitudes, which requires the mastery of competences such as Emotional management and Uncertainty. The little attention that the reviewed frameworks put on these and other LtB competences in comparison to the LtD group of competences matches with previews findings from case-studies on climate change education [16], as well as with the perceptions of the teachers participating in one of the reviewed studies (D7).

Lastly, it turns interesting to discuss that the most varied pedagogical strategies put into practice to implement the reviewed competence frameworks are also the ones related to the LtD group of competences. Indeed, it has been argued that educators aiming to make Sustainability Education transformational need to engage in an action-oriented pedagogy, while embracing self-directed learning, orientation to the problem, inter and transdisciplinary, participation and collaboration [13]. As mentioned above, some of these key aspects for transformation are also related to the LtB group, but this group of competences has also received less attention in terms of the pedagogical strategies needed to promote them. In a way, all competences and levels of learning seem to be key to achieve transformative learning processes, considering that transformative learning entails conscious changes in attitudes, values and behaviors [26]. In this sense it has been argued that transformative learning acts at the deepest level of learning, where the first one involves "doing things better" (external objective world), the second level refers to "doing better things" (ethics, values, beliefs), and the deepest one makes the consciousness to evolve into "seeing things differently" (epistemic dimension) [27]. This view is in line with transformative sustainability education (TSE) pedagogical strategies that focus on participatory, place-based approaches to promote deep relational and emotional changes in consciousness about and connections between the self and the surrounding world [28]. Thus, a challenge is to explore effective pedagogical approaches to improve educators' competences related to complex learning processes involving, for instance, emotional aspects, so these pedagogical strategies can create the space for environmental values to evolve [29]. This endeavor requires training educators in promoting spaces for sharing experiences, emotional openness and resonant understanding [30]; in sum, putting emphasis, following the "wild pedagogies" approach, on emotions and the fluctuant reality [15]. Future research should consider analyzing the impact of training courses fostering these emotional competences in terms of their contribution to developing educators' emancipatory qualities with transformative potential [9].

3. Conclusions

The main research objective of this review is to identify and analyze frameworks and models of competences for educators in Sustainability Education in the scientific literature and to examine their relation to transformational perspectives. Our findings have provided answers to the research questions posed regarding this objective while recognizing methodological limitations. All of the 14 reviewed papers are developed in the European context, although North-American perspectives influence some of them and are in line with ESD and competence-based approaches. However, the theoretical foundations of how these papers tackle the concepts of sustainability and competences are poorly developed. Our findings also show that reviewed frameworks conceptualize sustainability competences by explicitly addressing the role of educators or, in contrast, by relating these competences to generic ones, which might have practical implications and shape the transformational potential of the frameworks and models. Regarding included competences, the most commonly found across the reviewed frameworks are Critical Thinking, Connections, Participation in Community and Learning to Live Together that have been identified as those that educators need to face current sustainability challenges from a transformative perspective. However, other critical competences in this regard, such as Emotions Management, Futures or Uncertainty are less addressed. In this line, results also suggest that the reviewed studies widely emphasize the competences that belong to the Learning to Do group both conceptually but also into practice when developing pedagogical strategies, whereas other more holistic competences belonging to the Learning to Be group are still receiving less attention. Further studies should explore innovative ways to approach these emotional and more holistic competences in the practical arena. Furthermore, research should continue analyzing the transformational potential of different frameworks and models of competences, approaches and pedagogies, considering the specific role of the educators in Sustainability Education.

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