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Education for Sustainability, Transformational Learning Time and the Individual <–> Collective Dialectic

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In the interest of developing sustainability practitioners, this manuscript challenges the conceptualization of transformative learning for Education for Sustainability (EfS) in relation to single courses or programs. Conversely, I will argue that becoming a sustainability practitioner (i.e., someone who takes action in the interest of the sustainability movement) is life-long and life-wide commitment. Time and how and why it matters is addressed. To develop this point, this manuscript details a case study of an education for sustainability graduate program that I designed and currently lead. The purpose is to further theorize transformative learning as it links individual action(s) and collective change(s) in the border-like but permeable spaces that are in-between. It asks the practical question of the ways educators (and practitioners) might expansively and generatively work together in creating a lifetime of classrooms to continuously bridge individual action and collective change.

Keywords: transformational learning, education for sustainability, individual and collective, case study, time

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> If solutions within this system are so difficult to find then maybe we should change the system itself (Thunberg, 2018).[1]

INTRODUCTION

Our social institutions' aversion to authentically individual actions is a sociological truism. However, in the context of sustainability, powerful social institutions like education, are getting tested by the actions of ordinary individuals, including students. Like is so often the case, younger members of society are active in efforts to force open the black box of individual-collective change and disrupt the habit-forming power of social institutions. Seatter and Ceulemans (2017) recently detected a troubling issue in higher education, positing that "[a]s course titles change from "Environmental Education" to "Education for Sustainability" and "Education for Sustainable Development," there is no evidence that the pedagogical approach has altered."[2] While many now teach sustainability (Brundiers et al., 2021), a paradox is created "when educators approach a sustainability curriculum that has the potential *to transform students' thinking and actions*, with a reductive and non-substantive pedagogy" (Seatter and Ceulemans, 2017) (italics mine).

The "potential to transform students thinking and acting" (Seatter and Ceulemans, 2017, p. 47) is one way to define transformative learning. Relatedly, it is a theory of a socially conscious classroom

[1]Greta the Time Traveler -> https://twitter.com/realmediagb/status/1074689330155786245.

[2]Sustainable education, environmental education, outdoor education and education for sustainable development are seemingly competing terms. In truth, however, they tend to accentuate different assumptions about the nature of the problem and the role of education in its amelioration.

design for Education for Sustainability (EfS) that links the collective and individualized efforts at local participation in an immense and multifarious sustainability social movement.

The emerging question of whether or not learning can still be place-based and relational when it's online reflects one of many negative impacts of COVID 19 on students who are in the midst of, or have just graduated from, various sustainability-oriented programs. For students already focused on global environmental change, the pandemic crisis (and zoom) brought into relief the fact that individual students, student groups and the entire cohort of students lacked the time to analyze what was being disrupted and what this was (or could be) teaching us (Alhadeff-Jones et al., 2011). As the program designer and instructor, this ongoing experience led me to conceptualize time as key factor in education for sustainability. I tried some things to test this hunch, including a guided auditory and visualization exercise, which involved beginning a zoom session by reading short passages from Harding's (2006) book, Animate Earth: Science, Intuition, and Gaia, and asking students to reflect on various passages.

The hoped-for result was something like a calming, guided reflection that would hopefully be a welcome intervention to the oft-challenging, temporal aspects of online learning during a pandemic. A few outcomes emerged. First, Earth time as a source of meditation and visualization on the age of the planet and the processes involved in understanding it as a living system was a welcome disruption. The discussions depicted time in a circular or relational way, as fluid as a river, with eddies representing twirling spheres of humans, non-humans and the Earth. Observations touched on going backward, forward and sideways in simultaneously churning concentric circles of time and learning. Students, one of whom attempted this exercise in a closet, observed change as happening not across "linear" individually-defined lives, but in relation to cohorts, communities and generations. One particularly adventurous student uniquely combined the exercise with climbing a cliff face, commented on going backward to ancestors and forward to descendants. The second outcome is that, despite these gains, I did not think to insist upon critical self-reflection considering the predominant perceptions and uses of time. To put things another way, the Earth time that Harding describes was not used to invoke and comment on the fact that the human system is detached from the reciprocal relationships.

We are in an age of limitless consumption (MacKinnon, 2021) that is destroying ecological balance at a dizzying pace. We neither acknowledge nor juxtapose different ways of perceiving time. How often do we discuss the Earth as a roughly 13 billion years old living system? How often is our species understood as a social system that while only coming into being about 200,000 years ago, appears intent upon separation from all other systems? (Capra and Luisi, 2014). Do we even interrogate the functional basis for the economic social institution whose underlying colonial capitalist's ideas, while only roughly 500 years old, appear so antiquated, racist and unhealthy? Instead, since the industrial revolution, we've warmed the world by more than 1.5°C and destroyed almost 40% of the world's forests. In that same time period, of the 8 million known plant and animal species on Earth. We've put more than 1 million on a path to extinction (IPCC, 2018; IPBES, 2019). In light of crises, consumption and the potential role of higher education, it is especially critical to question the role of time in transformative learning.

In putting forward transformative learning as epochal phenomenon, I must confess some prior assumptions. For me, transformative learning has not been a "Damascus moment" or disorienting dilemma that one confronts and overcomes. Rather in the past I saw transformative learning in chronological, rather than Earth time, a "3 days alone in the forest" kind of exercise where one awaits an epiphany. I think that the injection of time into transformative learning helps me consider sustainability programming as it encourages ongoing ways to learn from one's classroom and other experiences through critical reflection. I also adhere to a neo-pragmatist philosophy of human action, which, like transformative learning links habit and creativity. Both suggest a contemporary human process of employing routine to address complexity and seeking creative solutions when challenges arise (VanWynsberghe and Herman, 2015b). It is normal to compartmentalize the learning that goes on in educational programs and yet sustainability demands otherwise.

Building on an expansive understanding of key sustainability competencies (cf., Brundiers et al., 2021)[3] there are assertions that some capacities in humans that are largely forgotten but fundamental to sustainability (Glasser, 2018; Glasser, unpublished[4]). Pacis and VanWynsberghe (2020) cite alternative ways of knowing and affinity for all life as examples. Calls to cultivate these underlying capabilities is perhaps why Indigenous ways of knowing resonate so deeply at this time, perhaps signaling an opportunity for lifelong and life wide learning to buttress the argument for key sustainability competencies (Kimmerer, 2013, 2017). Adult education uses "lifelong" to recognize the learning that is possible at different stages in one's life and "life wide" suggests the opportunity to learn across the spectrum of spaces we inhabit. Alhadeff-Jones et al. (2011) conceive of the relationships between transformative learning and time along these lines. The authors assert what they call temporal dynamics into transformative learning itself, including critical reflection on the way time impacts experiences. Importantly, they note that "[S]uch temporalities have duplicity: they involve an inner experience (by itself) and an external one (in relationship with others (p. 395).

Linking time, the future and a planetary scale of consciousness is explained in the following quote:

> If we subscribe to a millennial eschatology, our hope will be other worldly; if we are Marxists, we understand change as contingent on revolution, and therefore our hope is for an overturning of the dominant world economic system. . . It makes sense to me that part of what is to be done by futurists is laying bare the temporal models that shape individual and collective hope and the decisions such hope underpins (Bussey, 2017, p. 5).

[3]Glasser and Hirsh (2016, p. 126) define key competencies as, "[A] constellation of abilities, attitudes, knowledge, understanding, skills, and habits of mind that are functionally linked to support both problem-posing and problem-solving and evoke purposeful behavior toward particular end goals."

[4]Glasser, H. (Unpublished). Learning for Sustainability Core Competency Framework.

This "laying bare" of temporal models is the work of a futurists or, according to advocates of a "key sustainability competencies" framework anticipatory thinkers (Wiek et al., 2011, 2016; Lambrechts et al., 2013; Wiek and Kay, 2015; Sterling et al., 2017; Brundiers et al., 2021).

In this manuscript, the concept EfS is used to deliberately emphasizes the fact that higher education must reconnect with society in relationship to time in order to facilitate social change. Unlike "sustainable education" as used by Sterling and Orr (2001, p. 8) we posit the need for education to be "for" the sustainability social movement (Vanwynsberghe and Moore, 2008). Specifically, I would argue that higher education's primary social functions can be adapted in order to make common cause with and provide service to the sustainability movement. EfS then is a real-world, place-based, disruptive and creative process of inquiry that promotes learning understood as knowledge in action. Categories of actions include a critically reflexive approach to the classroom, community engagement, and transdisciplinarity. There is no pedagogy that can singularly promote the complexity of EfS and therefore, as educators, we must experiment and then combine many strategies in order to engage all of the students and contexts.

The focus on the individual-collective dialectic is meant to encapsulate the ways sustainability educators/facilitators/coaches often think about and direct our learners toward action. Relatedly, this manuscript posits the idea that EfS educators should think about our courses or programs as they contain the potential to contribute to the development of a sustainability practitioner over time. The assertion is that there is a trajectory of transformative learning experiences in the interest of the sustainability movement. The classroom writ large is the nexus of this reconnection, the space between the individual and the collective.

Theoretical and conceptual points are elaborated using excerpts from a case study database of one of the authors efforts to design and lead a 2-year, part-time, and 30 credit Masters in Education (MEd) program in the University of British Columbia in Vancouver Canada. The overarching purpose of this program is to be in service to the sustainability movement, which is operationalized in a partnership with the City of Vancouver (and other stakeholders) where policy is analyzed and implemented in order for student projects that generally follow a design-based or social innovation framework. A neo-pragmatist philosophy of human action underlies the program (VanWynsberghe and Herman, 2015b, 2018; Earl et al., 2018). Understood in relation to EfS, a neo-pragmatist theory links disruption and creativity, akin to Seatter and Ceulemans' (2017, p. 52) promotion of "pedagogical approaches that challenge students to participate actively, think critically, and reflect." Warwick (2016) typologizes this student-activating, holistic, and relational approach to EfS in the following way:

- The critical dimension (space for dialogue and systems thinking).
- The creative dimension (space to imagine new sustainable futures).
- The active learning dimension (space to collaboratively act for sustainability).

In light of today's complicated sustainability problems, like urban transportation, decolonization and even the great resignation, this disruptive and reflective approach to teaching and learning in place is more likely to give rise to self-motivated change agents. This is because students will practice acting to create change rather than just learning about what needs to change. This neo-pragmatist application offers expansive learning opportunities, helping a cohort of students to deliberately co-create a program that disrupts normal learning (and research) habits. In the MEd program, we also accentuate a process of active listening, communication, dialogue, systems thinking and social innovation by intentionally bringing together participants (students, mentors, supporters, and funders) from varied sectors such as education, community organizing, law, art, library services, outdoor learning, language acquisition, and filmmaking. We have taken this experiment to some lengths, employing instructional models that include co-teaching situations with city and regional staff whose backgrounds in engineering, planning and policy labs and combined with architects, sociologists, philosophers and adult educators.

TRANSFORMATIVE LEARNING AND EDUCATION FOR SUSTAINABILITY

For the purposes of this manuscript, and as briefly mentioned above, sustainability is a global social movement. As a social movement, sustainability challenges society's dominant ideologies, especially those based on the narratives of modernity and progress, offering a positive program (VanWynsberghe and Moore, 2015a) that can catalyze deep individual and collective learning and put participants on track toward sustainability over a lifespan.

This open-minded and adaptive approach finds its basis in Mezirow's early notions of transformative learning, which are outlined in column 1 in the below table. Mezirow proposed transformative learning in 1978 as a rational, metacognitive process of reassessing assumptions and expectations that influence our thinking, feeling, and acting (meaning perspectives) (Mezirow, 2009). He defines transformative learning as "the process by which we transform problematic frames of reference (mindsets, habits of mind, meaning perspectives, sets of assumption and expectation) to make them more inclusive, discriminating, open, reflective, and emotionally able to change" (*ibid.*, p 92). Transformative learning allows people to shift their meaning perspectives and habits of mind through disruption, dialogue and critical reflection on the source and consequences of assumptions, determining a new truth, taking new actions, and transforming habits to acquire a new disposition (*ibid.*, p. 94).

Curricular and pedagogical approaches to transformative learning are strongly linked in EfS, especially as a caution against passive learning (Bonwell and Eison, 1991; Felder et al., 1997). In EfS, one could spend an entire course relating to students an

incapacitating amount of information about the cliff-edge that humanity's currently peering over because of destructive socio-ecological systems. The key for transformative EfS classroom design is the opposite; that is, educators and students who co-construct their classrooms as important organizational actors in achieving a healthy future for their immediate communities as well as the planet.

The process of achieving transformative learning can be facilitated and encouraged through the creation of classroom design features, pedagogies and competencies that are "intentionally designed to foster select elements or a holistic process of transformative learning" (Kasworm and Bowles, 2012, p. 391). In **Table 1** (see below), an admixture of classroom features, pedagogies and learning outcomes is offered to summarize these relationships as they appear in the literature. The first column is entitled "features of transformative learning" (column 1). In this column, the aim is to highlight specific features that can initiate transformative learning. Column 2 offers pedagogical strategies that realize the aforementioned features. The discussion that follows the table represents a further unpacking of its content.

Taken together transformative learning enables participants to individually and collectively examine taken-for-granted theories, concepts and ways of knowing through real-world action that is in service to a community (Moore, 2005; Sipos et al., 2008; Cranton and Taylor, 2011, 2012; Sterling, 2011; Wals and Lenglet, 2016; Harmin et al., 2017). The EfS classroom must explore (and unsettle) our deeply engrained habits of mind and body behind because unsustainability is due to such destructive habits. Transformative learning supports the use of pedagogical strategies like critical reflection, diaries, discussions, and even role playing to foster a willingness to change oneself and to facilitate social change for a sustainable future.

Conceptual understanding is aided by a further unpacking of transformative learning as it links the individual and the collective. The following section undertakes this effort.

TABLE 1 | Features and potential pedagogies for TL and KSC.

Classroom features of transformative learning	Education for sustainability pedagogies
Disruptive (Mezirow, 2009; Kasworm and Bowles, 2012)	Research in the service of co-learning; critical (i.e., decolonizing); dialogue and role play; internships and other work applications
Dialog (Mezirow, 2009)	Socratic method, group discussion and role play, community-based speakers/problems
Project-based learning (Wiek et al., 2014; Earl et al., 2018)	Policy reviews, social innovation methods, prototyping, ideation, and story-telling
Critical reflection (Mezirow, 2009; Kasworm and Bowles, 2012)	Diaries, self-evaluations, writing; and peer assessments
Holistic, experiential (Sipos et al., 2008; Kasworm and Bowles, 2012)	Traditional ecological knowledge; diaries, logs and self-evaluations; and field trips
Adapt new roles/relationships (Mezirow, 2009)	Service-learning; applied learning; dialogue and role play; internships; and tactical urbanism
Inter-/trans-disciplinary inquiry (Sipos et al., 2008)	Participatory action research, community-based learning; group discussion, role play, group diaries; internships; case studies, and systems mapping

THE TIME BETWEEN TRANSFORMATIVE LEARNING AND EDUCATION FOR SUSTAINABILITY

An important question arises, namely is it possible for individual-level change to help create societal change and vice versa? Transformative learning theorists argue that yes, the individual and the collective can work to shape one another because they are not binaries and each scale can impact the other (O'Sullivan, 2012; also see Cranton and Taylor, 2012; Walter, 2013). How does this interplay work? Firth and Robinson (2016) argue for an updated form of consciousness raising that combines collective knowledge production and challenges to linear time.

> Experiences of time are necessarily connected to experiences of continuity and change, causality and/or free will, and the realm of the possible and desirable. Transformation is limited by the dominant mode of homogeneous empty time (Benjamin, 1955, 1970), and empowered by prefigurative temporalities (Firth and Robinson, 2016). Time has suffered particular mutations in neoliberal capitalism, which are dissimilar to those of the Fordist structure combated by earlier movements. A current spatio-temporal closure – an inability to imagine beyond present constructions of space and time – afflicts oppressed subjects in general (pp. 345–346).

This focus on consciousness raising might explain that the seemingly endless educational efforts that employ the "knowledge equal action" logic for change where scientifically validated information is assumed to produce a similar reaction in everyone. The second sentence of the quote argues that linear time underscores this attachment to such a simplistic formula wherein life itself is about behaving in ways directly tied to knowledge. How can creativity (prefigurative temporalities) make inroads in the face of such a logic?

To start a deeper conceptualization of the transformative learning process we must accept the degree to which our individual thinking is shaped by society and schooling. Social institutions like education reflect a social structure where knowledge is an overpowering force on the behavior of individuals. Normative pressures are everywhere. We feel the need to conform in our dress, our hairstyles, and our body types. Governments pass laws that govern our behavior, with the explicit purpose of affecting our actions. It takes remarkable effort to work against these pressures but it starts with understanding that the behavior of individuals is shaped by the larger institutions and structure of society. To put things another way, change making is made when time is seen as expansive enough to take chances, co-produce knowledge and make a mess of important things, like categories, classrooms, and tools.

Key to conceptualizing transformative learning as the space between the individual and the social is recognizing that society too has to adapt to its environmental conditions just as readily as do individuals *but the timing is different*. Society as a whole comes across problems and can subsequently be deemed inadequate for addressing current pressures. We can expect to see some degree of macro-level creativity at these junctures, including the emergence of and responses to social movements. For example, the climate change/justice/education mobilization is often discussed as necessitating radical alterations in both the production and consumption of economic goods. This a good example of both the problem and the movement because the changes needed call into question the nature of contemporary society. It is against this backdrop that Greta Thunberg offers the words quoted in the at the beginning of the paper to the manuscript, which amount to suggesting that "solutions" are not to be "discovered" in the current system because individual and collective forces effectuate and facilitate the problematic situation in one another.

If the above relationship is an acceptable premise, then we must agree that that there is a social basis to transformative learning. In other words, there is a pre-existing social capacity for learning about and adopting social values that are then acted upon as public commitments. In this way we can begin to consider as deep-seated, and thus as social, transformative learning. Walter (2013), for example, researched the personal narratives of change-making environmental scientists, like Aldo Leopold. In doing so, Walter accentuated the ways in which personally transformative learning provokes a collective process of transformation. To explain the scaled nature of this individual – collective interaction, Walter turned to Lange who argued that:

> [D]isorienting dilemmas are inherently destabilizing, adults reach deep into themselves to become more conscious of their ethical grounding—they return to their "inner compass" (p. 130), and this becomes restorative, allowing not only individual transformation but also a collective commitment to social activism on ecological and global concerns as well (Walter, 2013, p. 28).

Walters uses this quote to explain that famous environmental scientists, such as Rachel Carson, become change makers because they work in parallel with a wide swath of other people who are also in the early stages of shifting their worldview and adopting new values.

Figure 1 depicts in simple terms the interplay between the individual and the collective that we are talking about here. To start, I ask the reader to note the simplified categories of the individual and the collective and the arrows between them. The individual is on a transformative learning journey.

In addition to continuing to understand transformative learning in relation to individual and collective action, this ascending spiral staircase is meant to convey an individual's transformative learning journey. The egg-shaped platforms are landings that depict a learner having reached a milestone, a standard because that demonstrates a contribution to social change. Something that needs to be emphasized is the timing of journey. This is not a journey that fits into a course or even a program. It is rather what adult educators would call a lifelong and life-wide undertaking.

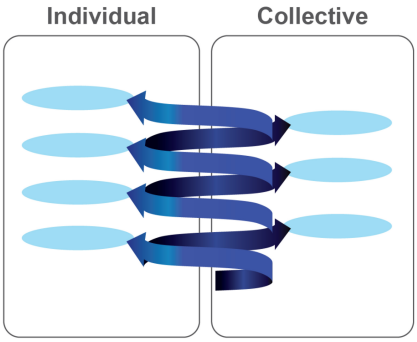

FIGURE 1 | Transformative learning journey.

Taken together, the above figure conceptualizes the ways in which classrooms can contribute individually and collectively over a life-time to transformative learning. Transformative learning bonds together our individual and collective potential in creative efforts to achieve a preferred future. As Mezirow (2009, p. 95) himself states, "[I]magination of how things could be otherwise is central to the initiation of the transformative process." This requires "the generation of energy for radical vision, action, and new ways of being. If we are to survive on this planet, we need new connections to each other and to the natural world" (O'Sullivan, 2012, p. 171). Thus, creativity is key since it involves the production of something novel and appropriate that continues to shift mindsets or lifestyles (Lozano et al., 2017). Creativity can allow us to envision the future we wish to co-create, disrupt deeply entrenched destructive norms, and replace unsustainable habits with ones that are conducive to sustainable well-being. If a process of iteration and adaptation were to become the norm, then this could create space for change agents to be bold in how they work to challenge the *status quo*. Without disruption, society cannot transform at the pace necessary. Habits must be challenged. Doing so is disruptive. Creativity offers solutions to unsustainable habits, including thoughts.

THE EDUCATION FOR SUSTAINABILITY CLASSROOM AS SETTING

This section is the previously mentioned excerpt from the case study of a graduate program in EfS. The focus is on the learning setting because is also emphasized in the theory. The reader may perceive this consideration to be a simplistic change, but the impacts can be profound. One of the features of applying a neo-pragmatist philosophy to EfS is the off-campus placement of the classroom (Earl et al., 2018). As a result, the EfS classroom that is the subject of the case study is ten kilometers away from the University of British Columbia campus and under a major bridge to the downtown core in a building owned by the City of Vancouver. Stepping out of this decidedly non-traditional classroom provides a panoramic view of the downtown and

nearby paths take one toward a new housing development or a large marketplace.

Theoretically, placing the classroom in the heart of the city and away from the main campus is part of questioning the habitual thoughts and actions that lead to the typical campus. We take this to the point of questioning the classroom on campus as anachronistic. The fact is that the physical look and feel of the EfS classroom is profoundly important to linking it to contributing to the sustainability movement and our efforts to consult on and experiment with options for addressing problems that come to light in the course of working with City of Vancouver staff and officials on sustainability priorities. The overall structure supports studio-like applied learning research and action. An expansive orientation to the notion of the classroom accommodates the insightful and often practical views of City of Vancouver staff and officials, Elders, educators, civic leaders, community members, public intellectuals, historians, authors, artists, scientists, developers, social innovators, and entrepreneurs.

Pedagogically, transcending the spatial boundaries of the academy, like other classroom features, is disruptive. Unconventional classroom layouts, that is, there being situated in off-campus locations counter stagnant facts (Mezirow, 2009, 104; Earl et al., 2018). A new classroom space activates different habits in students that are not only relevant to education, but to the constitution of society that our interactions construct and reproduce. Students told me they experienced more freedom and creativity, moving beyond the classroom to apply their knowledge to the real-world. They also appreciated opportunities to interact with outside systems, and their different norms and restrictions. This often took the form of consultation with community stakeholders.

One of our favorite questions asks if this is a classroom? We obviously apply this to our off-campus classroom, but we've also asked this in in middle of the city or as we canoe down the Fraser River or as we peer through a chain link fence at a brownfield site. The point is that, as opposed to the bucolic campus, such learning settings can introduce students to new viewpoints as they interact with people from outside of their normal social spheres. Classrooms then are an initial response to O'Sullivan's call for a "structural shift in the basic premises of thought, feelings, and actions" (2012, p. 164) in order to "touches our deeper levels of knowing and meaning" (Sterling, as cited in Harmin et al., 2017, p. 1490).

Deeper levels and therefore transformative learning may take a long while. One of the students in the inaugural cohort puts it well and I encourage an emphasis on the last line.

> But after some reflection, I would argue that the most valuable piece I will carry forward from this program is not what we learned - it is how we learned. When I walked in to CityStudio on our first day there, the chalk board had many, many things written on it. But the one that has stuck with me throughout my 2 years there was "trust the process." The outcomes are important, but the process in itself is also incredibly important. We learned through processes of self-inquiry, self-reflection, and self-discovery. For the majority of the program, we learned by doing rather than only by listening or reading. Ideas and facts were not just given to us through lectures and readings. Discussions were rich, sometimes difficult, and always allowed us to see our own worldviews and how they relate to our colleagues' [worldviews]. I feel like I questioned my own beliefs about sustainability a lot, and that was scary and wonderful. It has been a wonderful 2 years, and *I am certain that I will carry all of these lessons forward through life*.[5]

The quote reinforces the discussion that preceded it, but it also demonstrates that a 30-credit program, approximately 2000 hours of interaction, study and reflection, merely initiates a process of transformative learning. In many ways, the program or creative piece is the easy bit, *remaining disrupted* much more onerous. MEd programs, like the one described here, contribute to transformative learning but it does not signal the fact that a program does more than provide the right enabling conditions and encouragement to catalyze future transformations toward the sustainability movement. Research concurs, transformative learning has been recognized as something that can be epochal or cumulative (Mezirow, 2009, p. 94; also see Sipos et al., 2008), and thus acknowledging this should be built into lesson plans with the understanding that learning outcomes and competencies and transformation may take years to emerge.

CONCLUDING REMARKS

"Visioning a healthier, fairer, more meaningful future for all of the planet's inhabitants involves learning to change by changing how we learn" (see text footnote 4, p. 13). This manuscript posits that transformative learning could be this new way of learning because it is process-driven and open ended; not prescriptive and without arbitrary endpoints. Transformative learning promotes critical, inquiry-based collaboration and creation with the question of what to transform into changing all the time. Here the classroom is examined, especially in the sense of linking the individual and collective in a long-term union of learning, which is defined in action.

Transformative learning could facilitate a shift toward multiplicity of ways of knowing not least allowing us to understand "ourselves and our self-locations; our relationships with other human beings and with the natural world; our understanding of relations of power in interlocking structures of class, race, and gender; our body awareness; our visions of alternative approaches to living; and our sense of the possibilities for social justice and peace and personal joy" (O'Sullivan, as cited in Walter, 2013, p. 28). Understanding many perspectives and their relationships to one another is important for sustainability since, increasingly, research into the natural world demonstrates that social (read human) systems are homo sapiens' "natural" setting to the planet's peril. It appears that we have humans have actively torn ourselves from the practices we'd undertake

[5]Several lessons were addressed from the first to second cohort. First, a cohort is more intense and collaborative than its coalition-like durations and purpose would suggest. Second, we assumed that participants "knew" sustainability. It turns out this it is still new and graduate programs, like ours, must be prepared to backfill on some content. Our final major lesson was that we needed to be more intentional about building in listening as an essential skill, especially as related to the nature of service and the need for research and other skills to be applied to the problem outlined.

if we really did consider nature our home. What is more, the social life of, for example, forests demonstrates that humans leave something to be desired in regards decidedly social gestures, like reciprocity. Maybe our somewhat desperate turn to Aboriginal peoples' worldviews reflects a dawning awareness of our current place vis-à-vis natural systems and the desire to change this trajectory.

The research considers some relevant pedagogical strategies and a few are noted here. Wang (2010), for example, uses the modality of *currere* to combine knowledge, life history and intellectual growth to sponsor self-transformation. Wang (2010, p. 276) writes of a 4-step method that combines these functions:

- Regressive step is about the free associative remembrance of the past.
- Progressive step is the meditative pondering of the future.
- Analytical step is about the analysis of what one uncovers above in relation to one's present biographic situation.
- Synthetical step is about pulling oneself toward a higher level of knowing and being.

This strategy is not in **Table 1** but it obviously conforms with critical reflection in order to leverage a decidedly more personal change. As Wang (2010, p. 282) states "A dynamic interplay between external time and internal time is key to initiating and sustaining the transformation of the present moment."

Firth and Robinson's (2016) previously mentioned research also advances a revised version of the 1970's consciousness-raising groups in the form of a collective transformational learning strategy. They isolate what they call grassroots knowledge production and suggest the term Kairos as transformative time. They write (2017, p. 354] that "Kairos is experienced as a time-lapse or a moment where everything is simultaneous... [It is] a series of small, but structurally transformative events within the lives of particular actors... A particular kind of personal Kairos is experienced within critical reflection in the form of the "click"– the moment at which subjective alignments are reconfigured on the basis of the group process. To return to **Table 1**, critical reflection can be advanced by the use of such pedagogies as diaries, self-evaluations, free writing, and peer assessments.

Today's complex problems require that we adopt novel way of thinking, feeling, acting, and relating to all other aspects of the world. It is posited here that transformative learning theory has the potential to create future change-makers that can bring about this large shift by encouraging awareness, reflection, empowerment, and action over time. We can disrupt habits that we have adopted from unsustainable dominant ideologies by them by striking out in novel ways (Rieckmann, 2012, p. 128). Transformative learning encourages people to develop habits and dispositions *for* sustainability rather than just learning *about* it creating a shift to ontological learning so that we may not only think, but act our way into a new future.

There are new challenges to transformative learning theory in relation to time. Distortions in the temporal dimensions of an EfS curriculum (i.e., the differences between virtual time and real time) have occurred and they may have lasting impacts. In the past, perhaps the biggest pedagogical concerns of transformational learning theorists involved the legitimacy of learning when doing outdoors activity (attending an off-campus classroom, climbing a cliff, hiking a trail, canoeing, etc.) versus the traditional classroom. That was before COVID-19 when these were the extreme settings for learning. However, for some recent graduates we must ask if one will undertake a lifetime of keeping the planet intact for future generations when a significant chunk of their classroom learning involved a screen. It is a worry that a new link to "capitalist time" (i.e., time as linear, progress, production, profit, success, productivity) has been forged in higher education. How can we include other ways of knowing (i.e., Indigenous worldviews of acting in relation to its impacts for seven generations) where time is not linear? How can we continue to emphasize gifting/giving in a monetary system? How can we emphasize time for self-care, self-improvement, reflection, connecting with community/ecosystem?

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

AUTHOR CONTRIBUTIONS

The author confirms being the sole contributor of this work and has approved it for publication.

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