

Enriching Responsible Living Curricula with Transdisciplinarity

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Abstract This chapter tenders a new approach for enriching responsible living curricula predicated on transdisciplinarity. It weaves together four large ideas to support the argument that learners can make more responsible life choices if they are exposed to a transdisciplinary-informed curriculum: transdisciplinary knowledge, transdisciplinary habits of mind (cognitive skills), transdisciplinary learning (iterative cycle), and the transdisciplinary learning *approach* (including the four pillars of education needed for the 21st century). The entire discussion is grounded in Professor Dr. Basarab Nicolescu's approach to transdisciplinarity: Multiple Levels of Reality mediated by the Hidden Third (to reconcile conflicting perspectives); the Logic of the Included Middle; and, knowledge as complex, emergent, embodied and cross-fertilized.

Keywords Transdisciplinarity • Responsible living • Curriculum

1 Introduction

The Partnership for Education and Research about Responsible Living (PERL) anchors its work in the concept of responsible living. The underlying premise of PERL's work is that people need to be educated and taught how to live responsibly on the earth, with each other and other species. At its website, PERL (2012) notes that responsible living involves (a) the readjustment of present priorities; (b) the redefining of human relationships; (c) the transformation of how societies deal with existing economic, social and ecological challenges; and, (d) the intensification of the dialogue between science and society.

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In general, responsibility refers to the opportunity or ability to act independently and take decisions without authorization. It means being able to respond to life and act accordingly without depending on someone telling you what to do. Living responsibly also entails “living responsively, with a proper awareness of planetary needs, political imperatives, national issues, local questions and both family and personal wants, not always in that order but always with each element in that chain entire” (Morton 2008, p. 2). Educating people about the tenets of responsible living will require an especially designed curriculum and pedagogy, called a responsible living curriculum, described in the next section. Indeed, PERL (2012) has developed a definition of ‘education for responsible living’ that can inform any attendant curriculum initiatives:

Education for responsible living provides opportunities for learning about the systems and processes connected to consumption. It involves relearning and reorganizing information in wider contexts. It is contingent on reconsideration of such central questions as the value of material and non-material prosperity, and the significance of service to ones fellow human. The present situation indicates the need for the further development of analytical, reflective thinking skills in order to decode the extensive and aggressive commercial messages to which individuals around the world are constantly exposed. Five basic skills are essential to learning to be responsible. These are: communication skills, decision making skills, problem solving skills, creativity and change management. (p. 2)

2 Responsible Living Curricula

The common element of any responsible living curriculum is its focus on helping students consider contemporary, tough, real world issues and problems and look for ethical solutions for themselves and for society. Such curriculum would emphasize ways in which ethical principles affect responsible decision making and would include self-analysis, analysis of complex world systems, and of attendant issues and problems. Students would consider the consequences of any decisions taken to address these issues. Responsible living curricula would teach ethical reasoning about right and wrong human conduct so students can learn to live responsibly on the earth (General Education Task Force 2012).

Courses in this type of curriculum would contain three key components: ethics, responsible living decisions, and citizenship or civic engagement (General Education Task Force 2012). Indeed, Dahl (2011) likened living responsibly to being good consumer citizens, people “who make choices based on ethical, social, economic and ecological considerations” (PERL 2012, p. 2). Students shaped by a responsible living curriculum would be able to engage critically, ethically and positively with a diverse and changing world because the curriculum itself would be “current, dynamic and responsive” to the world (General Education Task Force 2012, p. 45).

Responsible living curricula would also strive to help students integrate what they learn into their daily lives. The development of students’ consciousness and self-control would be fostered, as would prosocial behaviour (voluntary behaviour

intended to benefit others) and independence, interlaced with a strong sensitivity to interdependence and interconnectedness. A space would be created where students can develop appropriate attitudes and dispositions, and acquire skills and knowledge, necessary to make responsible, informed choices so they can lead empowered, purposeful, and fulfilled lives. They would also learn to develop attitudes that allow them to take advantage of new opportunities and, at the same time, deal confidently with the stresses of uncertainty and change. The curricula would integrate concepts and content from a variety of subject areas and, most especially, would deal with contemporary issues facing children. Students would learn to care for themselves, for others, and for the environment (Thuente 1993). This chapter proposes that transdisciplinarity provides a powerful anchor from which to teach responsible living as defined above.

3 Transdisciplinarity

Hermani (2011a, b) has an intriguing view of students that informs the discussion shared in this chapter. Students “come to school with what they intrinsically are, in their integrity, in order to learn to know themselves, as well as the environment and our world’s interactions” (2011a, p. 3). A transdisciplinary approach enables educators to respect this integral link between students and their wider world. It gives educators permission to focus on helping students ‘learn to know who they are’ by showing them they are inherently tied into and connected with the complexity of the world. With this self-knowledge, students can begin to engage in more responsible life choices as they learn to care for themselves, for others, and for the environment (the crux of a responsible living curriculum). Indeed, “transdisciplinarity is a powerful educational approach for the shift in culture [required] where [responsible living] is no longer a vision but a way of living” (Marinova and McGrath 2004, p. 6).

The rest of this section provides a necessarily brief overview of transdisciplinarity as understood by Professor Dr. Basarab Nicolescu (1997, 2002, 2008, 2010, 2011). As a caveat, McGregor (2006, 2009, 2010, 2011c, 2014) has provided detailed overviews of Nicolescu’s transdisciplinary (TD) approach, and how he understands what counts as reality, logic, knowledge, and the role of values. As a succinct overview, transdisciplinary knowledge is emergent and complex. TD Reality comprises multiple levels, which are able to interface with each other through the mediating effects of leaving behind resistance to unfamiliar or disliked ideas. The logic used to infer judgements, make decisions, problem pose and problem solve is inclusive logic, respecting many actors’ points of view. Integral value constellations play a crucial role in solving problems faced by humanity, and must be managed and led in a climate of collegiality and respect.

In a bit more detail, Nicolescuian transdisciplinarity holds that there are Multiple Levels of Reality (instead of just the material, physical reality). The movement between these realities is lubricated or mediated by, what Nicolescu

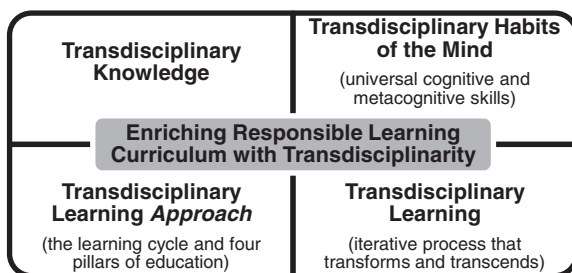
(1997) calls, the Hidden Third. This mediator, or hidden agent, manifests when diverse actors with divergent perspectives, yet keen interests in addressing a complex problem, come together. While engaged in co-creating this new knowledge, this collection of people use inclusive logic (instead of Classical exclusive logic). Inclusive logic assumes that things that are normally seen as antagonistic or contradictory can temporarily be reconciled to create new transdisciplinary knowledge (through the Logic of the Included Middle). The resultant knowledge is characterized as very complex, emergent, embodied (owned by everyone) and cross-fertilized (McGregor 2014).

In short, Nicolescuian transdisciplinarity proposes that people from all walks of life (Multiple Realities) would enter a fecund *middle ground* (a zone of non-resistance, ripe with potential and possibilities) prepared to remain open to others’ viewpoints as they use inclusive logic to temporarily reconcile contradictions. All the while, they are respecting emergence, synergy and fusion, leading to the integration of ideas to form new complex, embodied, and cross-fertilized knowledge, which can be used to address complex problems (McGregor 2014). The next section introduces an inaugural attempt to conceptualize a transdisciplinary orientation to responsible living curricula.

4 Four Elements of a Transdisciplinary Orientation to Responsible Living Curricula

Emerging from an extensive literature review, four elements are now woven together to create a transdisciplinary orientation for enriching responsible living curriculum: transdisciplinary knowledge, transdisciplinary habits of mind (cognitive skills), transdisciplinary learning (iterative process), and the transdisciplinary learning approach (learning cycle including the four pillars of knowledge needed for the 21st century) (see Fig. 1). Together, they can help educators gain a transdisciplinary orientation for responsible living curricula, strongly informed by Nicolescu’s approach to transdisciplinarity (Nicolescu 1997, 2002, 2008, 2010, 2011).

Fig. 1 Four elements of a transdisciplinary orientation for responsible living curricula



4.1 *Transdisciplinary Knowledge*

Traditional curriculum uses disciplinary knowledge and subject-focused content (Hartley 1997). Most people are familiar with mono-disciplinary knowledge, developed by and housed within distinct disciplines (e.g., economics, politics, sociology). Multidisciplinary knowledge is created when one discipline uses the insights it gains from inviting others to contribute to the solution of a disciplinary problem. Interdisciplinary knowledge is created when scholars from multiple disciplines work to integrate their ideas into a new whole, but the work is still confined to scholars in academic disciplines. When scholars within universities work with actors outside the academy, people who are living the problems, we witness the creation of transdisciplinary knowledge (McGregor 2006; Wall and Shankar 2008). Apgar et al. (2009, p. 256) clarify that transdisciplinary knowledge is created by “mov[ing] beyond the integration of different disciplines *towards* transdisciplinary approaches that link different disciplines *with* local and traditional knowledge systems” (emphasis added).

Transdisciplinary knowledge is a new kind of knowledge that complements traditional, one-discipline, multi and interdisciplinary knowledge. TD knowledge is formed in a transintellectual space, wherein resides a gradual cross-fertilization of ideas resulting from the convergence of different perspectives and value systems in the spirit of solving complex, emergent global problems of humanity (Lattanzi 1998). This type of knowledge is globally open and entails the integration of disciplinary knowledge with stakeholders’ lived experiences leading to new visions of a responsible and sustainable future. It is alive and perpetually in flux and information because the problems being solved with TD knowledge are alive. Its creation entails self-transformation oriented towards new knowledge of the self, the unity of all knowledge, and the creation of *a new art of living* (Nicolescu 1997); that is, responsible and sustainable living.

Transdisciplinary knowledge is co-created outside the traditional university boundaries in the actual context of where it will be applied, by those who will be applying it to solve complex problems they are experiencing (McGregor and Volckmann 2011). Lattanzi (1998) suggests that distinct (disciplinary) bodies, or autonomous branches of knowledge, be referred to as *departments of knowledge*, to distinguish them from the *holistic knowledge* that forms the base of transdisciplinary learning. From this stance, he argues that knowledge from distinct disciplines is valuable, first-step knowledge, needed to understand problems from one perspective. However, the transdisciplinary knowledge base is best for treating problems that benefit from not treating them in *disciplinary isolation*. Such problems include human aggression, less than harmonious distribution of resources, thwarted human empowerment and loss of human potential.

This is why transdisciplinarity is described as a process characterized by the integration of efforts by multiple disciplines and members of civil society to address issues or problems with global implications. By integration is meant opening things up to all involved so that something new and permanent can be

created via synthesis and the harmonization of ideas and perspectives. Indeed, many issues of fundamental importance for our society, such as sustainability and peace, could not even be posed within the domain of one discipline. Of significance is that Lattanzi (1998) believes an inquiry into a simple issue should not stop just because a satisfactory explanation has been found. This latter approach is inherent in the other three approaches for creating knowledge (mono, multi and inter). Transdisciplinary thinking would have people dig deeper for the underlying complexity of daily reality that creates issues with global implications, including excessive consumption, climate change/global warming, pollution, overpopulation, and unsustainability. Such an intellectual enterprise requires particular habits of the mind.

4.2 *Transdisciplinary Habits of Mind*

Transdisciplinary thinking helps people deal with the complex, wicked societal problems that require knowledge across all aspects of society: academic research disciplines, communities, civil society, industry and governments; that is, it involves the integration of knowledge from multiple knowledge systems or knowledge spheres (McGregor 2011a). Thinking from a TD perspective means people have to (a) recognize and value the multiple interacting parties (i.e., multiple realities) while (b) allowing themselves to self(re)-organize during the perspective sharing and problem solving process (Apgar et al. 2009).

In that spirit, Mishra et al. (2011) identify seven habits of a transdisciplinary (TD) mind; that is, cognitive skills they suggest *any* individual tends to use when creatively thinking across a range of domains. These TD mind skills are universal and employed by people inclined to integrate different solutions, viewpoints and perspectives. They include: perceiving, patterning, abstracting, embodied thinking, modelling, play, and synthesizing (see also Mishra and Koehler (2006) and <http://www.tpack.org/>). These TD mind habits are crucial for a responsible living curriculum.

First, *perceiving* is a two-layered process. People learn to observe using their five senses, and then they learn the process of *imaging* (calling to mind what they observed without any external stimuli). Second, *recognizing patterns* involves identifying a repeating form or plan in a seemingly arbitrary arrangement. Third, *abstracting* entails two processes: (a) people extract and focus on one feature of a thing to grasp its essence. Then, (b) they use analogies (comparisons between two seemingly disparate things) to explain the abstraction. Fourth, *embodied thinking* is also two-pronged. (a) Using kinesthetic thinking, people learn to ‘think with their body’, learning how to use their five senses to know the world around them (e.g., how hard to hold an egg without breaking it). (b) Thinking with the body also involves putting oneself in another person’s position (out of one’s body into another body’s experience) in order to understand them (empathize) (Mishra et al. 2011).

Fifth, *modelling* involves both abstractions, noted earlier, and dimensional thinking (space and time). When people model, they build replicas or use theories or formulas to represent and then study something. *Deep play*, the sixth universal TD mind habit, involves people intellectually playing with ideas, concepts, boundaries or processes so they can open doors to new ways of thinking via unexpected breakthroughs. Finally, *synthesizing* involves feeling and thinking coming together into many and new ways of knowing, which could not have emerged if everything had remained separate and disconnected. Through synthesis, people develop deep, empathetic, complex connections between each other and their attendant ideas and positions (Mishra et al. 2011).

Derry and Fischer (2005) also discuss transdisciplinary competencies and mindsets, arguing that learners need these as well as disciplinary-specific, in-depth knowledge (see Lattanzi 1998) They propose three mindsets (habits of the mind) that would bring disparate disciplines and actors together: knowledge about boundary objects, knowledge creation communities, and metacognitive skills that foster reflective community. First, knowledge exchange requires hosts (researchers, journals, bureaucracies, standards, stakeholders/stakesharers) (see Torkar and McGregor (2012) for discussion of stakesharers). These hosts are called *boundary objects*, features that cluster at the edges of borders, with the potential to connect ideas across people. They can impede and expedite transdisciplinary learning.

Second, transdisciplinary learners need to have a commitment to the collective creation, expansion and building of knowledge through knowledge creation communities. Third, TD learners must be able to “think about and monitor their thinking” (metacognition skills) because this habit of the mind supports the aforementioned reflective knowledge creation community. They must be skilled at reflecting on the data, concepts and real world items, on the activities of the problem solving system/community, and on their modes of participation and inquiry (Derry and Fischer 2005). Transdisciplinary mind habits help inform transdisciplinary learning.

4.3 *Transdisciplinary Learning*

“Transdisciplinary learning is important” (Stahl et al. 2011, p. 497), and central to a responsible living curriculum. Transdisciplinary learning draws together concepts, theories and approaches from parent disciplines, and from stakeholder’s knowledge systems and lived experiences, and then *transforms* these into new knowledge, possible because boundaries have been broken down or transcended. TD learning is driven by the need for new knowledge creation to address complex problems of humanity (Park and Son 2010).

Transdisciplinary learning opportunities help people gain better understandings of how their perspectives, knowledge, and values contribute to solving the problems. In particular, if opportunities are provided for altering the perspectives, knowledge and values that are being examined, iterative learning is possible,

leading to appreciations of how each actor's *position* on an issue can change as other's positions are brought to bear. As well, what they *know* can remain the same, but be viewed differently as different actors' perspectives are brought to bear (Stahl et al. 2011). Also, embedded disciplines and stakeholders' knowledge systems will come into play as needed or desired throughout the transdisciplinary learning process.

TD learning requires opening one's mind to an array of competing perspectives on how to solve problems (even on what constitutes a problem). The TD approach is all about merging divergent perspectives to problem solve (McGregor 2011b). This inherent crossing back and forth, in and out, over and under each other's perspectives and positions opens 'newer learning' because it opens important questions about thinking and gives learners permission to question. Transdisciplinary learning helps people see problems in even more than three-dimensional depth because it mimics the complexity of the problems people experience in the real world (Davies 2009). People "creatively move into, through, across [and beyond] disciplines in order to *open meaning* rather than be pinned down by [disciplinary] facts" (Davies 2009, p. 2, emphasis added). Iterative, interactive transdisciplinary learning necessitates a transdisciplinary approach to learning.

4.4 Transdisciplinary Learning Approach

While the concept of transdisciplinary learning pertains to an iterative learning process, a transdisciplinary learning *approach* refers to a three-step learning cycle and to four pillars of education (see Delros 1999). Müller et al. (2005) envisioned a transdisciplinary learning approach to help people from different disciplines and sectors work together to establish a common orientation to the issue at hand. (a) Each participant would articulate his or her position (including any limitations) and (b) all participants would accept the superiority of a common learning approach over disciplinary stances stemming from arbitrary, artificial boundaries. The latter involves all participants engaging in both an integrating and a service role, leading to the convergence of mindsets into agreed-to, new transdisciplinary knowledge.

Müller et al.'s (2005) transdisciplinary approach to learning involves a learning cycle with three steps, with learning occurring through continuous, iterative interactions between internal interpretations and external actions. The three learning steps are as follows. First, each participant comes to the table with his or her own purpose, concepts, knowledge and interpretations of the world. Second, informed by their internal perspectives, each participant poses actions, which have a series of expected and unexpected effects. Third, these actions and consequences are observed and described by each participant, leading to a convergence of viewpoints inspiring the creation of new knowledge, ideas and concepts. Each participant's interpretation of these shared data (including boundary judgements), their view of the problem, their chosen approach and possible solutions might

shift, which could lead to new ideas and concepts (Müller et al. 2005), and the TD learning cycle continues.

Müller et al. (2005) suggest that this TD learning approach can best be represented using a spiral to illustrate that the cycle has no beginning nor defined end: one could start with interpreted knowledge, take action based on this knowledge, observe the consequences and interpret the results to get new knowledge, leading to another set of actions, which are observed and interpreted, and so on. They also describe the learning cycle this way: “the creative step [action] is a translation from the internal world of thoughts and feelings to the external world of forms; the descriptive step [observe] is a translation from the external world to the internal world; and the normative step [interpretive] is a translation from information to purpose [leading to the next act]” (p. 200). This TD learning cycle respects Schmitt’s (2007) call for transdisciplinary learning wherein people can “effectively communicate across disciplines and sectors, value other’s expertise and knowledge, establish necessary relationships, ask important questions, integrate shared learning, and grow in self-confidence while successfully working [and learning] with others” (p. 1).

4.5 *Four Pillars of Education*

The transdisciplinary learning approach involves a process wherein knowledge, attitudes, skills, concepts, and values transcend and are focused on issues across, between and beyond single subject areas (the meaning of *trans*). The goal of such learning is to understand the present world so that changes can be made to ensure the future, taking into consideration human commonalities (Nicolescu 2002; Renatica Learning Wiki 2011). TD learning experiences that help people to look *beyond* consumption and other unsustainable, uncaring human actions must reorient learners to what it *means to learn*. This reorientation entails moving beyond learning facts and information to learning how to know, to do, to be with, and to be (the four pillars of education) (Delors 1999; Nicolescu 1997). As a caveat, although these pillars may sound very familiar, those advocating for the integration of transdisciplinary thinking into responsible living curricula must define them very differently than they are conventionally understood, see next.

Very briefly, *learning to know* refers to training in permanent questioning of assumptions and in building bridges leading to continually connected beings. *Learning to do* certainly refers to acquiring a profession, but doing so within a profession that authentically weaves together several competencies at the same time as creating a flexible, inner, personal core. The latter refers to always being an apprentice of creativity and of creating one’s potential (Delors 1999; Nicolescu 1997). *Learning to be with others* means that not only do people learn to respect others but they learn a new attitude that permits them to defend their own convictions. This new attitude makes a space for both open unity and complex plurality—they do not have to be in opposition to each other. Finally, *learning to*

be does not mean the same thing as existing. It means people discover how they have been conditioned, determining if there is any tension between their inner self and their social life, and testing the foundations of their convictions and to question—always question. People have to continually ask themselves “Where am I?”, because things change and move and so do people (Delros 1999; Nicolescu 1997).

Nicolescu (1997) proposes that these four pillars form the foundation of TD knowledge. Of relevance to this chapter, Marinova and McGrath (2004) envision these four pillars as fundamental to a transdisciplinary pedagogy for responsible living. They form an intricate part of helping students value their role as a consumer citizen who is responsible for themselves, each other and the planet.

5 Summary and Conclusion

A responsible living curriculum strives to help students deal with change, take advantage of opportunities to be proactive in their lives, develop a conscience, and engage in ethical, defensible life choices (Thuente 1993). Enriching responsible living curriculum with transdisciplinarity would help students become deeply aware of their connectedness with others and of the necessity of being able to communicate through tensions and contradictions. It is a challenge to make responsible decisions if one cannot deal with the conflict and complications inherent in daily choices. From a transdisciplinary perspective, mutual and common interests would trump self-interests, something that is more ensured when students gain TD habits of minds and can co-create TD knowledge through TD learning cycles and iterative TD learning processes. Educators wishing to consider a transdisciplinary orientation in their responsible living pedagogy can gain much from the synergy evident among the four large ideas presented in this chapter (see Fig. 1).

By way of a summary, transdisciplinary engagement with others involves focusing on complex, messy problems facing humanity with the possibility, the hope, of innovative solutions emerging from the integration of divergent perspectives. Transdisciplinary work entails seeing patterns, using one’s imagination, being able to explain abstractions, creating multi-dimensional models, playing with intellectual ideas, and pulling the results together to generate solutions (i.e., transformative mind habits). TD mind habits is a powerful pedagogical idea, made even stronger when used in conjunction with boundary objects to create links, bridges or modes of transcending borders so people can connect in reflective, knowledge generating communities, operating at the borders between disparate worlds. Add to this the power of iterative learning and we get the convergence of a myriad of perspectives made possible from opening minds and fostering newer learning (all thanks to always questioning, being creative and accepting plurality, the tenets of responsible living).

Delivering a responsible living curriculum is further enriched by perceiving learners as coming to school as they *are*, so they can learn to know themselves

and figure out *where they are* at any given moment in time, as well as who they can *become* (better ensured through the TD learning approach, augmented with the four pillars of education, which are believed to be the foundations of transdisciplinary pedagogy). Finally, educators can help students *move beyond irresponsible living choices* if they envision learning as a cycle with people moving through three stages: using their internal interpretations of an issue to meet with and take action with others, the results of which are observed and interpreted by everyone, leading to more interpretation, action, observations and so on. This iterative, transdisciplinary learning never stops, is always done in a reflective community, and the knowledge generated is owned by everyone (embodied). The inherent result is more responsible living; that is, being able to respond to life and act accordingly in concert with fellow citizens.

In conclusion, educators who choose to support responsible living curricula by using a transdisciplinary-informed approach will find powerful pedagogical tools. Such tools are necessary because educators are charged with preparing students to deal with ever more complex global challenges; there is no room for error, no room left for irresponsible life choices. Educators need an approach which respects that globalization of the world requires students come to terms with the contradictions, tensions and, yes, opportunities they will encounter as they strive to live responsibly and responsively on the planet (Mimoun-Sorel 2010). Transdisciplinarity offers that hope; it views “human learning as art,...as a creative informative, formative, transformative endless learning process contributing to enrich and heal our bodies, minds and spirits” (De Mello 2001, p. 2). Transdisciplinary curriculum enrichment ensures responsible living.

6 Recommendations

To make sure that architects of responsible living curricula feel comfortable when drawing on the four-dimensional transdisciplinary orientation shared in this paper (see Fig. 1), shaped by Nicolescuian transdisciplinarity, several recommendations are shared:

- To bring transdisciplinarity to responsible living curriculum, educators and curriculum planners must become more familiar with the very new idea of transdisciplinarity. The brief overview provided in this chapter drew on Basarab Nicolescu’s methodological approach (three philosophical axioms of knowledge creation). But, there is another approach that educators might wish to peruse, that of the Zurich school. The latter views transdisciplinarity as a *new type of research*, called Mode 2 research, informed by the post-normal science perspective (Gibbons et al. 1994; Nowotny 2003). Both approaches are leagues beyond the conventional mono, multi and inter-disciplinary approaches that have long informed curriculum development. This chapter happened to favour Nicolescu’s approach because it focuses on the co-creation of new knowledge amongst

diverse actors and it honours the four pillars of education, believed to be fundamental to a transdisciplinary pedagogy for responsible living.

- As common as the term may be, it was a challenge to find good information about what constitutes a responsible living curriculum. Many people use the term, but do not define it. It is recommended that when designing responsible living curricula, architects take the time to clearly explain how they are defining the term. With more and more of these articulations, a richer body of knowledge can emerge around ‘what is’ responsible living curriculum. A necessary consensus could emerge, enriching TD curriculum initiatives.
- This chapter pulled together four aspects of transdisciplinary pedagogy that are not normally woven together (indeed, transdisciplinary pedagogy is a relatively new term itself); instead, they were found in the literature as stand-alone topics: transdisciplinary learning, TD learning process, TD habits of minds, and TD knowledge. They were presented here as a four-dimensional framework from which to anchor curriculum development for living responsibly, and for doing so through a transdisciplinary lens. Educators must commit to delving deeper into these four aspects of transdisciplinary curriculum. Readers are encouraged to read the entries in the reference list accompanying this chapter, since only a cursory overview was possible in such a short chapter format.
- Bringing a transdisciplinary orientation to curricula focused on responsible living will require educators to embrace and learn a powerful collection of student-centered, authentic and engaging pedagogies: holistic learning, integrative curriculum, thematic learning, inquiry-based learning, issues-based inquiry, democratic classrooms, teaching controversial and sensitive issues, and problem posing, problematization and solving. Teachers must teach values clarification, the values analysis process, values reasoning, and critical as well as creative, divergent thinking. These pedagogies privilege learners, with teachers as facilitators and coaches. Students *learn to learn*, for their *whole* life, so they can assume responsibility for their life decisions.
- As with any new approach to developing curriculum, educators and planners must be open to new ways to approach the contributory role of subject areas, learning domains, learners’ characteristics, learners themselves, and the degree of desired knowledge integration. As well, attention must be paid to relevant pedagogies and attendant teaching and instructional strategies (see above) so that teachers are open to altering their role and privileging learners. The learning environments must also take on special meaning, as must links with the wider community and world (including governments, businesses and local communities) (see Hartley 1997).
- Finally, a *transdisciplinary* orientation to curricula for responsible living requires educators and curriculum planners to gain a deep(er) respect for integrating multiple perspectives, embodied thinking, complexity, cross-fertilization, iterative processes, and spiral and cyclical principles. They must appreciate there are many different realities that compete with, yet complete, each other, and that there are various logics that can be employed when responsibly posing and solving complex problems. Educators need to appreciate that knowledge is

emergent, arising from complex interactions amongst diverse actors with competing agendas, yet all focused on living responsibly with the earth and with each other, well into the future.

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