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Meta-Transformative Learning Theory: A Synthesis of Transformative and Other Learning Theories into a Holistic Model

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Abstract

Researchers continue to revise Transformative Learning (TL) theory based on new ideas and trends in education to strengthen its practice (Taylor & Cranton, 2013). Some proposed explanations of TL capture the more integrative and holistic aspects of the theory, even calling it a metatheory (Hoggan, 2016). On the other hand, non-TL integrative learning theories have been developed that lack an explicit connection to TL (e.g., Tokuhama-Espinosa & Borja, 2023). This paper integrates both TL and non-TL learning theories to form an overall model of learning. Through a cursory examination of themes across common learning theories, we propose a Meta-Transformative Learning Theory (MTLT) that places TL as a macro-level objective following micro-level objectives present in previous non-TL learning theories. Our MTLT model can be used to support research and practice in any educational setting. A case example from sustainability education is provided to demonstrate the model's practical applications.

Keywords: Transformative Learning, Transformative Education, Learning Theories, Sustainability Education

Background & Purpose

Educators have sought explanations and frameworks to explain how learners come to obtain, understand, and apply new concepts and perspectives. These understandings can then guide the improvement of teaching and learning towards educative goals in various contexts – formal and informal settings, K–12 and post-secondary education, liberal arts and technical disciplines, and both school and workplace environments. This exploration has led to a complex constellation of intertwined learning theories that are often studied or applied in isolation. For example, transformative learning (TL) theories are most often used in the context of adult education (Kokkos, 2022), while Vygotsky's (1997) theory of cognitive development emerged by studying children.

Since its inception in the late 1970s, scholars have continued to revise transformative learning (TL) theory based on new data, ideas, and trends in education in an effort to improve practice and further research (Taylor & Cranton, 2013). Explanations of TL that seek to capture the more integrative and holistic aspects of this type of learning are starting to emerge. For instance, Hoggan's (2016) metatheory classifies diverse TL theories by their objects of change: worldviews, self, epistemology, ontology, behavior, or capacity. Similarly, by focusing on collective transformation,

Buechner et al. (2020) proposed we view individual or collective human experience and interconnected actions through mind, brain, culture, and systems. Illeris (2004) argued for a different, holistic model that includes cognition, emotion, and environment as essential learning dimensions in which learning processes occur.

Outside the TL community, several authors have proposed integrative learning theories to try to explain learning more holistically without invoking TL theory. For example, Tokuhama-Espinosa and Borja (2023) identified eight neural pathways used during teaching and learning: memory, executive functions, attention, social cognition, relationships, self-esteem, and motivation. Schneider et al. (2022) developed a model of learning that includes social cues, sensory memory, working memory, long-term memory, social processes, motivation, emotion, and metacognition processes. In this paper, we expand upon these types of holistic theories by seeking to integrate TL and non-TL learning theories to develop a new theory and model of learning. The goal was both an expansion of TL beyond adult education applications and an introduction of TL into non-TL learning theories. The work was inspired by Hoggan's metatheory of TL but extends it by integrating non-TL learning theories into a new model. Our goal was to find a parsimonious placement of TL amongst other learning theories in service to understanding overall learning processes. We entered this work rooted in Mezirow's definition of TL as "the process by which we transform our taken-for-granted frames of reference…to make them more inclusive, discriminating, open, emotionally capable of change, and reflective [to] generate beliefs and opinions that will prove more true or justified to guide action" (Mezirow, 2000). As this definition suggests, and as recognized by others (Barker, 2020; Buechner et al., 2020; Hoggan, 2016), TL is a holistic process that actively engages learners beyond the cognitive domain.

By analyzing 65 general learning theory articles and 22 TL-related theory articles, 5 core domains of learning emerged: neurophysiological, cognitive, affective-motivational, identity, and socio-behavioral. We provide an overview of the selected learning theories, the theory development processes that were utilized, our Meta-Transformative Learning Theory (MTLT) that emerged, and how this proposed model may be used to support course development. Based on these findings, we offer the following expanded definition for TL: *Meta-Transformative Learning refers to processes that result in depth, breadth, and stability changes to a person's neurophysiological, cognitive, affective-motivational, identity, and socio-behavioral domains*. We hypothesize sustainability education examples to give a practical context to the MTLT model and this definition.

Three major findings emerged from this project: 1) Human learning can be classified across five domains, happening in context with multi-sensory inputs, 2) TL can be an integral part of all learning theories, not studied or applied in isolation from them, and 3) TL can be conceived of as occurring at the macro-level for each of the learning domains. A metatheory of learning, such as the one we developed, can be utilized to guide faculty and other instructional communities of learning and practice. There are limitations to our findings. Given our results, a more formal literature review process following the PRISMA method (Page et al., 2021) is warranted and should include more stringent and cross-cut coding during content analysis to see if the MTLT still emerges. Future research should include carrying out empirical data collection on the application of this model to faculty development, curricular design, and even informal educational or mental health services.

Methods

To begin to fill the gap in the literature that exists between TL and non-TL learning theories, we first sought to identify holistic articles to examine for this pilot project. Major learning theories were identified by conducting a search using the ProQuest-Education database with the following criteria:

- Keyword: "learning theory"; full-text; peer reviewed
- Source Type: scholarly journals
- Dates: 01/01/2018 to 09/30/2023
- Document Type: articles
- Subject: literature reviews
- Language: English

Out of the 38,199 that initially appeared using the keyword alone, 133 articles met the additional search criteria. From these articles, 132 different learning theories were identified, which were then organized into seven major categories of learning (Kyle, 2015) with variations on their naming shown below:

- *Neuroscience Learning Theories*: Neuroscience and Neuro-Education
- *Affective-Motivational Learning Theories*: Affective Learning Theories, Motivational Learning Theories, and Social Emotional Learning Theories
- *Cognitive Learning Theories*: Cognitive Psychology, Educational Psychology, Cognitive Architectures, Constructivism
- *Behavioral-Experiential Learning Theories*: Behaviorism and Experiential Learning Theories
- *Identity-Humanistic Learning Theories*: Personality Type Learning Theories, Identity Learning Theories, and Humanism
- *Sociocultural Theories*: Connectivism, Situated Learning Theories, Critical Learning Theories, Social Constructivism, Social Learning Theories, and Social-Cultural Learning Theories
- *Transformative Learning Theories*: Transformative Learning Theories and Transformative Learning Assessments

Because our goal was to identify learning theories that have moved into the realm of common usage, and those that could be explained to a more general audience, showing their parsimony in describing the complex topic of learning, we used Google Scholar to search for representatives of these seven major categories of learning theories. The criteria used to select articles were:

- published between the years 2000 and 2023
- addressed one or more of the seven learning theory categories listed above in the title and/or abstract
- provided a summary of the learning theory as a figure, table, list, or paragraph
- scholarly article
- full text available
- found within the first 200 articles of the search results.

Of the 4,400 resultant articles, 87 met all criteria, leading to at least 5 representative articles for each of the seven major learning theory categories. These 87 articles included cognitivism, constructivism, behaviorism, experiential, and humanistic models (e.g., Foxall, 2007; Juvova et al., 2015; Khatib et al., 2013; Morris, 2020) as well as more contemporary models focusing on areas such as neuroscience, affective-motivational, identity development, and social-cultural learning (e.g., Ashforth & Schinoff, 2016; Cortese et al., 2019; Kendal et al., 2018; Mega et al., 2014). This approach gave us a broad sampling of learning theories on which to build our initial MTLT model. The resultant articles were examined using document analysis procedures. First, we listed and classified all learning concepts found in the 87 articles into one or more of the 7 categories described above. Some articles contained learning concepts that could be placed into categories other than their primary classification. For instance, Khatib et al. (2013) describe a humanistic learning model that includes learning concepts that can be placed in both the Cognitive and Affective-Motivational categories. Because of this, common learning concepts within each of the seven categories were clustered together. Next, through an iterative process we examined these groupings of learning concepts for each of the seven categories resulting in the MTLT presented below. A more systematic review of the literature on learning theories, using one or more scholarly databases and full qualitative thematic coding, should be conducted to compare to the initial findings of this pilot project.

Results: A Meta-Transformative Learning Theory (MTLT)

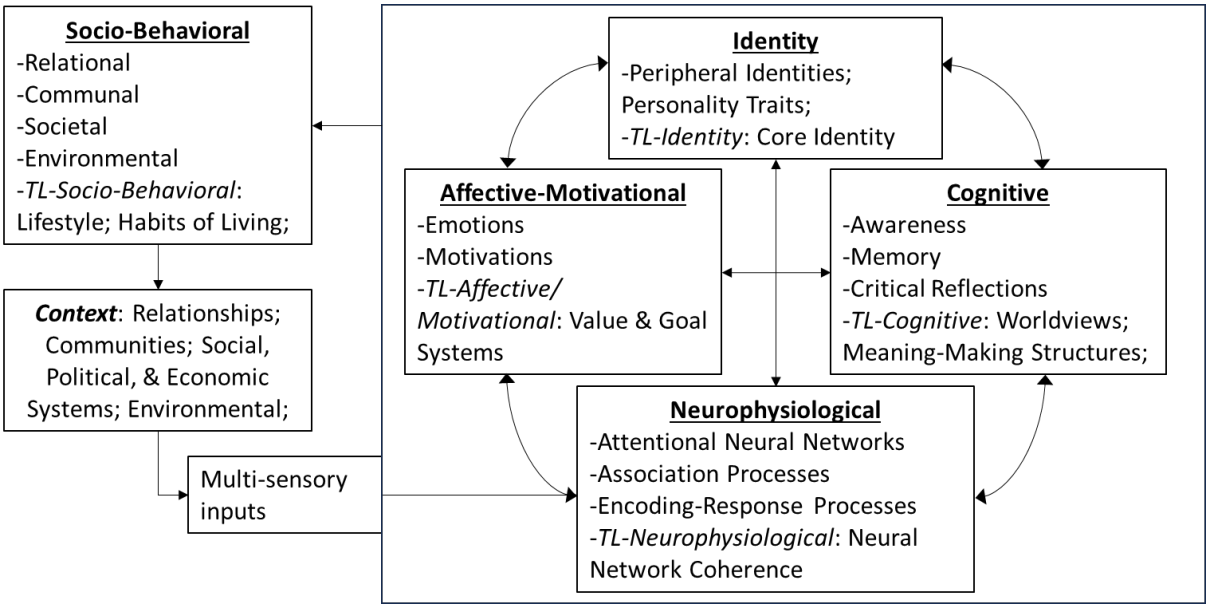

Figure 1: Proposed Meta-Transformative Learning Theory Model Encompassing Five Domains of Learning, Context, and Multi-Sensory Inputs

Our proposed MTLT (Figure 1) is comprised of neurophysiological, affective-motivational, cognitive, identity, and socio-behavioral domains of learning. These domains directly align with the seven previous categories identified in the literature as described above, with the exception of the Sociocultural and Behavioral-Experiential theories being combined into the socio-behavioral domain of the model. The MTLT model is composed of four interconnected domains that are situated within the individual. The model then captures the actions of the individual in the socio-behavioral domain, which impacts their local context. This context, in turn, influences the individual through their multi-sensory inputs (e.g., sight, sound, etc.) leading to the activation of neural networks. The context is not considered as one of the domains for this model as it is intended to represent external influences that impact each domain. The socio-behavioral domain, however, captures those actions that an individual takes within their context.

Overall, this model highlights the contexts in which TL occurs as well as how individuals can impact and be affected by these contexts (e.g., relationships, communities, socially, politically). As discussed in each of the sections below, the MTLT model places TL within each of these major learning domains rather than being separate from them. This model can therefore help us to clarify in which domain(s) specific TL theorists and practitioners are working. For instance, Taylor (2001), in his work on neurobiology and emotions, could be considered as working in both the affective-motivational and neurophysiological; Illeris (2014) in the identity domain; Mezirow (2000) has clear alignment with the cognitive domain; and the Barker's (2020) highest level of the Transformative Learning Maturity Model is focused on the socio-behavioral domain. The MTLT helps classify and clarify the broad work that is being done in the field of TL.

Locating TL within each of these domains provides greater clarity on the nature of TL and learning in general. Using the MTLT, we assert that TL is primarily concerned with significant changes that occur at a macro-level for each of these domains. For instance, changes in a learner's value and goal systems will be dependent upon and emergent from changes to specific emotions and motivations that they have. Similarly, shifts in a learner's worldviews and meaning-making structures will correspond to changes in specific beliefs and critical reflection processes. Illeris (2014) has already asserted that changes to one's core or central identity are intricately linked with one's contextual identities (e.g., work identity, family identity). Based on the MTLT, we can therefore posit TL as an emergent, macro-level phenomena for each of these domains.

In the sections that follow, we present the core attributes of each domain and how TL occurs at a macro-level for each of them. To help explain the model and domains, we then hypothesize its application in college-level environmental and sustainability education.

Neurophysiological Domain

For several decades now, neuroscience has been increasingly providing physiological insights into learning processes resulting in a growing field of neuro-education. The neurophysiological domain captures some of the primary neural processes that have been correlated with learning and transformation. In particular, attentional neural networks, associational processes, and encoding-response networks were highlighted in the literature reviewed for this article. For instance, Ramsey et al. (2021) provide insights into neural processes from sensory inputs to encoded memories, seeking to relate these to cognitive processes. Tokuhama-Espinosa (2008) summarizes some of the key principles of mind-brain education, which include emphasizing that the biological brain processes and makes associations among parts and wholes simultaneously. Cortese et al. (2019) explore some of the processes by which different neural networks across the brain work together to represent stimuli through feature selection and reduction processes, providing insights into how the brain processes information from low to high abstraction. TL practitioners need to be aware of these micro-level neural processes because they underly all processes of learning.

Taylor (2001), as mentioned above, has explored connections of TL with neurobiological functions, particularly as they relate to emotional regulation and processes. Taylor works to relate implicit memories, and their neurobiological underpinnings, with perspective transformations and asserts that such transformations are related to changes in meaning structures that lie outside of one's awareness. In support of this, Taylor notes several examples where perspective shifts, verbal processing, and automaticity may lie beyond conscious awareness and rationality. Taylor goes on to argue that emotions and rationality are likely very interdependent on one another. In the neurophysiological domain, such interdependence can be conceived as neural coordination across meta-structures of the biological brain that are simultaneously involved in critical reflection, emotional regulation, processing sensory input, and other functions. The MTLT therefore conceptualizes TL-neurophysiology as a coherence among various macro-level structures of the biological brain.

Affective-Motivational Domain

Educational theorists from diverse areas of research assert the importance of considering the affective aspects of learning. Song et al. (2021), for instance, stress the importance of the affective domain for long-term impact of learning. Ryan and Deci (2020) provide a model of internalization stages from extrinsic to intrinsic motivation, while Mega et al. (2014) provide an empirical model relating emotions, motivations, and self-regulated learning with academic achievement. Dweck (2017) seeks to connect goal theories with needs and representations that people construct as part of the learning processes. Finch et al. (2015) extend this work by linking experiential learning to emotional responses and regulation. These and many other authors assert the important roles of emotions and motivations in micro-level learning processes.

In the field of TL, authors like Taylor have argued for the centrality of the affective-motivational domain in TL processes. Dirkx et al. (2006) highlight the need for dealing with anxieties when enacting new beliefs in one's life. Wiley et al. (2021) go further by working to align the Beliefs, Events, and Values Inventory (BEVI) with a topology developed by Hoggan (2016). This inventory provides more extensive insights into some of the affective-motivational dynamics that might underlie TL's macro-level processes. Among the affective-motivational elements included in this inventory are "deep care/sensitivity for self, others, and the larger world," "cares for human experience/condition," "concern for less fortunate," and "emotional, sensitive, social, needy, affiliative; values the expression of affect; close connections with family." As these inventory elements help to illustrate, TL can be conceived at a macro-level for this affective-motivational domain, where value and goal systems emerge from collections of emotions and motivations. As a result, the MTLT provides insights into the integral relationship that affect and motivation have on TL's macro-level processes.

Cognitive Domain

Consideration of the cognitive aspects of TL has been central from the theory's inception (Mezirow, 2000). Of course, this domain is also central for other learning theories, which have emphasized the centrality of awareness, memory systems, and critical thinking. For instance, Doolittle (2014) presents models of complex and radical constructivism that illustrate how cognitive schema impact and are impacted by assimilation and disequilibrium processes. Çeliköz et al. (2019) present the Information Processing Model, providing insights into some of the relationships between attention, encoding and remembering processes, and various memory systems. Zhang and Soergel (2014) develop a model of sensemaking that highlights the centrality of various types of processing that are involved in acquiring knowledge to make better sense of our world. These and many other cognitive learning theories therefore provide more detailed insights into how micro-level learning impacts and is affected by this domain.

In TL processes, Patterson and Munoz (2015) use grounded theory research approaches to "track shifts in student understanding, analytic skills, ethical reflection, and personal as well as communal awareness" (p. 318), thereby emphasizing some of the macro-cognitive processes and impacts. In the process of developing the Transformative Learning Environments Survey (TLES), Walker (2018) depicts TL along four different approaches, one of which is the cognitive-rational approach. Similarly, Akenson et al. (2022) seek to discover common ground among transformative, civic, and leadership frameworks and highlight "awareness, critical reflexivity, engaged inquiry, [and] shift in perspective" as being central. As these TL theories highlight, the cognitive domain is a central part of TL's macro-level processes. Just as was asserted with the previous domains, it can be argued that the kinds of TL shifts that occur for this domain happen at a macro-level, impacting individual's worldviews and meaning-making structures in addition to their specific micro-level beliefs, memory systems, critical reflection processes, etc.

Identity Domain

The identity domain has also been central for some TL theorists, focusing on such concepts as identity (Illeris, 2014), self (Hoggan, 2016), reinterpreting one's biography (Nohl, 2015), and deeper self-awareness (Stuckey et al., 2013). In the broader field of education, the importance of considering students' various identities is also emphasized. For example, Dweck (2017) argues that self-coherence is an emergent need that lies at the center of other motivations that people have, guiding their actions, change, and growth. Others, such as humanistic educators like Khatib et al. (2013), argue that all people have desires to actualize their fuller potential and that learning about oneself is essential for education. Ashforth and Schinoff (2016) and Eteläpelto et al. (2013) provide detailed insights into some of the micro-level processes by which individual identities are shaped by organizational cultures, helping to clarify some of the adult learning processes that are implicitly present within these organizational cultures. Overall, these and other authors highlight the importance of the identity domain for learning processes.

As mentioned, this domain is a part of the body of TL knowledge. For example, this domain is central to the typology developed by Hoggan (2016) as one of the core categories, entitled *self*. Similarly, Tsimane and Downing (2020) list self-directedness and self-actualization as part of the essential TL processes. Illeris (2014) has done some of the most extensive work on this domain related to TL. In his work, Illeris conceptualizes our central identity as existing at the intersection of partial identities (e.g., work identity, family identity, political identity, etc.) that people have. Within that central identity, there is a core identity influenced by central preferences and personalities. Connecting this to Dweck's work, we might again conceive of TL-identity as an emergent macro-phenomenon within this domain. In other words, one's central identity or self, which exists at a macro-level and could be asserted to be the focus of TL for this domain, emerges from the various peripheral identities that we have. Based on education and TL literature, this domain is therefore considered to be an essential part of TL processes.

Socio-Behavioral Domain

In the field of education, sociocultural influences on learning and development are often cited as important aspects. In developing an expectancy value model, Eccles and Wigfield (2020) include such factors as cultural milieu, socializer's beliefs and behaviors, and social roles such as gender. Providing more details on social learning strategies, Kendal et al. (2018) categorize these strategies thereby providing greater insights into when people are more likely to copy others' behaviors. Similarly, Fox (2017) presents several models of social learning that include observation of other's behaviors as well as reinforcement from the community. Authors who are focused on situated cognition, such as Roth and Jornet (2013), help to clarify how learning and cognition are impacted by various contexts through embodiment. Slavin (2015) helps describe how some of these socio-behavioral dynamics are enacted in classrooms, highlighting the importance of social cohesion as part of these processes. Overall, these and other authors provide key insights into some of the ways that socio-behavioral dynamics influence learning and development at the micro-level.

Several TL authors assert sociocultural influences as well as behavioral actions as being integral for TL processes. For instance, Nohl (2015) identifies social testing and mirroring as well as social consolidation as part of the core phases of TL. In discussing TL at individual, group, and organizational levels, Henderson (2002) asserts that these levels are mutually integrated and must both be engaged in order for transformation to occur for each level. Finally, Barker (2020) works to develop a Transformative Learning Maturity Model by integrating insights from TL, global learning, and Indigenization theories. The highest level for this model involves embedded networks of collaborative learning as well as meeting decolonization and social outcomes. Barker's model, as well as the others, emphasizes the importance of sociocultural influences as well as taking action as an integral part of TL processes. As with the other domains, TL-socio-behavioral can be conceived of at a macro-level. For instance, at Barker's highest level, reaching the goals will require more than one-time actions and behavioral changes. Rather, those levels of change necessitate macro-transformations of one's lifestyle, social networks, etc.

Discussion

An Application of the MTLT: Education for Sustainability and the Environment

With these theoretical foundations in place, an example of how the MTLT can be applied to education is presented in this section. Environmental challenges are complex, interdisciplinary, and "wicked problems" tied to human behavior, political structures, and systemic injustice (IPCC, 2023). The application of TL to education for sustainability and the environment is a necessary foundation to work towards mitigation of environmental degradation (Lange & O'Neil, 2018). The following examples reveal how an educator might use the MTLT as a lens towards accomplishing TL outcomes in environmental education.

An environmental and sustainability educator seeking to impact their students' ecological identities through in- and out-of-class experiences could center their course design around the MTLT domain of identity. The educator in this scenario might be concerned with how their learners' affiliate or disaffiliate themselves with pro-nature others and how central their ecological identity is to their overall sense of self across contexts. They might ask how those ecological identities shift through the course learning activities.

The Ecological Identity Scale (Walton & Jones, 2018) could be employed as a pre-, post-test around course activities that help students reflect on where they see themselves in relation to ecological processes. Narrative learning could be employed where students take turns, in generative learning small groups, telling stories about childhood experiences in nature that impacted them. In each round, the listeners share with the storyteller what they hear about similarities to other stories and what is revealed about their nature connections (Peet, 2015). Guided nature walks, which enhance place-based learning, could be used as a context to discuss how students feel about being out in nature to help reveal how much they see themselves as a part of, or separate from, nature and ecological processes (Burns et al., 2022). Having a diversity of guest speakers or assigning interviews of local professionals with greater or less ecological identities could further help elicit students' reflections on

the centrality of their own ecological identities. Speakers, or potential interviewees, would need to comprise a diversity of types (racially, politically, socioeconomically) so that students can see ecological identities that supersede role-based identities in their own communities (Klimstra et al., 2023).

These proposed activities would provide opportunities for growth in both the micro- (part-identities, personality traits) and macro-levels (central-shifting ecological identity). Using the MTLT lens, the educator would also be considering the other four domains in their work.

Considering the neurophysiological domain, they might prime students with on-screen nature images and music during deep breathing and light stretching class-starters. And they could integrate concept mapping into student reflections on ecological identity to mimic how neural pathways work (Novak, 2010). In consideration of the affective-motivational domain, the educator could include *teaching for transformative experiences in science* methodologies, asking students to look for the ecology topics in their everyday lives and reflect on how it changed their perception and motivations (Pugh et al., 2017). From the cognitive domain, case studies that include characters with different ecological identities could be explored, and if these are setup as problem-posing instead of problem-solving cases (Santos et al., 2024), this could even reach to the macro-level during learner's rational reflections on their premises about those characters. Finally, the socio-behavioral domain would be considered in interview questions provided to students for their interview project or through a guest speaker. Some of these could be worded to help students notice individual and group sustainability behaviors through a cultural lens (Vigliano Relva & Jung, 2021). This could help bring students awareness and empowerment to examine what habits they have "inherited" that may be harmful to the earth or others, and then decide for themselves based on their own reflections, feelings, and reasoning what new lifestyle changes they want to strive for. Overall, by considering the micro- and macro-levels of learning across the five MTLT domains, educators can more effectively support students' holistic development in sustainability and other fields of study.

Implications: MTLT as a Metatheory

In his article *Transformative Learning as a Metatheory*, Hoggan (2016) defines a metatheory as "an overarching paradigm relative to a particular phenomenon or range of phenomena" (p. 63). Hoggan argues that TL should not be defined by one specific object of transformation (e.g., perspectives) but rather as an analytic metatheory that "seeks to provide categorizations of components that are common among all the underlying theories" (p. 63).

Our study built directly upon this approach to TL theorization. We extended Hoggan's (2016) assertions of TL as a metatheory by placing TL within the ecosystem of other common learning theories, expanding the definition of TL in the process. In contrast with Hoggan's typology, our MTLT places TL theory alongside other learning theories in the field of education, defining domains of learning across those major learning theories versus defining a metatheory of TL across the objects of transformation from the TL literature alone. Our MTLT also introduces the concepts of micro and macro elements of each domain. These expansions of Hoggan's meta-theory are further asserted to shift how we conceive of transformative learning as educators.

Throughout this paper, we have argued that TL can be conceived of as transformations that occur at a macro-level for each of the five domains of learning outlined above. Transformation is therefore an emergent phenomenon within each learning domain wherein, for instance, shifts in one's general worldviews (i.e., macro-level changes) are dependent upon and emergent from micro-level changes to clusters of specific beliefs that one has.

To further identify common components that characterize TL as a metatheory, Hoggan (2016) asserts three essential aspects of transformation that should be considered for learning outcomes, which we redefine for the MTLT as *breadth*, *depth*, and *stability*. For Hoggan, *depth* is the "degree to which it affects any particular type of outcome" (p. 71). As this relates to our MTLT, we would define depth as changes within a specific and single domain that correspond to changes to specific elements within that domain. For example, when assessing changes to one's value systems in the Affective-Motivational domain, within that domain one should note changes to specific motivations, emotional responses and regulation, etc. In other words, *depth* captures not just changes

at the macro-level for a specific domain but also corresponding changes at the micro-level to specific elements within that domain.

Breadth is defined by Hoggan (2016) as being "the number of contexts in which a change is manifest" (p. 71). In our model, we agree that context is important, but we have moved this to the stability criteria below. Instead, we assert that *breadth* refers to changes in one domain aligning with corresponding changes in another domain. For example, following the sustainability example in the previous section, if someone's identity shifts from being neutral about global warming to becoming an environmentalist, there will likely also be shifts in other domains, such as to their value systems (TL-Affective-Motivational), lifestyles (TL-Socio-Behavioral), and worldviews (TL-Cognitive). So, while *depth* is related to shifts that occur extensively *within* a single domain, *breadth* is associated with similar and corresponding shifts that happen *across* several domains in MTLT.

Hoggan (2016) then describes relative *stability* as an irreversible and permanent change that has transpired. Hoggan does, however, acknowledge that old habits will remain, and new shifts will occur, but he still asserts that transformation should endure. We seek to build on this assertion, as well as Hoggan's original description of breadth, by asserting that there are at least two aspects of *stability*: time and context. First, we argue that both *depth* and *breadth* transformations should endure across time. This can be assessed via longitudinal data for people participating in TL programs. For example, our emerging environmentalist should still self-identify in this way 6 months from now, a year from now, and 3 years from now, to have high *stability*. Secondly, we believe that *stability* should also be characterized by transformations that endure across several diverse contexts. Does this person self-identify as an environmentalist (and seek to embody its corresponding values, lifestyles, and worldviews) while they are at work, home, in their community, with their peers, and at school? Will this person continue to do so if they find themselves in an anti-environmentalist context? If these TL shifts endure across several diverse, and sometimes hostile contexts, as well as across time, then we assert that it meets this *stability* criteria.

Finally, seeking to further understand TL and learning, we used the holistic MTLT to redefine learning that is transformative. Hoggan (2016) defined TL as "processes that result in significant and irreversible changes in the way a person experiences, conceptualizes, and interacts with the world" (p. 71). Based on this definition and our research that led to the MTLT, we offer the following expanded definition: *Meta-Transformative Learning refers to processes that result in depth, breadth, and stability changes to a person's neurophysiological, cognitive, affective-motivational, identity, and socio-behavioral domains*. We believe that TL conceived in this way provides more detailed nuances and insights into the nature of transformative learning as a metatheory.

Conclusion

We presented a Meta-Transformative Learning Theory (MTLT) that integrated transformative learning (TL) theory amongst other learning theories, where both micro learning and macro transformative learning take place across five domains. Findings are based on literature review and standard research protocols but could be enhanced by a broader search of the literature, more comprehensive coding and thematic analysis, and inter-rater reliability examination. We offered examples of the MTLT's application in sustainability education to jumpstart its use in practical and transformative ways. More metatheory development and educational research is needed to further clarify the MTLT's macro-levels as well as the impact that it has in practice. As we have sought to expand upon Hoggan's approach to conceptualizing TL as a metatheory, we hope that others will

References

Akenson, A. B., Arce-Trigatti, A., & Akenson, J. E. (2022). Roots and growth: Threading the ethos of personal, social, and political transformation. *Journal of Transformative Education*, *20*(3), 241–260.

Ashforth, B. E., & Schinoff, B. S. (2016). Identity under construction: How individuals come to define themselves in organizations. *Annual Review of Organizational Psychology and Organizational Behavior*, *3*, 111–137.

Barker, T. (2020). Moving toward the centre: Transformative learning, global learning, and indigenization. *Journal of Transformative Learning*, *7*(1), 8–22.

Buechner, B., Dirkx, J., Konvisser, Z. D., Myers, D., & Peleg-Baker, T. (2020). From liminality to communitas: The collective dimensions of transformative learning. *Journal of Transformative Education*, *18*(2), 87–113.

Burns, H., Stoelting, N., Wilcox, J., & Krystiniak, C. (2022). One of the doors: Exploring contemplative practices for transformative sustainability education. In A. Nicolaides, S. Eschenbacher, P. T. Buergelt, Y. Gilpin-Jackson, M. Welch, & M. Misawa (Eds.), *The Palgrave handbook of learning for transformation* (pp. 129–146). Springer International Publishing. http://doi.org/10.1007/978-3-030-84694-7_8

Çeliköz, N., Erişen, Y., & Şahin, M. (2019). Cognitive learning theories with emphasis on latent learning, gestalt and information processing theories. *Journal of Educational and Instructional Studies in the World*, *9*(3), 18–33.

Cortese, A., De Martino, B., & Kawato, M. (2019). The neural and cognitive architecture for learning from a small sample. *Current Opinion in Neurobiology*, *55*, 133–141.

Dirkx, J. M., Mezirow, J., & Cranton, P. (2006). Musings and reflections on the meaning, context, and process of transformative learning: A dialogue between John M. Dirkx and Jack Mezirow. *Journal of Transformative Education*, *4*(2), 123–139.

Doolittle, P. E. (2014). Complex constructivism: A theoretical model of complexity and cognition. *International Journal of Teaching and Learning in Higher Education*, *26*(3), 485–498.

Dweck, C. S. (2017). From needs to goals and representations: Foundations for a unified theory of motivation, personality, and development. *Psychological Review*, *124*(6), 689–719.

Eccles, J. S., & Wigfield, A. (2020). From expectancy-value theory to situated expectancy-value theory: A developmental, social cognitive, and sociocultural perspective on motivation. *Contemporary Educational Psychology*, *61*.

Eteläpelto, A., Vähäsantanen, K., Hökkä, P., & Paloniemi, S. (2013). What is agency? Conceptualizing professional agency at work. *Educational Research Review*, *10*, 45–65.

Finch, D., Peacock, M., Lazdowski, D., & Hwang, M. (2015). Managing emotions: A case study exploring the relationship between experiential learning, emotions, and student performance. *The International Journal of Management Education*, *13*(1), 23–36.

Fox, B. (2017). It's nature and nurture: Integrating biology and genetics into the social learning theory of criminal behavior. *Journal of Criminal Justice*, *49*, 22–31.

Foxall, G. R. (2007). Intentional behaviorism. *Behavior and Philosophy*, *35*, 1–55.

Heddy, B. C., & Sinatra, G. M. (2013). Transforming misconceptions: Using transformative experience to promote positive affect and conceptual change in students learning about biological evolution. *Science Education*, *97*(5), 723–744.

Henderson, G. M. (2002). Transformative learning as a condition for transformational change in organizations. *Human Resource Development Review*, *1*(2), 186–214.

Hoggan, C. D. (2016). Transformative learning as a metatheory: Definition, criteria, and typology. *Adult Education Quarterly*, *66*(1), 57–75.

Illeris, K. (2004). Transformative learning in the perspective of a comprehensive learning theory. *Journal of Transformative Education*, *2*(2), 79–89.

Illeris, K. (2014). Transformative learning and identity. *Journal of Transformative Education*, *12*(2), 148–163.

Lee H., & Romero, J. (Eds.). (2023). *Climate change 2023: Synthesis report. Contribution of working groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. IPCC.

Juvova, A., Chudy, S., Neumeister, P., Plischke, J., & Kvintova, J. (2015). Reflection of constructivist theories in current educational practice. *Universal Journal of Educational Research, 3*(5), 345–349.

Kendal, R. L., Boogert, N. J., Rendell, L., Laland, K. N., Webster, M., & Jones, P. L. (2018). Social learning strategies: Bridge-building between fields. *Trends in Cognitive Science, 22*(7), 651–665.

Khatib, M., Sarem, S. N., & Hamidi, H. (2013). Humanistic education: Concerns, implications and applications. *Journal of Language Teaching and Research*, *4*(1), 45–51.

Klimstra, T. A., Archer, A., Reitz, A. K., Chung, J. M., & Engelen, B. (2023). There goes my hero: The role of exemplars in identity formation. *Human Development, 67*(3), 154–169. https://doi.org/10.1159/000531435

Kokkos, A. (2022). Could transformative learning involve youth? In A. Nicolaides, S. Eschenbacher, P. T. Buergelt, Y. Gilpin-Jackson, M. Welch, & M. Misawa (Eds.), *The Palgrave handbook of learning for transformation* (pp. 883–896). Springer International Publishing. https://doi.org/10.1007/978-3-030-84694-7_49

Kyle, E. (2015). *Spiritual being and becoming: Western Christian and modern scientific views of human nature for spiritual formation*. Pickwick Publications.

Lange, E., & O'Neil, J. (2018). Introduction to special issue on transformative sustainability education. *Journal of Transformative Education, 16*(4), 275–276. https://doi.org/10.1177/1541344618796997

Mega, C., Ronconi, L., & De Beni, R. (2014). What makes a good student? How emotions, self-regulated learning, and motivation contribute to academic achievement. *Journal of Educational Psychology*, *106*(1), 121–131.

Mezirow, J. (2000). Learning to think like an adult: Core concepts of transformation theory. In J. M. Associates (Eds.), *Learning as transformation: Critical perspectives on a theory in progress* (pp. 3-33). John Wiley & Sons.

Morris, T. H. (2020). Experiential learning: A systematic review and revision of Kolb's model. *Learning Environments*, *28*(8), 1064–1077.

Nohl, A. M. (2015). Typical phases of transformative learning: A practice-based model. *Adult Education Quarterly*, *65*(1), 35–49.

Novak, J. D. (2010). *Learning, creating, and using knowledge: Concept maps as facilitative tools in schools and corporations*. Routledge.

Page M. J., McKenzie J. E., Bossuyt P. M., Boutron I., Hoffmann T. C., Mulrow C. D., Shamseer, L., … Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ, 372*(71), 1–9. https://doi.org/10.1136/bmj.n71

Patterson, B. A. B., & Munoz, L. (2015). Transformative learning: A case for using grounded theory as an assessment analytic. *Teaching Theology & Religion*, *18*(4), 303–325.

Peet, M. R. (2015). Transforming students' beliefs: Developing employability skills and generative identities through the Integrative Knowledge Portfolio Process. *Journal of Transformative Learning*, 3(2), 15–36.

Pugh, K. J., Bergstrom, C. M., Heddy, B. C., & Krob, K. E. (2017). Supporting deep engagement: The Teaching for Transformative Experiences in Science (TTES) model. *The Journal of Experimental Education, 85*(4), 629–657.

Ramsey, R., Kaplan, D. M., & Cross, E. S. (2021). Watch and learn: The cognitive neuroscience of learning from others' actions. *Trends in Neuroscience, 44*(6), 478–491.

Roth, W.-M., & Jornet, A. (2013). Situated cognition. *WIREs Cognitive Science, 4*, 463–478.

Ryan, R. M., & Deci, E. L. (2020). Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions. *Contemporary Educational Psychology*, *61*.

Santos, C. J., Brunstein, J., & Walvoord, M. E. (2024). Introducing a problem-posing protocol to encourage management students' reflections on sustainability premises. *Journal of Management Education, 48*(5), 856–886. https://doi.org/10.1177/10525629241242051

Schneider, S., Beege, M., Nebel, S., Schnaubert, L., & Rey, G. D. (2022). The cognitive-affective-social theory of learning in digital environments (castle). *Educational Psychology Review, 34*, 1–38.

Slavin, R. E. (2015). Cooperative learning in elementary schools. *Education*, *43*(1), 5–14.
Song, M., Nix, V., & Levy, J. (2021). Assessing affective learning outcomes through a meaning-centered curriculum. *Association for the Assessment of Learning in Higher Education Conference Proceedings*.
Stuckey, H. L., Taylor, E. W., & Cranton, P. (2013). Developing a survey of transformative learning outcomes and processes based on theoretical principles. *Journal of Transformative Education*, *11*(4), 211–228.
Taylor, E. W. (2001). Transformative learning theory: A neurobiological perspective of the role of emotions and unconscious ways of knowing. *International Journal of Lifelong Education*, *3*, 218–236.
Taylor, E. W., & Cranton, P. (2013). A theory in progress?: Issues in transformative learning theory issues in transformative learning theory. *European Journal for Research on the Education and Learning of Adults*, *4*(1), 33–47.
Tokuhama-Espinosa, T., & Borja, C. (2023). Radical neuroconstructivism: A framework to combine the how and what of teaching and learning? *Frontiers in Education*, *8*.
Tokuhama-Espinosa, T. N. (2008). *The scientifically substantiated art of teaching: A study in the development of standards in the new academic field of neuroeducation*. Ann Arbor, MI.
Tsimane, T. A., & Downing, C. (2020). Transformative learning in nursing education: A concept analysis. *International Journal of Nursing Sciences*, *7*, 91–98.
Vigliano Relva, J., & Jung, J. (2021). Through the eyes of another: Using a narrative lens to navigate complex social-ecological systems and to embrace multiple ways of knowing. *Frontiers in Marine Science*, *8*. https://doi.org/10.3389/fmars.2021.678796
Vygotsky, L. S. (1997). *Educational Psychology*. St. Lucie Press.