JOURNAL OF TRANSFORMATIVE LEARNING
The Journal provides a forum for perspectives on the practice and application of transformative learning.
JoTL is an Open Access journal published by the University of Central Oklahoma at jotl.uco.edu.

Development and Validation of an Instrument for Assessing Transformative Learning: The Transformative Learning Environments Survey (TLES)

SCOTT L. WALKER
Northwest Vista College

Abstract

The purpose of this study was to develop and validate a new transformative learning survey instrument. The Transformative Learning Environments Survey (TLES) was developed using a three-stage approach and field tested with a population of 649 postsecondary students. The new validated instrument consists of 52 items allocated to four scales: (1) Disorienting Dilemma, (2) Self-Reflection, (3) Meaning Perspective and Critical Discourse, and (4) Acting. Each scale is subdivided into (a) students' apperception and (b) their perception of the learning environment for a total of 8 subscales. Each item had a minimal factor loading of 0.50 with its own scale. Cronbach's alpha coefficients ranged from 0.85 to 0.93. The TLES was used to explore bivariate correlations between its subscales and a scale of student satisfaction where the outcomes ranged from -0.29 to 0.49. The TLES is an instrument that can be utilized for efficient small- and large-scale quantitative investigation into transformative learning.

Keywords: Transformative learning, TLES, adult education

Introduction

In 1978, Jack Mezirow, a professor emeritus of adult education at Teachers College, Columbia University, introduced a new idea to the world of adult learning—he called it "perspective transformation" (p. 107). He went on to write that the prevailing model of adult education at the time involved conducting needs assessments and then designing a program of change in behavior in what he outlined as a very mechanical prescription. Conversely, he purported that perspective transformation involved adult learners becoming critically aware of their assumptions—both cultural and psychological—and reflecting upon how those assumptions influence how we view ourselves and the world around us. He coined this pattern "meaning perspectives" (p. 101). In Lewin's (1936) early seminal work in psychology, he developed the representative formula of $B=f(P,E)$, whereby B represents behavior, f is function, P is the person, and E is the person's environment was the longstanding and prevailing behavioral model of the time. However, in the

modern context of transformative learning, Mezirow's representative formula might read B=f(P_{ex}+N_{ex}), where B represents behavior, f is function, P_{ex} is a person's past experience, and N_{ex} is one's new experience. In this case, the formula reads that a meaning perspective of an adult student is a function of the "cultural assumptions within which new experience is assimilated to—and transformed by—one's past experience" (Mezirow, 1978, p. 101) that leads to a more meaningful, self-created change in behavior. This paper presents the steps in development of a new instrument designed to assess adult learner perspective transformation. I present an overview of transformative learning followed by survey instrument-based research in transformative learning, the stages of development of the new instrument, and the validity and reliability results of the new *Transformative Learning Environments Survey* (TLES), as well as the results of a first exploratory study applying the TLES.

Transformative Learning

"Transformative learning has arguably become one of the most generative and provocative ideas in adult learning" according to Dirkx (2012, p. 399). "Generative" in that the original theoretical basis has taken on an expanding life of its own, and "provocative" in that, as the premise has developed since the late 1970s, it has been criticized for encompassing too many aspects of too many learning ideas (Hoggan, 2016; Newman, 2012). Nonetheless, in 1978, Mezirow presented a new theoretical concept of perspective transformation and has consistently defined transformative learning since as "the process of effecting change in a *frame of reference*" (1997, p. 5), as have others (viz. Apte, 2009; Duerr, Zajonc, & Dana, 2003; Fetherston & Kelly, 2007; Morrice, 2012). Examining change in how one views the world is the foundation of this idea.

Mezirow (1997) went on to state that as adults we define our world through our frames of reference—our past experiences and how we comprehend those experiences—that is, our preconceptions of the world. The problem with this, in terms of formal learning, is that we tend to rebuff ideas that do not fit into our preconceived notions, and we label them as "unworthy of consideration—aberrations, nonsense, irrelevant, weird, or mistaken" (Mezirow, 1997, p. 5). When we create understanding solely within our own preconceived notions based on past experiences we can prevent new answers to new questions and challenges that ask us to do things differently (Apte, 2009). Or, as Glisczinski (2007) put it, what is predominantly apparent in higher education is that we breed a "richness of information and poverty of understanding" (p. 318) of the world in which we exist. Taylor (2008) purports a similar notion that in higher education there is often an importance placed on students completing tasks in lieu of reflective dialogue.

If we accept the notion that our adult understanding is created under the influence of the hegemony of socio-cultural constructs, beliefs, and suppositions that may not necessarily be in our best self-interest (Dirkx, 2012), then it behooves us to look toward altering our perspectives in order to make sense of the world and of ourselves through a shift in consciousness—a *transformation* as it were. The problem though, as it has presented itself in the generative literature related to transformative

learning, is that when we consider these ideas deeply and ponder how to effect these changes in our adult students, a variety of theories related to learning begin to come into play that are supportive of this general idea. Over time, transformative learning has come to mean several things at once (Hoggan, 2016): It is the (1) behavioral outcome of a perspective transformation, (2) a process of learning, and (3) an educational event, or series of events, aimed at fostering the learning experience that produces the desired outcome (Stevens-Long, Schapiro, & McClintock, 2012). Further, adding complexity to nuance, a number of differing concepts have been identified (Hoggan, 2016; Lange, 2015; Taylor, 2008). These overlapping concepts suggest that there is not one singular transformative learning, rather, as Taylor suggests, there are at least seven concepts. He goes on to outline literature supported views of transformative learning as psychoanalytic, psychodevelopmental, socio-emancipatory, neurobiological, race-centric, cultural-spiritual, and positional (2008). Likewise, Stevens-Long et al. (2012) outline transformative learning as four intersecting theoretical perspectives based on: a cognitive-rational approach, a depth psychology approach, a structural developmental approach, and a social emancipatory approach.

Whether one views transformative learning as single theory, seven conceptions, or four approaches, there is yet another set of categories investigators have deconstructed from the literature: (1) the *transformation* itself, (2) transformative *learning*, and (3) transformative *education* (Stevens-Long et al., 2012). Heddy and Pugh (2015) add (4) transformative *experience* which they define as a focus on small shifts in students' perspectives associated with learning in a given content area. Transformation, when viewed through these different theoretical lenses, appears to shift from the simply defined practice of modifying a frame of reference to a finer grained look at what that change is. Further, the process of learning (i.e. what students are processing/doing in their minds) and how that learning is established within a formal higher education environment (i.e. how instructors construct learning activities and the learning environment) comes into the picture. For instance, Stevens-Long et al. (2012), in their study of doctoral level education, developed the categories summarized in Table 1, where *T* is the transformation of the learner, *TL* is the learning process (student process), and *TE* is the education provided (instructor-developed activity).

Table 1 Transformation, Transformative Learning, and Transformative Education within Four Approaches

Cognitive-Rational approach T=shift in perspective of meaning TL=practice of cognitive dissonance, reflection on one's way of thinking, dialogue, and some action based on new ways of thinking TE=promoting critical reflection and discourse on prior experience/ways of thinking through intentional disorienting dilemmas
Depth Psychology approach T=Jungian-type individuation based on resolving personal predicaments and developing a consciousness of individual differentiation

TL=integration of innate discrimination of and openness to individual and collective unconsciousness TE=group or intrapersonal discourse with the subliminal aimed at the integration of affect, intuition, and imagination
Structural Development approach T=postformal thinking that involves epistemological shifts and more complex ways of knowing that are inclusive and integrative TL=confrontation with the limitations of prior thinking and exposure to more adequate forms of ways of knowing TE=provision of balance between challenge and affirmation through the engagement of relationships, interconnectedness, and interdependency
Social Emancipatory approach T=critical consciousness development or conscientization TL=expanding ones awareness of socio-cultural reality through action, reflection, and discourse TE=development of realization of hegemonic social tendencies, socio-cultural freedom, and understanding ways to take constructive action

Note: T=transformation, TL=transformative learning, TE=transformative education. Adopted from Stevens-Long et al., 2012.

Taylor's (2008) deconstruction of transformative learning into seven conceptions is framed somewhat like Stevens-Long et al. (2012). Nonetheless, Taylor establishes that in transformative education it is important to create opportunities for adult learners to learn both inside and outside of the classroom. Apte (2009) takes this idea further and confronts the notion that instructors who call themselves transformation educators often are trying to work their way through multifaceted processes of transformation themselves. Thus, in transformative learning perspectives, we have complex definitions, radical shifts in how higher education is conducted, and instructors who themselves must struggle with the conceptualization of the theory and development of a classroom environment that supports learning in terms of perspective transformation. What is evident here is that the notion of transformative learning is varied, complex, and fraught with a range of shades, variations, and subtleties, which can be difficult to pin down. Adding to this complexity are ways in which scholars investigate the varying aspects of transformative learning. The next section considers a perspective on the research that attempts to make clear the multifaceted vectors in this field.

Transformative Learning Research

Newman (2012) calls into question both the educational theory of transformative learning as well as the research associated with it. His premise is that, while researchers in the field have claimed more investigative sophistication since its onset, studies continue to be based predominantly on qualitative design. He stresses that qualitative research is mere storytelling, perhaps insightful, yet, just as much "invention" as "record" (p. 40). These stories, he suggests—to the consternation of

many, no doubt—are not reliable as research. King (2009), a veteran of adult education and research, inadvertently supports Newman by noting that in the past, as well as today, transformative learning research typically consists of "3-12 participants in in-depth qualitative studies" (p. xvi). Newman (2012) goes on to call into question quantitative survey instrument research too, due to the nature of self-reporting. He states that survey research "affirmations have no guaranteed validity" (p. 40). Nevertheless, research validity is never guaranteed absolute; it can only be demonstrated on a statistically-based scale of low validity to high validity, yet one must design investigations where validity can be measured to begin with. Romano's (2017) investigation of the only four empirical studies using quantitative instruments yielded none that produced validity and reliability results as they pertained to transformative learning as a theoretical concept.

Other scholars uphold the notion that transformative learning research has been predominately qualitative in nature as well, and examples of these studies proliferate. For instance, Snyder (2008, p. 160) reviewed 10 empirical "functional" transformative learning studies, all of which were qualitative. Morrice (2012, p. 257), taking a different qualitative approach, conducted a 4-year life history study of 10 refugees through 58 interviews. Smith, McAuliffe, and Rippard (2014) analyzed 17 reflection papers from master's and doctoral students who had participated in a study abroad program. Christie, Carey, Robertson, and Grainger (2015) report on an action research project involving 12 Papua, Indonesian teachers. A unique case study approach, with 28 interviews of post-trauma victims, was conducted by John (2016). Other such studies certainly exist, and the point here is not to present a meta analysis or synthesis of this aspect of transformative learning research, rather it is to place the present study in the context of the broader picture.

Further, others have conducted studies to include what are sometimes referred to as surveys, but more closely resemble open-ended questionnaires. For instance, Glisczinski (2008) incorporated Brookfield's (1995) *Critical Incident Questionnaire* (CIQ), a 5-question, open-ended questionnaire with 54 preservice teacher participants. He analyzed the responses through phenomenological thematic clustering to tease out emergent themes in the responses. Stevens-Long et al. (2012) utilized a questionnaire of their own design in their study of 59 doctoral students. However, they did not elaborate on how many questions the questionnaire consisted of or much about the questionnaire itself aside from the following: Through "intercoder review and consistency checking" they categorized the responses within a "pedagogy framework" of process, relationships, and content (p. 186). Meanwhile, others have developed mixed-method studies that triangulate questionnaire responses with interviews. Duerr, Zajonc, and Dana (2003) conducted one such study designed to "uncover programs based in accredited institutions in North America that focus explicitly on transformative learning" (p. 180). Respondents answered 32 questions related to demographics, spiritual principles and practices (presumably of the programs), and teaching and evaluation methods. They then followed with 14 interviews. Of note, they stated that their questionnaire should be considered exploratory, not "intended to be a definitive quantitative measure" (p. 181).

The above examples perpetuate Newman's (2012) accusation that transformative learning research is fundamentally qualitative in nature and also

supports King's (2009) assertion that most research in this field is likewise qualitative in nature and conducted with a low number of participants. In contrast, a handful of researchers have attempted to develop survey instruments to collect quantitative data as a beginning point for follow-up qualitative research. One such study was completed by Glisczinski (2007) whereby he modified a survey used by King (1997) in her doctoral dissertation research. This 9-item instrument considers 153 preservice teachers' (1) disorienting dilemmas (three items), (2) challenges to existing assumptions (four items), and (3) critical reflection-based behavior change (two items). Seven additional items collect participant demographics. He conducted basic descriptive analyses to determine that overlapping portions of this study population fit into four transformative learning quadrants of (1) Disorienting Experiences (73%), (2) Critical Reflection (43%), (3) Rational Dialogue (47%), and (4) Action (35%). Unfortunately, Glisczinski offers neither reliability nor validity analysis of the modified instrument.

King (2009) went on to refine the instrument she presented in her 1997 doctoral dissertation and named it the *Learning Activities Survey* (LAS). The LAS is designed to quantitatively preview students' perspective transformation and then be followed by interviews. This rather complex instrument contains 14 items, 7 of which gather respondent demographics. Two of the items are open-response designed for respondents to elaborate on the previous items, and one of the items is primarily instructional, i.e. "If 'Yes," please go to question #3…" (p. 20). One item actually contains two *yes/no* questions, while another contains three questions with essentially a set of *if/then* statements. Interestingly though, two of the items seek to gather information about the learning environment in which the learning took place rather than simply considering the participant's apperception. King fails to report reliability, although, she vaguely states, "the reliability question was addressed from a hermeneutical perspective" (p. 42). Instrument validity is not addressed.

Approaching transformative learning from a socio-cultural angle in a first-year undergraduate course in conflict resolution, Fetherston and Kelly (2007) developed a survey they administered to 82 students. Their research method was of a pre-/post-class design, mixed with 16 interviews, and demographic characteristics. While their discussion of their survey instrument is limited, they developed a unique set of clusters of the transformative learning experience. They identified students who are not "getting it" (Cluster 1), students who experience transitional challenges (Cluster 2), student who "get it" and change (Cluster 3), and students with transitional disruptions (Cluster 4). Like Glisczinski (2007), this study resulted in categorizations of students, or students' perceptions, based upon a framework of transformative learning.

Stuckey, Taylor, and Cranton (2013; see also Stuckey & Taylor, n.d.) have developed the *Transformative Learning Survey* (TLS) that measured 136 participants' responses. The generic study population of convenience from Canada, the United States, and "a wide variety of nationalities" (p. 218). Participants were asked to respond based on a major life event. The TLS has two parts: Part One-Learning Outcomes has two free-response items related to life-changing events, followed by items with a four-point response scale ranging from *mostly disagree* to *mostly agree*.

Part Two-Learning Process has the same response scale. In all, there are 20 scales with a total of 110 items. Stuckey et al. reported on their pilot study with Chronbach's alpha internal consistency reliability ranging from 0.52 to 0.90, with four scales falling below their acceptable values of 0.70 or greater. They also analyzed the scale-level data for interitem correlations using Spearman's *p* and cross-scale correlations using Pearson's *r*, however, they did not report the quantitative results of the interitem correlations and their cross-scale correlations vary radically from 0.27 to only 0.77. They outline revisions to their pilot instrument, but they do not address the reliability and validity results of those revisions.

Given the above general outline, what is apparent is that transformative learning research is primarily grounded in qualitative studies with some movement toward research design approaching the topic from a somewhat more quantitative perspective. Nevertheless, within qualitative educational research circles there is ongoing debate over reliability, validity, objectivity, and generalizability, rephrased in the postmodern era as credibility, dependability, confirmability, and transferability (Lincoln & Guba, 1985; Lub, 2015). According to Cho and Trent (2006), qualitative research can demonstrate greater credibility through design that includes transactional validity and transformational validity. None of the authors I read in my review of the literature made note of these validity design measures that would add credibility to the body of work. Thus, without attention to accurate reflections of reality (Cho & Trent, 2006), naysayers of qualitative research will continue to have fodder for their arguments.

Thus, placed in the broad field of transformative learning research, the present study was established grounded in the viewpoint that higher education instructors can design and reliably measure a classroom environment such that it promotes transformative learning in terms of Mezirow's initial definition of "effecting change in a *frame of reference*" (1997, p. 5). And, that, in order to do this, perspective transformation involves adult learners becoming critically aware of their cultural and psychological assumptions through disorienting dilemmas, discourse, and reflecting upon those assumptions before any internally motivated behavior change can take place (Apte, 2009; Fetherston & Kelly, 2007; Lotz-Sisitka, Wals, Kronlid, & McGarry, 2015; Stevens-Long et al., 2012).

Moreover, we have begun to hear a call for quantitative transformative learning research in the adult learning literature. For example, we find Brock calling for a broad-based survey instrument with which to investigate quantitative aspects of transformative learning (2015). Given that few quantitative instruments demonstrating substantial validity and reliability exist in the milieu of transformative learning research (Romano, 2017), and especially that none consider measuring the extent to which the post-secondary education classroom environment supports transformative learning, I have developed the *Transformative Learning Environments Survey* (TLES). Its purpose is to explore large numbers of students' apperceptions of their own transformation (if any), as well as the extent to which the classroom setting supports, or fails to support, students' shifts in their frames of reference in any post-secondary subject area. Hoggan (2016, p. 71) called for exploring "depth" of transformative outcomes, and it was Taylor (2008) who noted that it is just as important to investigate the reasons behind the lack of adult learner transformation as it is to study

transformation itself, regardless of the approach or conception. Furthermore, this new instrument directly considers students' views of their own internal experience with that of their view of the external classroom influence. To expand on this notion, we can consider the longstanding concept of environment *press* not found elsewhere in quantitative transformative learning research. Press, in this case, is the directional influence the environment has on one's behaviour. Press has a directional tendency with properties not obtainable by the sum of the parts of the learning environment (Fraser, 2012; Murray, 1938). With the TLES, both the *docile* and the *autonomous* press are considered, whereas press is labelled docile when it is regulated by the person and autonomous when regulated by the external environment. If we can measure the extent of the characteristics of large numbers of transformative learning environments—both the docile and the autonomous—it is potentially possible, based on the results of such measurement, to manipulate those environments in ways that promote transformation within that setting (Fraser, 2012; Murray, 1938; Nahemow & Lawton, 1973). If nothing else, we can establish a base from which to ask further questions using qualitative methods. Further yet, a new instrument of this nature can assist investigators in gaining insight on the *beta* press (a person's interpretation of the environment based upon his/her apperception), rather than just limited aspects of the alpha press (the actual press only as far as it can be determined by the limitations of an outside observer).

Qualitative observation, inquiry, ethnography, student and teacher interviews, and case studies, among other qualitative forms of assessment and evaluation, have commonly been used by researchers to gather information on transformative learning. However, in order to bridge the gap between the third-party observer/researcher's etic views and students' own emic perceptions of what goes in on their environments, a less subjective, quantitative, and economical means of measurement exists through the use of valid and reliable survey instruments. This research method is based on validated, efficient, and broadly relevant questionnaires students complete for researchers' gathering of perceptions of transformative learning from the stakeholders' perspectives (Fraser, 1998; 2012). This has yet to be done in transformative learning research, thus the justification for the new TLES.

Further, given the multi-faceted growth in how learning environments have been conceptualized since 1978, in this study I focused on what Stevens-Long et al. (2012) identified as the cognitive-rational approach (Table 1) in the development of a new instrument. And, because intentional disorienting dilemmas might be uncomfortable to some students and critical reflection may not be the way they are accustomed to learning, I have included an additional scale of student affect, in this case *student satisfaction* in the first exploratory application of the refined TLES. Generally, student satisfaction in relation to transformative learning environments has gone unexplored. Like worker productivity in relation to job satisfaction, student satisfaction can presumably lead to increased student outcomes (So & Brush, 2008; Zandvliet, 1999) or shifts in behavior. Further, student satisfaction is consistently used in post-secondary education to measure how effectively a program or institution delivers what students expect, need, and want, and it is associated with student achievement (Fraser, 2012; Lizzio, Wilson, & Simons, 2002; Kuh, 2001a, 2001b).

Additionally, with the inclusion of an attitudinal scale in the exploratory application of the TLES, the relationship between students' satisfaction and their perceptions of the extent of their transformative learning and that to which the learning environment supports it can be investigated (Fraser, 1981; So & Brush, 2008).

Data Collection

The target population for this study was higher education students enrolled in human geography and cultural anthropology classes in a two-year, public community college that serves nearly 17,000 (National Center for Education Statistics, n.d.) urban and suburban students in the greater San Antonio, Texas, USA region. These classes are typically made up of 25 students who are predominantly Hispanic (62%) (NCES, n.d.). The sample was a non-probability sample of convenience drawn from 649 voluntary participants in my department. The survey instrument, the *Transformative Learning Environments Survey* (TLES), was available on the World Wide Web using a proprietary commercial online survey service. It was administered to students over a two-week period toward the end of an academic semester after they had time to develop perspectives related to transformative learning in their classes. The surveys were administered during classes on classroom computers.

Stages in the Development of the Transformative Learning Environments Survey (TLES)

The development of the TLES followed an established three-stage approach grounded in the seminal work of Fraser (1986; 2012) used for creating learning environment instruments. Stage 1 involved the development of salient learning environment scales that, in this case, addressed transformative learning in its broad terms. Stage 2 development was the writing of the items to represent the scales identified in Stage 1. Stage 3 involved field-testing the instrument as well as reliability and validity analysis procedures. Each of these three stages is described in more detail below.

Stage 1 – Identification and Development of Salient Scales

The first stage consisted of two steps to identify and develop salient scales. Step one involved a review of the literature related to transformative learning with the aim of identifying key components considered important in transformative learning. The second step involved consideration of prior transformative learning instruments, of which there are few, to identify if any prior scales could be modified. While I was not able to modify any previously developed scales, Fetherston and Kelly's (2007) framework of transformative learning informed the scale development, as did Glisczinski's (2008) four-quadrant results. The scales thus became: *Disorienting Dilemma*, *Self-Reflection* (Illeris, 2017), *Meaning Perspective and Critical Discourse*, and *Acting*. Unique to this instrument though is that it considers both the participants' apperceptions related to their own transformation and their perceptions of the environment in which they were learners, thus it has two components for each of the four scales: (1) a student apperception component (the extent to which they perceive

their own transformation) and (2) the perception of the student regarding the extent to which they perceive the instructor having established a transformative learning environment.

Stage 2 – Writing Individual Items

The second stage consisted of three steps to writing items to capture the essence of each scale. Step one was writing the items themselves. Each item was constructed to investigate the extent to which the participant perceived the scales. Step two consisted of a review of the items by two faculty members versed in transformative learning in order to ascertain the face validity of the items. Step three involved a pilot test by a group of 75 students to assess and provide feedback regarding the feasibility of the layout, terminology, and general usability of the online instrument and resulting data.

Stage 3 – Field Testing and Analysis

The third stage consisted of two steps. The first step was a field test of the draft instrument with a sample from the population so that a statistical analysis could be performed on the instrument's integrity. The second step consisted of factor analysis to determine factor structure and which items might be removed in order to enhance the factor structure, as well as a test for internal consistency reliability.

In addition to the four scales related to the learning environment, an additional scale of affect was included in the exploratory application of the new instrument. The aim was to gather data to investigate associations between the classroom environment, student transformation self-perception, and satisfaction. The frequency response categories were identical for all of the items: Never, Seldom, Sometimes, Often, and Always.

Reliability and Validity of the TLES

I approached the development of the Transformative Learning Environments Survey from an intuitive-rational perspective (Fraser, 2012) whereby only the items with strong internal consistency remained in the instrument. Likewise, I followed what Hase and Goldberg (1967) referred to as an internal strategy in which only items with strong factor loading within their own scales and weak loading on other scales would remain in the instrument. This section outlines the methods in which I refined the TLES and how validity and reliability were determined.

Factorial Validity

I explored construct validity using principal component factor analysis with equimax rotation (Brown, 2009) and Kaiser normalization with the aim of determining the fundamental factor structure of items loading on their a priori scales. This is done to analyze if items within a given scale are measuring that scale, to what extent, and that they are not measuring another scale.

Table 2 presents the rotated component matrix of individual items after faulty items were removed. Eight scales were originally developed and all eight remained after factor analysis. However, the original field-tested instrument was made up of 56 items, and four were removed because their factor loadings fell below the 0.50 threshold on their own scale or were distributed too strongly across more than one scale. The scale of Disorienting Dilemma-student (DDs) began the field test with seven items and lost one. The Disorienting Dilemma-environment (DDe) lost two items. On the Self-Reflection-student (SRs) scale, one item was lost, and none were lost on the Self-Reflection-environment (SRe) scale. The scale of Meaning Perspective and Critical Discourse-student (MPCDs) lost no items nor did the Meaning Perspective and Critical Discourse-environment (MPCDe) scale. The scale of Acting-student (ACTs) and Acting-environment (ACTe) both lost no items in the factor analysis. After factor analysis, 52 items remained (Table 2). Example items and a description of each scale are in the Appendix.

Additionally, I calculated the percentage of variance of each factor (Table 2). The scale of Acting-environment—the extent to which the instructor creates and environment for student to demonstrate change in behavior—accounted for the highest proportion of variance at 37.7%. The scale of Meaning Perspective and Critical Discourse-environment explained 15.8% of the variance. These two scales accounted for more than half (53.5%) of the variance in the items in the TLES.

Table 2 Rotated Component Matrix

Item	Factor Loading							
	ACTe	MPCDe	MPCDs	ACTs	SRs	DDs	DDe	SRe
DDs1						.801		
DDs2						.785		
DDs3						.567		
DDs4						.729		
DDs5						.684		
DDs6						.504		
DDe7							.636	
DDe8							.516	
DDe9							.777	
DDe10							.829	
DDe11							.781	
DDe12							.725	
SRs13					.680			
SRs14					.718			
SRs15					.592			
SRs16					.574			
SRs17					.575			
SRs18					.565			
SRe19								.707
SRe20								.706
SRe21								.571
SRe22								.574
SRe23								.610
MPCDs24			.763					

Table 2 Rotated Component Matrix *continued*

Item	Factor Loading							
	ACTe	MPCDe	MPCDs	ACTs	SRs	DDs	DDe	SRe
MPCDs25			.787					
MPCDs26			.600					
MPCDs27			.818					
MPCDs28			.766					
MPCDs29			.525					
MPCDe30		.731						
MPCDe31		.750						
MPCDe32		.745						
MPCDe33		.728						
MPCDe34		.764						
MPCDe35		.793						
MPCDe36		.738						
ACTs37				.577				
ACTs38				.634				
ACTs39				.659				
ACTs40				.676				
ACTs41				.654				
ACTs42				.670				
ACTs43				.576				
ACTs44				.543				
ACTe45	.655							
ACTe46	.662							
ACTe47	.720							
ACTe48	.717							
ACTe49	.661							
ACTe50	.700							
ACTe51	.691							
ACTe52	.723							
Eigenvalue	3.01	1.26	0.78	0.70	0.65	0.59	0.52	0.48
%Variance	37.7	15.8	9.8	8.8	8.1	7.4	6.5	6.0

Note: Factor loadings smaller than 0.50 have been omitted. Extraction was principal component analysis with equimax rotation and Kaiser normalization. *N*=649. DDs: Disorienting Dilemma Student, DDe: Disorienting Dilemma Environment, SRs: Self-Reflection Student, SRe: Self-Reflection Environment, MPCDs: Meaning Perspective & Critical Discourse Student, MPCDe: Meaning Perspective & Critical Discourse Environment, ACTs: Acting Student, ACTe: Acting Environment.

Reliability

In addition to testing for validity, I assessed each scale for internal consistency using Chronbach's Alpha coefficient as presented in Table 3, where 1 is the strongest. The TLES scales ranged from 0.87 to 0.93, while the additional scale of Satisfaction had a coefficient of 0.97. The overall reliability of the TLES instrument as a whole (without the Satisfaction scale) was 0.96.

Discussion of the Results of the Development of the Transformative Learning Environments Survey (TLES)

Above, I have presented the rigor involved in the three-stage development of the TLES. In terms of construct validity—the degree to which an instrument measures what it claims to measure—the new TLES demonstrates strong results with factor loadings of 0.50 or greater (Table 2) on 52 of the 56 original items, where the "conventionally accepted value of 0.40" (Fisher & Waldrip, 2002, p. 32) was exceeded. Four poorly loading items, below my 0.50 threshold on their a priori scales, were dropped. Likewise, in order to establish a stable factor pattern for the factor analysis, a sample of 649 students was used, where 300 is considered "good," and 500 is considered "very good" (DeVellis, 2012, p. 158). Nevertheless, despite these strong construct validity results the best solution for demonstrating the generalizability of the TLES would be to replicate this factor analytic solution with a different population (DeVellis, 2012).

Further, internal consistency reliability of the TLES—the consistency of results across items—was strong across each scale and the instrument as a whole (0.96). The scale-level alpha coefficients ranged from 0.87 to 0.93 (Table 3), where, for group data, coefficients of <0.65 are considered undesirable, 0.65 to 0.70 are somewhat acceptable, but minimally so, and those from 0.70 to 0.80 are more acceptable. Alpha coefficients ranging from 0.80 to 0.90 are typically very good, and those above 0.90 are excellent and that scale could be shortened by the elimination of items (DeVillis, 2012). However, in scale development, it is common to aim for high alpha coefficients because they tend to deteriorate under different research circumstances (DeVillis, 2012).

The Transformative Learning Environments Survey (TLES) has been demonstrated as a strong survey instrument that can be applied to examine students' perceptions of their own transformation and the extent to which the learning environment supports their perception transformation. Further research could include testing the instrument under different circumstances to include, but not be limited to, larger/smaller populations, different secondary and post-secondary education levels, and with different student demographics. It could also be applied in investigations where a school, program, or department is striving to increase transformative learning instructional methods in classrooms. Likewise, this instrument could be combined with scales from other psychosocial learning environment instruments to investigate a variety of aspects of transformative learning. Following this notion, the next section outlines the first auxiliary application of the TLES as related to student affect where the affect scale was modified from Fraser (1981).

Table 3 Scale reliability using Chronbach's alpha coefficient for the TLES and affect scale of Satisfaction

Scale	Actor	Number of items	Alpha Reliability
Disorienting Dilemma	Student	6	0.87

	Environment	6	0.85

Scale	Actor	Number of items	Alpha Reliability
Self-Reflection	Student	6	0.89
	Environment	5	0.89
Meaning Perspective & Critical Discourse	Student	6	0.89
	Environment	7	0.92
Acting	Student	8	0.90
	Environment	8	0.93
Affect	Satisfaction	8	0.97

N=649

First Analyses Using the Transformative Learning Environments Survey (TLES)

Using data from the population surveyed during the development of the TLES, I conducted an initial trial investigation in order to explore associations between the scales of the new TLES and students' satisfaction. This section, secondary to the examination of the TLES as a valid and reliable instrument, explores those analyses and the results thereof. The additional scale of Satisfaction is an eight-item scale modified from Fraser's (1981) *Test of Science-Related Attitudes*. It uses the response options of: Never, Seldom, Sometimes, Often, and Always—also modified from the original so that this response scale is congruent with the TLES response scale. I conducted the investigation using simple correlation and multiple regression analyses (Table 4).

Table 4 Associations between the eight scales of the TLES and student satisfaction using simple correlation and multiple regression analyses

Scale	Actor	*M*	*SD*	*r*	*ß*
Disorienting Dilemma	Student	3.44	1.10	0.17*	0.04*
	Environment	2.48	1.28	-0.29	-0.08**
Self-Reflection	Student	3.51	1.09	0.23*	0.05*
	Environment	3.65	1.03	0.28*	0.06**
Meaning Perspective & Critical Discourse	Student	3.96	0.88	0.29*	0.05*
	Environment	4.36	0.83	0.49*	0.38**
Acting	Student	3.64	1.00	0.33*	0.10**
	Environment	3.91	0.93	0.41*	0.16**
Satisfaction		4.34	0.92		

Multiple correlation (*R*)	0.59**
R^2	0.34**

*$p < 0.01$, **$p<0.001$, N=649

In Table 4, the simple correlation (*r*) corresponds to the bivariate relationship between Satisfaction and the eight TLES scales. The standardized regression coefficient (*ß*) represents the association between Satisfaction and the TLES scales when all other scales are mutually controlled. The coefficient of multiple correlation (*R*) indicate the multivariate relationship between Satisfaction and the TLES scales where 1.0 would be a perfect correlation. Meanwhile, the coefficient of multiple determination (R^2) indicates the proportion of variance in the Satisfaction scale accounted for by the TLES scales. The mean (*M*) of each scale is also presented alongside the standard deviation (*SD*) of each scale.

The mean of the responses for each scale range from a low of 2.48 (*SD*=1.28) to a high of 4.36 (*SD*=0.83), where 1 is the possible lowest and 5 is possible highest (1=Never, 2=Seldom, 3=Sometimes, 4=Often, and 5=Always). In terms of student apperception, Meaning Perspective & Critical Discourse (MPCD) was viewed the strongest (*M*=3.96) by the students. This indicates they perceived that they *sometimes* made meaning through discussion. The lowest student apperception of transformative learning fell to the scale of Disorienting Dilemmas (*M*=3.44). Students found that the classroom environment *often* (*M*=4.36) promoted opportunities for MPCD and *seldom* (*M*=2.48) offered Disorienting Dilemmas.

One can interpret the above results considering two views of the beta press (i.e. students' apperceptions): (1) the students' views of their own experience (docile press; labeled as student as the Actor in Table 4), and (2) the students' views of the psychosocial environment in which they were a part (autonomous press; labeled as environment as the Actor in Table 4). The autonomous press/psychosocial learning environment can be manipulated by an instructor, thus, the instructors in this sample might note that the means for the scale of the environment's Disorienting Dilemmas are low, occurring just above Seldom (*M*=2.48) as the students report it. The results of this scale, defined as "the extent to which the instructor used disorienting dilemmas as a part of instruction," might clue instructors into the fact that they may not be challenging students' worldviews and, if it is their aim to do so, they could increase the use of challenges to students' preconceived notions of the world. Likewise, the scale of Meaning Perspective & Critical Discourse—"the extent to which the instructor creates opportunities for critical discourse"—appears strong (*M*=4.36), just above Often occurring. This could be interpreted as students having the opportunity to discuss among themselves or write responses to particular transformative-oriented prompts, which could be interpreted as good in terms of student learning—an instructional activity that should continue. Student apperceptions, however, appear to hover between Often and Sometimes (*M*=3.64) across each of the student-as-actor scales. This may be acceptable in some higher education scenarios; however, if stronger transformative learning is the aim of a program area, department, or course,

then instructors might want to follow these quantitative results with questions to the students about how they are viewing their own learning and thinking.

Further refined by introducing analysis of student affect is that the simple correlation between Satisfaction and the TLES scales ranges from -0.29 to 0.49. All are positive and statistically significant ($p < 0.01$) with the exception of the relationship between the scale of Disorienting Dilemma-environment and students' Satisfaction. The multiple correlation between the set of TLES scales and Satisfaction is 0.59 and statistically significant ($p<0.001$), while the proportion of variance is 0.34. What we are seeing here is that there is a negative association between students' perceptions of disorienting dilemmas being presented to them and their satisfaction (r=-0.29). In other words, it is likely that students do not like to have their worldviews disrupted. In contrast, students seem to have a strong, and statistically significant, positive association between Meaning Making and Critical Discourse and Satisfaction (r=0.49).

In order to determine which of the TLES scales are independently associated with Satisfaction, I examined the standardized regression coefficient. With the exception of Disorienting Dilemma-environment (-0.08), the TLES scales are independent, positive, and significant in relation to students' Satisfaction. The TLES scale of Meaning Perspective and Critical Discourse-environment indicated the strongest association (0.38) with Satisfaction, followed by Acting-environment (0.16). Given that each of the simple correlation and regression weights are positive, except for Disorienting Dilemma-environment, it indicates that a stronger mean on a TLES scale is associated with stronger student satisfaction. On the contrary, when considering the scale of Disorienting Dilemma-environment as it is associated (r) with Satisfaction, when one scale mean increases, the other decreases. Likewise, the negative standardized regression coefficient ($ß$ = -0.08) indicates that a one unit positive standard deviation change in students' perceptions of the Disorienting Dilemma-environment scale results in a negative change in Satisfaction.

In this brief discussion of the first application of the Transformative Learning Environments Survey (TLES), I have offered a demonstration of how the results of the TLES can be rich with information resulting from the data of a given population. In this particular population, where each of the instructors commonly use collaborative learning instructional methods, it is evident in the results, especially when one considers students' satisfaction in association with Meaning Perspective & Critical Discourse (M=4.36, r=0.49, and $ß$=0.38). However, the lack of disorienting dilemma use and students' dissatisfaction with such instructional methods demonstrates that more could be done in terms of applying transformative learning theory into practice with this population.

Conclusion: Unique Contributions of this Study

This study adds three unique contributions to the body of transformative learning research: (1) a new valid and reliable research instrument, (2) an instrument that considers both apperception and perception of the classroom environment within

the context, and (3) an indication of which transformative learning aspects are associated with student satisfaction.

First, in a field of andragogy study that is dominated by qualitative means of investigation, the development and validation of an instrument for assessing transformative learning in higher education, the Transformative Learning Environments Survey (TLES), adds a quantitative dimension to the body of research. The TLES builds upon the framework of Fetherston and Kelly's (2007) survey instrument, as well as that of Glisczinski (2008) whose instrument has roots in Brookfield's (1995) *Critical Incident Questionnaire* (CIQ). Meanwhile, the scale of student Satisfaction has foundations in Fraser's (1981) seminal work in learning environment research. Based on analysis of data from 649 postsecondary students, the TLES has exhibited strong factorial validity and internal consistency reliability. Transformative learning practitioners and researchers now have a new instrument with which they can measure the extent students perceive changes in themselves and the support of the learning environment.

Second, this study is unique in establishing an instrument that captures student apperception (self-cognition) as well as their perception (beta press) in four harmonious categories of disorienting dilemmas, self-reflection, perspective on meaning and critical discourse, and behavior change. Likewise, perception of the learning environment is important because as educational practitioners we can manipulate the learning environment to emphasize certain aspects such as those that are strongly associated with student satisfaction by creating increased opportunities for critical discourse in our classrooms. Or, we can focus on creating situations where cognitive dissonance is done carefully through disorienting dilemmas so that we do not push students too far in to cognitive dissonance, yet still promote an environment of perspective change. Future research could be conducted to investigate what associations are most strongly/weakly evident and educators could emphasize or deemphasize those characteristics depending upon their particular situations and/or educational goals.

Third, in the first research application of the TLES, I have added to the notions of which transformative learning characteristics are positively and negatively associated with student satisfaction. It is apparent within this population that students' perspectives on the extent to which there are opportunities in a class for critical discourse and meaning making are strongly influential on how satisfied they are with their learning experience. Perhaps it could be stated simply that when adult students have the opportunity to speak up, examine their assumptions in light of others, and defend their thinking in a supported manner, they are more satisfied with their learning practice. Likewise, when students perceive that they are given an opportunity to demonstrate changes in their behavior, to express themselves, and to reveal their new ways of thinking, they are similarly more satisfied. In contrast, the TLES has revealed, with this population, that being in a learning environment where disorienting dilemmas (i.e. unsettling information, different frames of reference/points of view, stimulation of uncertainty in their prior worldview) are used as a part of the instruction, students are less satisfied with the learning environment. It may well be that pushing students into disorienting dilemmas where they are uncomfortable with their status quo worldviews is the most beneficial aspect of the learning environment

for them—however, we, their instructors, should offer opportunities for them to discuss and demonstrate their changes in thinking to complete a transformative cycle.

Perhaps this notion that discomfort in thinking comes before perspective transformation is what is needed to provide overall positive educational outcomes is a good area of study to follow in a future line of research for transformative learning educators. Likewise, future lines of study could expand on the TLES with additional scales representing other constructs argued to be considerably pertinent to transformative learning such as emotions, feelings, and relationships.

Appendix Description of the Transformative Learning Environments Survey (TLES)

Actor	Scale	Scale Description	Example Items
Student	1) Disorienting Dilemma	The extent to which students perceived a disorienting dilemma.	In this class… …My assumptions were challenged. …My viewpoints were challenged.
Environment		The extent to which the instructor used disorienting dilemmas as a part of instruction.	In this class, the instructor… …Provided me with unsettling information. …Used a different frame of reference than I would have.
Student	2) Self-Reflection	The extent to which students critically perceived their subjective perceptions of knowledge.	In this class I… …Had to think about my position on the topics. …Had to look closely at my own values.
Environment		The extent to which the instructor created opportunities for student critical self-reflection.	In this class, the instructor… …Asked me to think about where my ideas came from. …Asked me to reflect on my ways of thinking.
Student	3) Meaning Perspective & Critical Discourse	The extent to which students perceive their meaning perspectives.	In this class… …I became aware of the perspectives of others. …I realized other students' perspectives.

Environment		The extent to which the instructor creates opportunities for critical discourse.	In this class… …I had full information. …I felt comfortable defending my way of thinking.
Student	4) Acting	The extent to which students perceive a change in their behavior.	As a result of this class, I… …Adopted new ways of thinking about class topics. …Have made different decisions related to class topics.
Environment		The extent to which the instructor creates an environment for students to demonstrate change in behavior.	In this class, the instructor… …Helped me make any new ways of thinking obvious. …Set up situations where I could express any new viewpoints.

References

Apte, J. (2009). Facilitating transformative learning: A framework for practice. *Australian Journal of Adult Learning*, *49*(1), 169-189.

Brock, S. (2015). Let's spread the word about the wisdom of transformative learning. *Journal of Transformative Learning*, *3*(1), 18-21.

Brookfield, S. D. (1995). *Becoming a critically reflective teacher*. San Francisco: Jossey-Bass.

Brown, J. D. (2009). Choosing the right type of rotation in PCA and EFA. *JALT Testing and Evaluation SIG Newsletter*, *13*(3), 2-25.

Christie, M., Carey, M., Robertson, A., & Grainger, P. (2015). Putting transformative learning theory into practice. *Australian Journal of Adult Learning*, *55*(1), 9-30.

Cho, J., & Trent, A. (2006). Validity in qualitative research revisited. *Qualitative Research*, *6*(3), 319-340.

DeVellis, R. F. (2012). *Scale development: Theory and applications* (3rd ed.). Los Angeles, CA: Sage.

Dirkx, J. M. (2012). Self-formation and transformative learning: A response to "Calling transformative learning into question: Some mutinous thought," by

Michael Newman. *Adult Education Quarterly*, *62*(4), 399-405. doi: 10.1177/074173612456420

Duerr, M., Zajonc, A., & Dana, D. (2003). Survey of transformative learning and spiritual dimensions of higher education. *Journal of Transformative Education*, *1*, 177-210. doi: 10.1177/1541344603001003002

Fetherston, B., & Kelly, R. (2007). Conflict resolution and transformative pedagogy: A grounded theory research project based on learning in higher education. *Journal of Transformative Education*, *5*, 262-285. doi: 10.1177/1541344607308899

Fisher, D. L., & Waldrip, B. G. (2002). Measuring culturally sensitive factors of classroom learning environments with the CLEQ. In S. C. Goh & M. S. Khine (Eds.), *Studies in educational learning environments: An international perspective* (pp. 27-48). New Jersey: World Scientific.

Fraser, B. J. (1981). *Test of science-related attitudes*. Melbourne, Victoria: Australian Council for Educational Research.

Fraser, B. J. (1986). *Classroom environment*. London: Croom Helm, Ltd.

Fraser, B. J. (1998). Classroom environment instruments: Development, validity and applications. *Learning Environments Research*, *1*, 7-33.

Fraser, B. J. (2012). *Classroom environment*. New York: NY: Routledge.

Glisczinski, D. J. (2007). Transformative higher education: A meaningful degree of understanding. *Journal of Transformative Education*, *5*, 317-328. doi: 10.1177/1541344607312838

Glisczinski, D. J. (2008, Summer). Seeking insight: Critical incidents, collaboration, and cyber-reflection in higher education. *MountainRise International Journal of the Scholarship of Teaching and Learning*, 1-19.

Hase, H. D., & Goldberg, L. R. (1967). Comparative validity of different strategies of constructing personality inventory scales. *Psychological Bulletin*, *67*, 231–248.

Heddy, B. C., & Pugh, K. J. (2015). Bigger is not always better: Should educators aim for big transformative learning events or small transformative experiences? *Journal of Transformative Learning*, *3*(1), 52-58.

Hoggan, C. D. (2016). Transformative learning as a metatheory: Definition, criteria, and typology. *Adult Education Quarterly*, *66*(1), 57-75. doi: 0.1177/0741713615611216

Illeris, K. (2017). *How we learn: Learning and non-learning in school and beyond*. New York, NY: Routledge.

John, V. M. (2016). Transformative learning challenges in a context of trauma and fear: An educator's story. *Australian Journal of Adult Learning*, *56*(2), 268-288.

King, K. P. (1997). *Examining activities that promote perspective transformation among adult learning in higher education* (Unpublished doctoral dissertation). Widener University, Wilmington, DE.

King, K. P. (2009). *The handbook of the evolving research of transformative learning based on the Learning Activities Survey (10th anniversary edition).* Charlotte, NC: Information Age Publishing.

Kuh, G. D. (2001a). Assessing what really matters to student learning. *Change*, *33*(3), 10-17.

Kuh, G. D. (2001b). *The National Survey of Student Engagement: Conceptual framework and overview of psychometric properties*. (National Survey of Student Engagement: The College Student Report). Retrieved from http://nsse.indiana.edu/pdf/psychometric_framework_2002.pdf

Lange, E. A. (2015). The ecology of transformative learning: Transdisciplinary provocations. *Journal of Transformative Learning*, *3*(1), 28-34.

Lewin, K. (1936). *Principles of topological psychology* (F. Heider & G. Heider, Trans.). New York: McGraw-Hill Book Company, Inc.

Lincoln, Y. S., & Guba, E. (1985). *Naturalistic inquiry*. Beverly Hills, CA: Sage.

Lizzio, A., Wilson, K., & Simons, R. (2002). University students' perceptions of the learning environment and academic outcomes: Implications for theory and practice. *Studies in Higher Education*, *27*(1), 27-52. doi: 10.1080/03075070120099359

Lotz-Sisitka, H., Wals, A. E. J., Kronlid, D., & McGarry, D. (2015). Transformative, transgressive social learning: Rethinking higher education pedagogy in times of systemic global dysfunction. *Current Opinion in Environmental Sustainability*, *16*, 73-80. Retrieved from http://doi.org/10.1016/j.cosust.2015.07.018

Lub, V. (2015). Validity in qualitative evaluation: Linking purposes, paradigms, and perspectives. *International Journal of Qualitative Methods*, *14*(5), 1-8. doi: 10.1177/1609406915621406

Mezirow, J. (1978). Perspective transformation. *Adult Education Quarterly*, *28*(100), 100-110. doi: 10.1177/074171367802800202

Mezirow, J. (1997). Transformative learning: Theory to practice. *New directions for adult and continuing education*, *74*, 5-12.

Morrice, L. (2012). Learning and refugees: Recognizing the darker side of transformative learning. *Adult Education Quarterly*, *63*(3), 251-271. doi: 10.1177/0741713612465467

Murray, H. A. (1938). *Explorations in personality: A clinical and experimental study of fifty men of college age.* New York: Oxford University Press.

Nahemow, L., & Lawton, M. P. (1973). Toward an ecological theory of adaptation and aging. In W. Preiser (Ed.), *Environmental Design Research, Vol. 1 – Selected Papers* (pp. 24 – 32). New York, NY: Routledge.

National Center for Education Statistics (NCES). (n.d.). *Integrated Postsecondary Education Data System (IPEDS)* online report for Northwest Vista College. Retrieved from https://nces.ed.gov/ipeds/datacenter/institutionprofile.aspx?unitId=afadabaeb4b3

Newman, M. (2012). Calling transformative learning into question: Some mutinous thoughts. *Adult Education Quarterly*, *62*(1), 36-55. doi: 10.1177/0741713610392768

Romano, A. (2017). The challenge of the assessment of processes and outcomes of transformative learning. *Educational Reflective Practices*, *7*(1), 184-219. doi:10.3280/ERP2017-001012

Smith, J. E., McAuliffe, G., & Rippard, K. S. (2014). Counseling students' transformative learning through a study abroad curriculum. *Counselor Education and Supervision*, *53*(4), 306-319.

Snyder, C. (2008). Grabbing hold of a moving target: Identifying and measuring the transformative learning process. *Journal of Transformative Learning*, *6*(1), 159-181. doi: 10.1177/1541344608327813

So, H-J., & Brush, T. A. (2008). Student perceptions of collaborative learning, social presence and satisfaction in a blended learning environment: Relationships

and critical factors. *Computers and Education*, *51*, 318-336. doi: 10.1016/j.compedu.2007.05.009

Stevens-Long, J., Schapiro, S. A., & McClintock, C. (2012). Passionate scholars: Transformative learning in doctoral education. *Adult Education Quarterly*, *62*(2), 180-198. doi: 10.1177/0741713611402046

Stuckey, H. L., & Taylor, E. W. (n.d.). *Transformative learning survey*. Unpublished instrument. Retrieved from https://www.research.net/s/TransformativeLearningSurvey

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), 221-228. doi: 10.1177/1541344614540335

Taylor, E. W. (2008). Transformative learning theory. *New Directions for Adult and Continuing Education*, *119*, 5-15. doi: 10.1002/ace.301

Taylor, E. W., & Cranton, P. (Eds.) (2012a). *Handbook of transformative learning: Theory, research and practice*. San Francisco: Jossey-Bass.

Taylor, E. W., & Cranton, P. (2012b). *A content analysis of transformative learning theory*. Proceedings of the 2012, Adult Education Research Conference, SUNY Empire State College, Saratoga Springs, N.Y., June 1-3.

Zandvliet, D. B. (1999). *The physical and psychosocial environment associated with classrooms using new information technologies: A cross-national study*. Unpublished doctoral dissertation, Curtin University of Technology, Perth, Western Australia, Australia. Retrieved from the Australian Digital Theses Program Distributed Database http://adt.curtin.edu.au/theses/available/adt-WCU20020502.121823/

Author's Note: Scott L. Walker is a Professor of Geography and Department Coordinator at Northwest Vista College.

Citation: Walker, S. L. (2018). Development and validation of an instrument for assessing transformative learning: The Transformative Learning Environments Survey (TLES). *Journal of Transformative Learning*, *(5)*1, 23-46.