Transformative Learning in Graduate Medical Education: A Scoping Review

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ABSTRACT

Background Transformative learning (TL) is an educational theory focused on deep fundamental shifts in an individual's worldview. Such shifts are well known to occur within graduate medical education (GME). However, TL in GME has yet to be formally explored.

Objective We performed a scoping review of the literature on TL within GME to identify areas where trainees currently experience or have potential to experience TL, and to explore areas where fostering TL has been used as a pedagogical tool.

Methods In January 2020, we searched 7 databases to identify literature on TL in GME. Additional articles were identified by hand-searching the *Journal of Graduate Medical Education*.

Results A total of 956 articles were identified through database search with 3 unique articles found via hand-searching. Abstracts and manuscripts were screened by 2 authors and disagreements arbitrated by a third, yielding 28 articles for our analysis. The main components of TL (disorienting dilemma, reflection, discourse, action) took various forms. TL was closely linked with professionalism training and professional identity formation. Training programs in primary care fields were most frequently referenced. Often, trainees were experiencing TL without recognition of the theory by their educators. Gaps in the graduate medical education literature exist pertaining to TL in venues such as diversity, equity, and inclusion.

Conclusions Our scoping review uncovered the following themes: TL and professionalism, TL and primary care, and TL by other names. TL is likely occurring but going unrecognized in some settings.

Introduction

At its core, residency represents a time of potential transformation in the life of a practicing physician. Transformative learning (TL) is an educational theory originally credited to Mezirow[1] that is about "dramatic, fundamental change in the way we see ourselves and the world in which we live."[2(p166)] In adult education, TL has traditionally been conceptualized as a learning theory that describes what happens in the course of living one's life. This is supported by examples that typically comprise the "disorienting dilemma" or spark for the TL process, such as the death of a friend or family member or termination of a job.[3] However, some have argued that an educator, through pedagogical design or execution, has the ability to foster TL in a process similar to that which occurs naturally in the world.[4] Since the outcome of TL is the development of a more open and inclusive worldview,[2] fostering TL with this goal may be extremely relevant to the educator, including those in the health professions. This concept of TL as a pedagogy in the health professions has recently been recognized.[5]

TL may be particularly relevant for residency education, a critical time for professional identity formation.[6] Within graduate medical education (GME), harnessing TL has been proposed within the competencies of practice-based learning and improvement (PBLI) and systems-based practice (SBP) and has been offered as a framework for quality improvement (QI) curricular design.[7] Through critical reflection on a disorienting dilemma, learners may improve their own clinical practice (PBLI). Through the social change perspective of TL,[3,8] learners may recognize injustices in the health care system and intervene (SBP/QI). However, in contrast to traditional pedagogies, the worldview shift integral to TL theory may lead to more lasting individual or systems change.

The first major review of TL in health professions education[5] excluded GME, and thus an equivalent scoping review is needed to view the TL landscape in GME in order to enrich understanding of this approach to learning and identify literature gaps for

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further work. Our research questions included: "What are the current venues in GME where TL occurs?" and "Where and how is TL utilized as a pedagogy in GME?"

Methods

Literature Search

In January 2020, with the assistance of a medical research librarian and following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR) checklist,[9] we performed a systematic search of 7 databases (MEDLINE, ERIC, Scopus, Cochrane Library, PsychInfo, Embase, and CINAHL) to identify the published literature on TL interventions and experiences in GME. Key search terms were harvested by the first author (B.V.) and research librarian (A.K.). Through an iterative process of multiple consecutive searches, a final search strategy was established (provided as online supplementary data). To identify additional studies, we hand-searched the reference lists of the articles included in our full-text review, as well as the *Journal of Graduate Medical Education* for additional articles that met our inclusion criteria.

Eligibility Criteria

Articles were included if they met criteria for both GME and TL. GME was defined as post-receipt of the terminal degree but before unsupervised clinical practice. To meet criteria for TL, articles either had to explicitly use the terms "transformative learning" or "transformational learning," or they had to contain the following 4 essential components of TL theory identified by the authors as the key minimal standards defining TL: (1) disorienting dilemma, (2) critical reflection, (3) discourse, and (4) action.[2,10] We had no publication date or language restrictions. Given our broad research question and the anticipated paucity of empirical literature on TL within GME, we chose to perform a scoping review[11,12] without article type restrictions.

Article Review Process

Abstracts and manuscripts were screened by 2 authors, and disagreements were arbitrated by a third author. The article review process proceeded as per FIGURE 1 for a final set of 28 citations to be analyzed in our scoping review.

Data Analysis

We abstracted and charted data using a priori codes based on themes identified in a previous literature review of TL in undergraduate medical education,[5] as well as themes that were identified during a proof-of-concept literature review on the topic.[13] Additional a priori codes included GME venue, Accreditation Council for Graduate Medical Education (ACGME) core competencies,[14] and TL components. Through inductive coding, additional unforeseen codes and subcategories relevant to TL within GME were included. Results were reviewed with all co-authors until there was consensus on themes to be included in our final analysis.

In the sections that follow, we will first provide an overview of our search results, including a description of the articles and their content as it relates to the 4 components of TL. Next, we have combined our thematic analysis with our discussion section in order to provide recommendations for practice that go beyond what is specifically addressed in our included articles. Finally, we review main gaps in the literature, limitations of our review, and provide some conclusions.

Results

Twenty-eight citations met inclusion criteria and were published between 2000 and 2018. Twenty (71%) described empirical research[15–33] or were formal literature reviews.[34] Two articles (7%) used entirely quantitative methodology,[15,27] 10 (36%) used qualitative methodology,[16–18,20,22,23,26,28,29,34] and 8 (29%) utilized mixed methods.[19,21,24,25,30–33] The remaining articles were either first person accounts of experiences or curricula[35–37] or were entirely conceptual.[7,38–41] Nineteen articles (69%) explicitly mentioned "transformative learning" or "transformational learning."[7,16–19,21–23,26,27,29,31,33,34,36,38–41] In the case of empirical work and first person accounts, the educational venues were in the United States,[15–21,23–25,27,30,32,33,36,37] Kenya,[29,35] the Netherlands,[26] Norway,[28] Mexico,[31] or described international health electives across multiple countries.[22] The majority of articles described traditional GME (ie, internship, residency, fellowship), with the primary care fields (internal medicine, family medicine, pediatrics, general practice, or unspecified primary care) being most represented (TABLE 1). Only 2 articles referenced surgical GME.[26,35] Additional GME populations included international medical graduates from medical and other health professions,[34] clinical pastoral education programs,[15,40] and *pasantes* (Mexican social service physicians between medical school and residency).[31] We also stratified articles according to the 3 perspectives of TL (TABLE 1).[3,8] The cognitive perspective describes the traditional theory, beginning with the disorienting dilemma, followed by critical

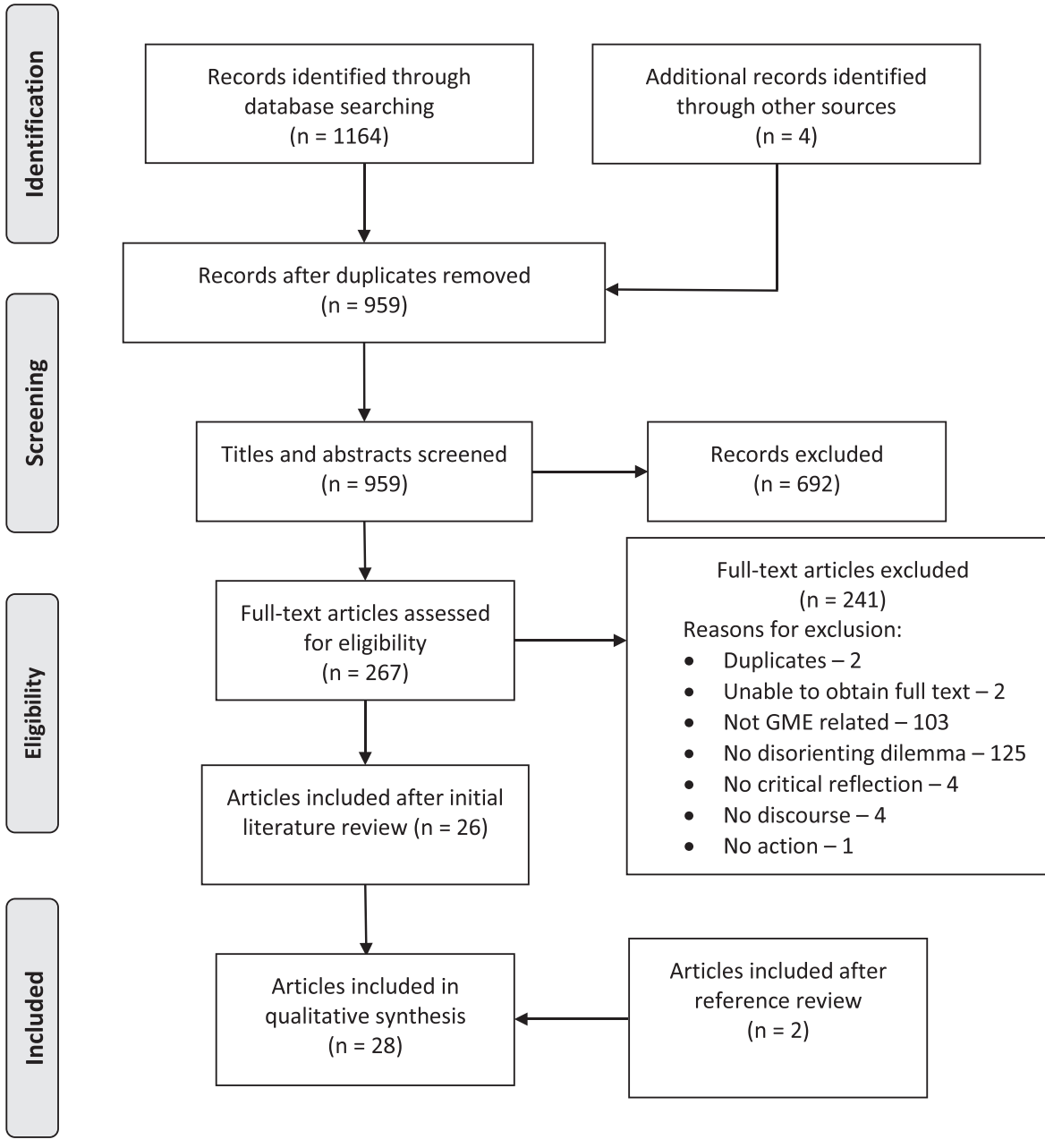

FIGURE 1
PRISMA Flow Diagram

Note: Articles were included through a sequential review process, needing to meet 2 main criteria: (1) included if explicitly related to graduate medical education; and (2a) if transformative learning (TL) was explicitly referenced or (2b) if TL was not explicitly referenced, reviewers would evaluate if the 4 components of TL (disorienting dilemma, reflection, discourse, and action) were present. Articles were excluded if a minimum of 1 of the 4 criteria were absent.

reflection and rational discourse, and leading to action. The beyond rational component involves recognizing insights and epiphanies and may involve doing so through spirituality, art, dreams, or other non-traditional means. The social change perspective more closely aligns with the cognitive approach but sees societal transformation through challenging oppression and social justice as the outcome, rather than through individual transformation.

Components of TL Theory

Here, we talk about the formal elements of TL as they appeared in the articles (TABLE 2).

TL Element No. 1–Disorienting Dilemma: We identified multiple experiences that could be interpreted as disorienting dilemmas, mainly involving difficult clinical encounters. These scenarios could be real or simulated, and often revolved around death, trauma,

TABLE 1
Characteristics of Included Articles

Author, y	Article Type	GME Population	Explicit Mention of TL	ACGME Competency	TL Perspective	Explanation for Inclusion
Ahmed et al,[15] 2016	Quantitative research	Clinical pastoral education	No	PC, ICS, SBP	Cognitive	Pastoral care residents demonstrated TL through experiential learning with challenging standardized patient cases and debriefing
Alterman and Goldman,[35] 2008	First person account	Surgery, PGY-3	No	PC	Cognitive	A surgical resident's transformative account of international volunteerism
Anandarajah et al,[16] 2016	Qualitative research	Family medicine, PGY-1–PGY-3	Yes	PC, ICS, PROF	Cognitive, beyond rational	A longitudinal study of TL after implementation of a spiritual care curriculum
Beckman and Post,[41] 2015	Conceptual	Internal medicine	Yes	PBLI	Cognitive	Reflecting on cognitive errors as both PBLI and TL
Branch,[38] 2005	Conceptual	Residency, PGY-1–PGY-2	Yes	PC, PROF, PBLI	Cognitive, beyond rational	The use of critical incident reports to recognize or foster TL
Branch,[17] 2010	Qualitative research	Primary care track	Yes	ICS, PROF	Cognitive, beyond rational	A description of longitudinal communication and professionalism programs including a primary care track with transformative potential
Docherty-Skippen and Beattie,[39] 2018	Conceptual	Internal medicine	Yes	PROF, ICS, SBP, PBLI	Cognitive	Recognition of duoethnography as a form of curricular inquiry that fosters reflection and TL
Eubank et al,[18] 2011	Qualitative research	Family medicine	Yes	PBLI, PROF, ICS, SBP	Cognitive, social change	Utilization of experiential learning and coaching to foster TL in a teamwork curriculum
Foshee et al,[19] 2017	Mixed-methods research	Internal medicine, PGY-1–PGY-3	Yes	PROF	Cognitive, beyond rational	A transformative professionalism curriculum based on recognition, appreciation, practice, and reflection
Fosse et al,[28] 2017	Qualitative research	Primary care track, PGY-1	No	SBP, ICS	Cognitive, beyond rational	Nursing home–based residents experienced TL around patient priorities at the end of life
Johnson,[36] 2000	First person account	Pediatrics	Yes	PC, SBP, PBLI, ICS	Cognitive	An exploration of Marsick's 8 principles of TL through a residency lens
Jones,[40] 2010	Conceptual	Clinical pastoral education	Yes	PBLI	Cognitive, beyond rational	An overview of TL theory and its application to clinical pastoral care education
Kehoe et al,[34] 2016	Literature review, realist synthesis	International medical graduates	Yes	ICS, PROF	Beyond rational	A literature review recognizing that program support and cultural awareness for international medical graduates fosters TL
Ledford et al,[32] 2014	Mixed-methods research	Family medicine	No	ICS, PROF	Cognitive, beyond rational	Using an objective structural clinical examination coupled with individual and group reflection as a TL pedagogy on patient spirituality
Litzelman et al,[29] 2017	Qualitative research	Residency	Yes	PROF	Cognitive, social change	TL demonstrated via critical incident reflections for a global health elective

TABLE 1
Characteristics of Included Articles (continued)

Author, y	Article Type	GME Population	Explicit Mention of TL	ACGME Competency	TL Perspective	Explanation for Inclusion
Lochner et al,[25] 2018	Mixed-methods research	Family medicine	No	MK, PROF, ICS	Social change	Curricular intervention to improve education on social determinants of health focused on transformation via social change
Markakis et al,[37] 2000	Curricular report	Internal medicine/ primary care track	No	PROF, ICS	Cognitive, beyond rational	Learner-centeredness and explicit attention to professionalism and humanism are key to TL in these realms
Mehdi et al,[33] 2018	Mixed-methods research	Internal medicine	Yes	PBLI	Cognitive, beyond rational	An innovation utilizing reflection on cognitive errors and biases showed signs of perspective transformation resembling TL
Nothnagle et al,[20] 2014	Qualitative research	Family medicine, PGY-2–PGY-3	No	PROF, PBLI, ICS	Cognitive, beyond rational	A seminar designed to address the hidden curriculum appeared to foster TL
Pavon et al,[30] 2018	Mixed-methods research	Internal medicine, PGY-1	No	SBP	Cognitive, beyond rational	TL demonstrated after implementation of a transitions of care curriculum
Plant et al,[21] 2017	Mixed-methods research	Pediatrics, PGY-1–PGY-3	Yes	MK, PC	Cognitive	An evaluation of when and how reflective practice occurs, with recognition of TL as an outcome
Sawatsky et al,[22] 2018	Qualitative research	Residency, fellowship (23 specialties)	Yes	PROF, PC, SBP, PBLI	Cognitive, beyond rational, social change	A study of international health elective experiences through the intersecting lenses of TL and professional identity formation
Shahid et al,[23] 2017	Qualitative research	Internal medicine, PGY-1–PGY-3	Yes	PC, MK, ICS	Cognitive	A clinical reasoning conference grounded in TL via metacognition
van den Eertwegh et al,[26] 2014	Qualitative research	General practice, PGY-1 & PGY-3; Surgery, PGY-1–PGY-5/PGY-6	Yes	ICS	Cognitive	Focus groups demonstrated limitations to a behaviorist approach to communications skills training with TL as a potential solution
Van Wieren et al,[31] 2014	Mixed-methods research	Social service physicians	Yes	MK, PC, SBP, PBLI	Cognitive, beyond rational	An intervention to turn a mandatory service year in an underserved community into a TL experience
Wittich et al,[7] 2010	Conceptual	Internal medicine, PGY-1	Yes	PBLI, SBP	Cognitive, social change	Using TL, specifically critical reflection, as the decision point between personal or system improvement
Wittich et al,[27] 2011	Quantitative research	Internal medicine, PGY-1	Yes	PBLI, SBP	Cognitive, social change	Reflection on quality improvement projects did not lead to project success despite being grounded in TL theory
Zenni et al,[24] 2006	Mixed-methods research	Pediatrics, PGY-1–PGY-3	No	SBP	Beyond rational, social change	Pediatric residents assumed the role of a parent faced with life challenges to teach SBP

Abbreviations: GME, graduate medical education; TL, transformative learning; PC, patient care; ICS, interpersonal and communication skills; SBP, systems-based practice; PGY, postgraduate year; PROF, professionalism; PBLI, practice-based learning and improvement; MK, medical knowledge.

TABLE 2
Findings Related to 4 Essential Elements of Transformative Learning (TL) Theory From Included Citations

4 Essential TL Elements	Findings Stratified by TL Element	References
Disorienting dilemma	Difficult clinical encounters (real or simulated)	
	Death or dying	15, 16, 22, 28, 29, 32, 35–40
	Trauma	35, 40
	Faith	15, 16
	Medical errors	7, 19, 21, 33, 37, 40, 41
	Ethical issues	16, 19, 22, 28, 32, 36
	Caring for the underserved	20, 22, 29, 31, 35
	Practicing abroad	22, 29, 35
	Different cultures	
	Observing variation in colleagues' practices	21
	International medical graduates in a new training role	34
	Communication challenges	16, 32, 34
	Self-monitoring through video review	26
	Pressure or humiliation from a superior	15, 20, 21, 38–40
	Interprofessional team dynamics	21
	Health system hierarchy	18
	Empathy for patients	
	Assuming the role of the patient	24
	Patient home visits	30, 37
Critical reflection	Content	
	Role clarification	35
	Spiritual development	16
	Professionalism	19–21, 29, 39
	Learning needs or outcomes	25, 31, 34
	Biases	23, 33, 37
	Feedback	18, 36
	Quality improvement	7, 27
	Compassionate values	16
	What it means to be a physician	22
	Process	
	"Verbatim"	15
	Balint groups	16
	Focus groups	26
	Debriefing on videotaped simulations	15, 32
	Duoethnography	39
	Protecting time	39
	Social media	19
	Individual exercises (writing, drawing, meditation, etc)	17, 20, 30, 32, 38
	Barriers	
	Lack of skill or familiarity in reflecting	21

TABLE 2
Findings Related to 4 Essential Elements of Transformative Learning (TL) Theory From Included Citations (continued)

4 Essential TL Elements	Findings Stratified by TL Element	References
Discourse	Debriefing sessions	15, 30
	Mentorship, coaching	18, 21, 22
	Other individual interactions with:	
	Senior physicians	29, 31, 35
	Peers	19, 21, 26, 34, 36, 37, 40
	Preferred by surgical residents	26
	Nurses	36
	Community organizers	25
	Patients or their families	28
	Qualitative research interview as discourse	16
	Group reflection	17, 20, 23, 32, 34, 38
	Small groups	30, 33, 34, 37
	Informal hallway discussions	19
	Morbidity and mortality conferences	41
Action	Recognition/rediscovery of core principles	15, 17, 20, 22, 38
	Attitudinal or culture shifts	18–20, 22, 25, 35
	Increased spirituality	16
	Gaining new perspective	21, 22, 24, 28–31, 33
	Social justice	7, 16, 20, 22, 24, 25, 29, 31, 35, 36
	Recognition of limitations	33, 41
	Assuming a new professional identity	20, 22, 28, 34, 36, 37

medical errors, ethical issues, or communication challenges. Trainee recognition of resource limitations or poor patient outcomes when caring for the underserved also appeared to be a disorienting dilemma with transformative potential. Factors related to the learning climate were also interpreted as disorienting dilemmas, such as when trainees experienced pressure or humiliation from faculty members.

TL Element No. 2–Critical Reflection: Our review provided insight into the content, processes/venues, and barriers to critical reflection. Disorienting dilemmas were most often the content of reflection. Regarding where and how reflection occurred, Balint groups, "verbatim sessions," video debriefing, focus groups, and curriculum inquiry (through a process called duoethnography) were all cited as potential venues. The humanities as a means for reflection were also commonly referenced, notably journaling, drawing, storytelling, and meditation. Unfamiliarity with the concept of reflection did pose a barrier to the process, as did lack of reflective skill. Time constraints were also identified as a barrier with some programs providing protected academic time for trainee reflection.

TL Element No. 3–Discourse: Mentors or coaches were integral in helping provide trainees awareness of unrecognized behaviors and questioning their assumptions. Surgical residents (compared to general practice residents) valued dialogue with peers over that with experienced supervisors. In addition to faculty and peer mentors, others involved in transformative discourse included nurses, community organizers, and patients. When the reflection discussed in the section above was accomplished in group format (in particular, small groups), such reflection resembled rational discourse. Interestingly, in one case, the research interview itself resembled discourse.

TL Element No. 4–Action: The outcomes of TL among our citations included attitudinal or culture shifts, increased spirituality, gaining new perspective (often surrounding social justice), and recognition of limitations. Reaffirming or assuming a new professional identity was a frequent result of TL in GME. Repetition and practice in situations similar to those that led to TL were seen as a prerequisite for lasting behavioral change.

Major Themes, Discussion, and Implications for Practice

There were 3 major themes identified: TL and professionalism, TL and primary care, and TL by

TABLE 3
Findings Related to 3 Themes Identified in Scoping Review of Transformative Learning (TL) in Graduate Medical Education

Scoping Review Theme	Findings Stratified by Theme	References
TL and professionalism	Pedagogy for professionalism training	17, 19, 37, 39
	Professional identity formation	16, 19, 20, 22, 38, 39
	Formation vs transformation	16
	Mentorship, role-modeling, coaching	15, 17, 18, 20–22, 24–26, 28, 29, 31, 34–39
	Creating content for reflection	
	Facilitating reflection	22, 26, 39
	Reflection "entry points"	22, 39
	Contextual, "real world" mentorship	26
	Faculty, attending physician, senior resident	31
TL and primary care	Procedural skills training = *informative* learning	
	Surgical TL	
	Examples	
	Volunteerism	35
	Communication skills curriculum	26
	Barriers: culture and context	26
	Lack of faculty development on feedback	
	Time constraints	
TL by other names	Synonyms	
	Identity transformation	20
	Professional formation	20
	Professional identity	20
	Formation	20
	Transtheoretical (stages of change) model	32
	Interrelating educational theories or concepts	
	Experiential or situated learning	15, 20, 28, 30
	Informal or hidden curriculum	20, 32
	Communities of practice	20, 28
	Self-directed learning	30, 37
	Benefits of recognizing and understanding TL theory	
	Critical reflection as the decision point	7
	Patient-level disorienting dilemmas (PBLI)	
	Reflection on the health system (SBP)	

Abbreviations: PBLI, practice-based learning and improvement; SBP, systems-based practice.

other names (TABLE 3). We combined our thematic analysis with our discussion section to provide recommendations and implications for practice that references literature outside of, but relevant to, our literature search results.

TL and Professionalism

While our database search yielded a multinational body of literature, we chose to map the selected articles according to the ACGME core competencies (TABLE 1). While every core competency was represented to some degree (FIGURE 2), there was a preponderance of emphasis on TL as it pertained to professionalism. While some citations discussed professionalism curricula using TL as a pedagogy, the concept of TL as professional identity formation comprised a larger subtheme. The GME literature on TL appears to focus more on *formation* than *transformation*,[16] in other words, developing a professional identity rather than changing it. While TL theory assumes prior life experience through which beliefs are developed, residents and fellows may still be in the formative phase of gaining such experiences. *The Lancet* report of the Global

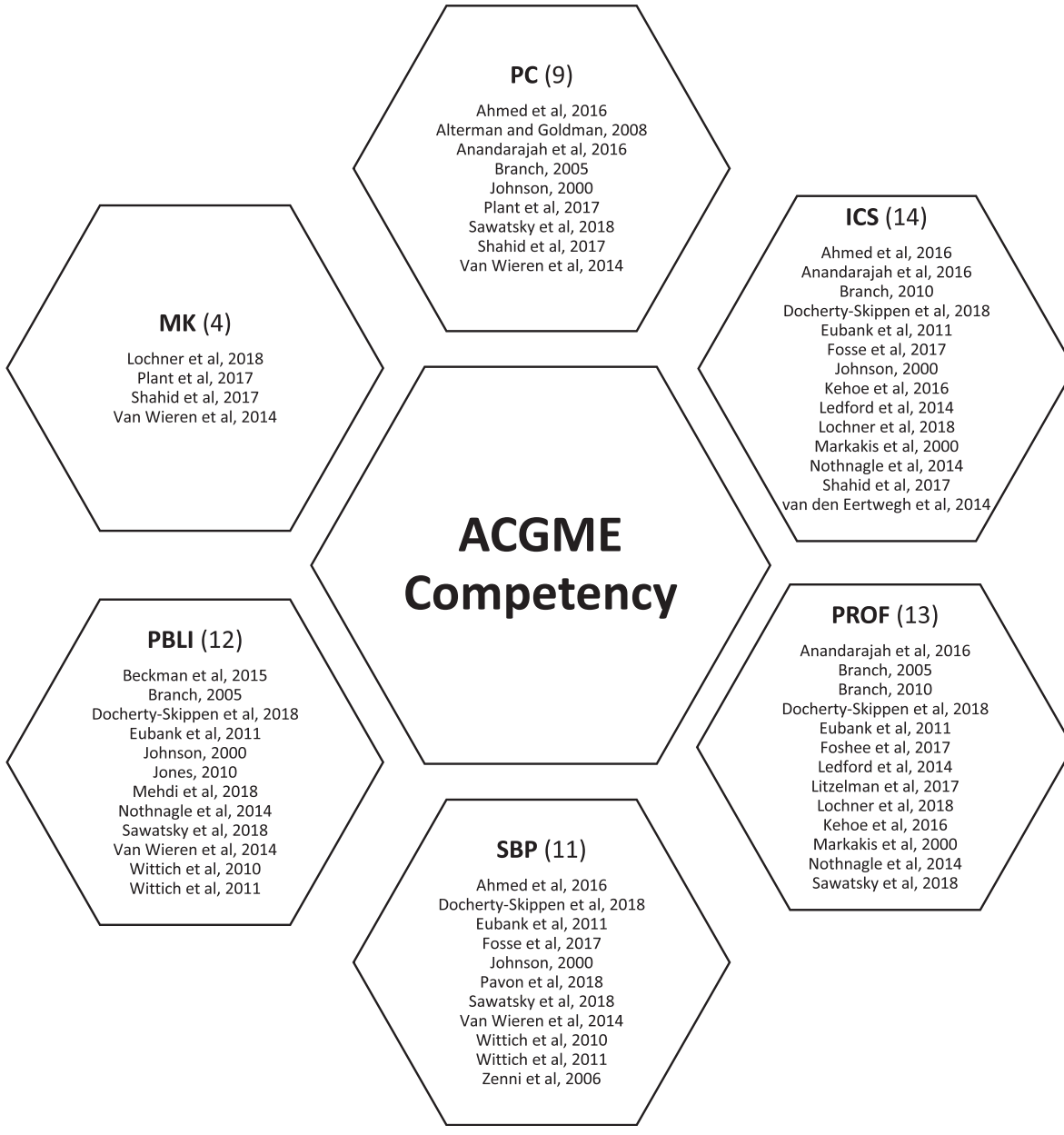

FIGURE 2
Citations Stratified by ACGME Competency (Citation Counts)

Note: This figure identifies the manuscripts that either implicitly or explicitly reference each ACGME core competency. Of note, the counts provided should not be interpreted as emphasis, as professionalism emerged as a strong theme despite interpersonal and communication skills receiving slightly higher total manuscript counts.

Abbreviations: MK medical knowledge; PC, patient care; ICS, interpersonal and communications skills; PBLI, practice-based learning and improvement; SBP, systems-based practice; PROF, professionalism.

Commission on Education of Health Professionals for the 21st Century[42] also interprets formation and transformation differently, with formative learning encompassing socialization and professional identity formation, and TL producing leaders and enlightened change agents. Thus, greater attention should be paid to differentiating formation and transformation in the literature, as well as in the training environment, so that the desired outcome may be achieved.

Mentorship, role-modeling, and coaching appeared integral to both professional identity formation and TL of residents and fellows (referenced in 64% of our citations). Such mentors were faculty members, attending physicians, or near-peer mentors (senior

residents).[31] Mentors created content on which to reflect (eg, sharing personal stories, introducing or recognizing "entry points"[22,39]) and facilitated critical reflection (eg, unpacking assumptions, bringing awareness to the subconscious). Cruess et al[43] argued that combined with the accrual of individual experience, mentorship and role-modeling are the most powerful influencers on socialization and professional identity formation. We assert that explicit recognition of TL by the mentor may move the learner more efficiently through such processes toward the goal of unsupervised practice as professionals.

TL and Primary Care

The vast majority of articles describing TL in GME pertained to the primary care fields. Procedural skills training integral to surgical GME or other technical specialties may more closely align with *informative* learning, or learning with the goal of knowledge and skills expertise.[42] Culture and context may also limit recognition of TL in the surgical fields, with faculty supervising general practice residents receiving more training on giving feedback than surgical faculty.[26] One study on communication skills learning found that "surgical residents received little support and their supervisors' feedback was primarily focused on medical content and accurate diagnosis."[26(p95)] Perceived time constraints also appeared to be a factor influencing specialty-specific TL. Surgical residents' "daily workload left no time for experimentation with new approaches,"[26(p94)] whereas general practice residents were afforded extra time for discourse with facility, which "prevented their reverting to old behavior due to stress or time constraints."[26(p94)]

As mentioned, the Lancet Commission[42] recognized TL as a pedagogy to teach leadership attributes. In their review of leadership curricula in GME, Sadowski et al[44] identified primary care specialties to be the most common venues for such curricula. If formal attention to fostering leadership is more common within primary care training, it is not surprising that similar training programs apply pedagogies theorized to achieve this intended outcome more effectively. This parallel between leadership development and TL theory warrants further study.

We believe that TL has a place in surgical residency. Thus, one area for future work is to better understand the TL potential in the procedural fields. In addition, faculty development for graduate medical educators in the surgical fields should be more explicit about educating for TL and contain skill-building sessions on feedback, guiding reflection, and leadership development.

TL by Other Names

Multiple articles described theories that seem to be surrogate terms for TL. Identity transformation, professional formation, professional identity, and formation were often used interchangeably with TL. Additionally, the transtheoretical (or stages of change) model[32] closely resembled TL, picking up at stage 2 of Mezirow's stepwise model, omitting the disorienting dilemma. In addition to theories we felt were synonymous with TL, we recognized multiple other interrelating educational theories or concepts, including experiential or situated learning, the informal or hidden curriculum, communities of practice, and self-directed learning.

Given the large proportion (approximately one-third) of articles demonstrating implicit TL, we suspect that TL may be happening without educators being aware of the theory behind it. We propose that a greater understanding of TL theory for graduate medical educators would have increased potential for achieving learning outcomes, especially across the more esoteric of clinical competencies. One framework used "critical reflection as the decision point," guiding the trainee down a path from disorienting dilemma to either PBLI or SBP, improving their personal practice or the health care system, respectively.[7] The medical educator's ability to recognize this decision point is essential to moving a learner from reflection, to critical reflection, to transformation.

Gaps in TL GME Literature on Diversity, Equity, and Inclusion

We recognized multiple areas within GME where TL likely occurs but was not captured in our search. The main area where we failed to identify a significant body of literature about TL pertained to diversity, equity, and inclusion in the GME environment. Residents and fellows from races or cultures that are underrepresented in medicine (UiM) likely face disorienting dilemmas on a daily basis. Similar to the findings from a realist synthesis on international medical graduates transitioning to their new workplaces,[34] UiM trainees may experience disorienting dilemmas should they matriculate in training programs situated in vastly different cultures than where they grew up. Underrepresented health professions trainees may need to choose when to "be themselves"[45(p43)] versus conform to the culture of their current learning environment (ie, code-switching), for fear of their racial identity being perceived as unprofessional.[45] Such dilemmas may pressure UiM learners to remain silent[45] or speak up as leaders for change.[45,46] After racial injustices and police brutality yet again came to the forefront in 2020, medical

residents were often those who led hospitals to join protests.[46] These disorienting events leading to structural change align well with the social critique perspective of TL.[3,8]

The graduate medical educator can also experience TL as it pertains to the training of UiM residents and fellows and the care of ethnically diverse patients. Smith[47] provides a framework for utilizing reflection as a means for White individuals to develop an antiracist worldview. We believe this to be a perfect encapsulation of the 4 key elements of TL. Through this lens, non-UiM educators in the GME setting may move beyond allyship into action. While we all observe social injustices in society (TL element No. 1, disorienting dilemma), a recognition of TL theory may promote subsequent introspection surrounding White privilege (No. 2, critical reflection), and perhaps organizing venues for group dialogue on diversity (No. 3, discourse). Such a process may lead to GME faculty adopting more equitable recruiting practices, promoting curricula recognizing race as a social construct, and leading health systems innovations to promote equity in access to care (No. 4, action).

Limitations

Our review had several important limitations. First, while we utilized at least 2 reviewers for article screening, only a single author performed data abstraction. While this potentially limited the reliability and consistency of our review, a truly objective review may not be possible, nor should it be.[48] The literature review has just as much potential to describe the properties of the reviewers, as does the literature reviewed. Nevertheless, we attempted to minimize bias by having all reviewers reach a consensus on themes. Next, while contextual factors of the learning environment are traditionally felt to be an essential component of TL theory, we included articles that referenced simulated experiences. However, we are not the first to recognize the TL potential of simulation.[10] Finally, while we attempted to stratify other authors' works according to the components of TL, there is potential that we misinterpreted their intent. It is well documented that much literature on the practice of TL is not theoretically grounded.[2] Thus, we believe our interpretation is an act of dialogue between the adult learning and medical education community as to what constitutes TL both in theory and in the practice of GME.

Conclusions

The available literature on TL in GME emphasizes its relationship to professionalism and the primary care fields. TL is occurring in other settings but goes by different names in the literature or may go unidentified altogether.

References

1. Mezirow J, Marsick V. *Education for Perspective Transformation. Women's Re-entry Programs in Community Colleges*. New York, NY: Columbia University; 1978.
2. Merriam SB, Baumgartner L. *Learning in Adulthood: A Comprehensive Guide*. 4th ed. San Francisco, CA: Jossey-Bass; 2020.
3. Merriam SB, Bierema LL. *Adult Learning: Linking Theory and Practice*. 1st ed. San Francisco, CA: Jossey-Bass; 2014.
4. Taylor EW. Fostering Transformative Learning. In: Mezirow J, Taylor EW, eds. *Transformative Learning in Practice: Insights From Community, Workplace, and Higher Education*. 1st ed. San Francisco, CA: Jossey-Bass; 2009:3–17.
5. Van Schalkwyk SC, Hafler J, Brewer TF, et al. Transformative learning as pedagogy for the health professions: a scoping review. *Med Educ*. 2019;53(6):547–558. doi:10.1111/medu.13804
6. Hamstra SJ, Woodrow SI, Mangrulkar RS. Feeling pressure to stay late: socialisation and professional identity formation in graduate medical education. *Med Educ*. 2008;42(1):7–9. doi:10.1111/j.1365-2923.2007.02958.x
7. Wittich CM, Reed DA, McDonald FS, Varkey P, Beckman TJ. Perspective: transformative learning: a framework using critical reflection to link the improvement competencies in graduate medical education. *Acad Med*. 2010;85(11):1790–1793. doi:10.1097/ACM.0b013e3181f54eed
8. Cranton P. Transformative learning. In: Mayo P, ed. *Learning with Adults: A Reader*. Rotterdam, The Netherlands: Sense Publishers; 2013:267–274.
9. Tricco AC, Lillie E, Zarin W, et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): checklist and explanation. *Ann Intern Med*. 2018;169(7):467–473. doi:10.7326/m18-0850
10. Sokol RG, Shaughnessy AF. Making the most of continuing medical education: evidence of transformative learning during a course in evidence-based medicine and decision making. *J Contin Educ Health Prof*. 2018;38(2):102–109. doi:10.1097/ceh.0000000000000199
11. Sucharew H, Macaluso M. Progress notes: methods for research evidence synthesis: the scoping review approach. *J Hosp Med*. 2019;14(7):416–418. doi:10.12788/jhm.3248
12. Sullivan GM. Why are medical education literature reviews so hard to do? *J Grad Med Educ*. 2018;10(5):481–485. doi:10.4300/JGME-D-18-00676.1

13. Vipler B, McCall-Hosenfeld J, Haidet P. Transformative learning in graduate medical education—a scoping review. *Gen Intern Med*. 2020;35(suppl 1)(Abstracts from the 2020 Annual Meeting of the Society of General Internal Medicine):306–307. doi:10.1007/s11606-020-05890-3
14. Batalden P, Leach D, Swing S, Dreyfus H, Dreyfus S. General competencies and accreditation in graduate medical education. *Health Aff (Millwood)*. 2002;21(5):103–111. doi:10.1377/hlthaff.21.5.103
15. Ahmed RA, Damore DR, Viti JF, et al. A pilot curriculum to integrate standardized patient simulation into clinical pastoral education. *Am J Hosp Palliat Care*. 2016;33(5):498–502. doi:10.1177/1049909115575733
16. Anandarajah G, Roseman J, Lee D, Dhandhania N. A 10-year longitudinal study of effects of a multifaceted residency spiritual care curriculum: clinical ability, professional formation, end of life, and culture. *J Pain Symptom Manage*. 2016;52(6):859–872.e1. doi:10.1016/j.jpainsymman. 2016.06.006
17. Branch WT Jr. The road to professionalism: reflective practice and reflective learning. *Patient Educ Couns*. 2010;80(3):327–332. doi:10.1016/j.pec.2010.04.022
18. Eubank D, Orzano J, Geffken D, Ricci R. Teaching team membership to family medicine residents: what does it take? *Fam Syst Health*. 2011;29(1):29–43. doi:10.1037/a0022306
19. Foshee CM, Mehdi A, Bierer SB, et al. A professionalism curricular model to promote transformative learning among residents. *J Grad Med Educ*. 2017;9(3):351–356. doi:10.4300/jgme-d-16-00421.1
20. Nothnagle M, Reis S, Goldman R, Anandarajah G. Fostering professional formation in residency: development and evaluation of the "Forum" Seminar Series. *Teach Learn Med*. 2014;26(3):230–238. doi:10.1080/10401334.2014.910124
21. Plant J, Li ST, Blankenburg R, Bogetz AL, Long M, Butani L. Reflective practice in the clinical setting: a multi-institutional qualitative study of pediatric faculty and residents. *Acad Med*. 2017;92(suppl 11 Association of American Medical Colleges Learn Serve Lead: Proceedings of the 56th Annual Research in Medical Education Sessions):75–83. doi:10.1097/acm.0000000000001910
22. Sawatsky AP, Nordhues HC, Merry SP, Bashir MU, Hafferty FW. Transformative learning and professional identity formation during international health electives: a qualitative study using grounded theory. *Acad Med*. 2018;93(9):1381–1390. doi:10.1097/ACM.0000000000002230
23. Shahid F, Abbas H, Mohmand M, et al. Conscious observation and analysis of subconscious thinking (COAST): the harbinger of metacognitive approach to clinical reasoning. Abstracts from the 2017 Society of General Internal Medicine Annual Meeting. *J Gen Intern Med*. 2017;32(suppl 2):83–808. doi:10.1007/s11606-017-4028-8
24. Zenni EA, Ravago L, Ewart C, Livingood W, Wood D, Goldhagen J. A walk in the patients' shoes: a step toward competency development in systems-based practice. *Ambul Pediatr*. 2006;6(1):54–57. doi:10.1016/j.ambp.2005.08.003
25. Lochner J, Lankton R, Rindfleish K, Arndt B, Edgoose J. Transforming a family medicine residency into a community-oriented learning environment. *Fam Med*. 2018;50(7):518–525. doi:10.22454/FamMed.2018.118276
26. van den Eertwegh V, van Dalen J, van Dulmen S, van der Vleuten C, Scherpbier A. Residents' perceived barriers to communication skills learning: comparing two medical working contexts in postgraduate training. *Patient Educ Couns*. 2014;95(1):91–97. doi:10.1016/j.pec.2014.01.002
27. Wittich CM, Reed DA, Drefahl MM, et al. Relationship between critical reflection and quality improvement proposal scores in resident doctors. *Med Educ*. 2011;45(2):149–154. doi:10.1111/j.1365-2923.2010.03860.x
28. Fosse A, Ruths S, Malterud K, Schaufel MA. Doctors' learning experiences in end-of-life care—a focus group study from nursing homes. *BMC Med Educ*. 2017;17(1):27. doi:10.1186/s12909-017-0865-8
29. Litzelman DK, Gardner A, Einterz RM, et al. On becoming a global citizen: transformative learning through global health experiences. *Ann Glob Health*. 2017;83(3–4):596–604. doi:10.1016/j.aogh.2017.07.005
30. Pavon JM, Pinheiro SO, Buhr GT. Resident learning across the full range of core competencies through a transitions of care curriculum. *Gerontol Geriatr Educ*. 2018;39(2):144–159. doi:10.1080/02701960.2016.1247066
31. Van Wieren A, Palazuelos L, Elliott PF, Arrieta J, Flores H, Palazuelos D. Service, training, mentorship: first report of an innovative education-support program to revitalize primary care social service in Chiapas, Mexico. *Glob Health Action*. 2014;7:25139. doi:10.3402/gha.v7.25139
32. Ledford CJ, Seehusen DA, Canzona MR, Cafferty LA. Using a teaching OSCE to prompt learners to engage with patients who talk about religion and/or spirituality. *Acad Med*. 2014;89(1):60–65. doi:10.1097/acm.0000000000000062
33. Mehdi A, Foshee C, Green W, Spencer A. Cognitive autopsy: a transformative group approach to mitigate cognitive bias. *J Grad Med Educ*. 2018;10(3):345–347. doi:10.4300/jgme-d-17-00884.1

34. Kehoe A, McLachlan J, Metcalf J, Forrest S, Carter M, Illing J. Supporting international medical graduates' transition to their host-country: realist synthesis. *Med Educ*. 2016;50(10):1015–1032. doi:10.1111/medu.13071
35. Alterman DM, Goldman MH. International volunteerism during general surgical residency: a resident's experience. *J Surg Educ*. 2008;65(5):378–383. doi:10.1016/j.jsurg.2008.07.009
36. Johnson CE. The transformative process of residency education. *Acad Med*. 2000;75(6):666–669. doi:10.1097/00001888-200006000-00022
37. Markakis KM, Beckman HB, Suchman AL, Frankel RM. The path to professionalism: cultivating humanistic values and attitudes in residency training. *Acad Med*. 2000;75(2):141–150. doi:10.1097/00001888-200002000-00009
38. Branch WT Jr. Use of critical incident reports in medical education. A perspective. *J Gen Intern Med*. 2005;20(11):1063–1067. doi:10.1111/j.1525-1497.2005.00231.x
39. Docherty-Skippen S, Beattie K. Duoethnography as a dialogic and collaborative form of curriculum inquiry for resident professionalism and self-care education. *Can Med Educ J*. 2018;9(3):e76–e82.
40. Jones LC. You learn it in your heart: transformative learning theory and clinical pastoral education. *J Pastoral Care Counsel*. 2010;64(4):7.1–10. doi:10.1177/154230501006400407
41. Beckman TJ, Post JA. Residents' clinic articles in the age of competency-based medical education. *Mayo Clin Proc*. 2015;90(12):1597–1599. doi:10.1016/j.mayocp.2015.09.014
42. Frenk J, Chen L, Bhutta ZA, et al. Health professionals for a new century: transforming education to strengthen health systems in an interdependent world. *Lancet*. 2010;376(9756):1923–1958. doi:10.1016/s0140-6736(10)61854-5
43. Cruess RL, Cruess SR, Boudreau JD, Snell L, Steinert Y. A schematic representation of the professional identity formation and socialization of medical students and residents: a guide for medical educators. *Acad Med*. 2015;90(6):718–725. doi:10.1097/acm.0000000000000700
44. Sadowski B, Cantrell S, Barelski A, O'Malley PG, Hartzell JD. Leadership training in graduate medical education: a systematic review. *J Grad Med Educ*. 2018;10(2):134–148. doi:10.4300/jgme-d-17-00194.1
45. Bush AA. A conceptual framework for exploring the experiences of underrepresented racial minorities in pharmacy school. *Am J Pharm Educ*. 2020;84(1):7544. doi:10.5688/ajpe7544
46. Stone VE. White coats for Black lives: the time has come for action. *Ann Intern Med*. 2020;173(8):656–657. doi:10.7326/M20-4280
47. Smith R. Moving from allyship to antiracism. *Creat Nurs*. 2021;27(1):51–54. doi:10.1891/crnr-d-20-00080
48. Montuori A. Literature review as creative inquiry: reframing scholarship as a creative process. *J Transform Educ*. 2005;3(4):374–393. doi:10.1177/1541344605279381

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