REVIEW ARTICLE

Transformational Teaching: Theoretical Underpinnings, Basic Principles, and Core Methods

George M. Slavich · Philip G. Zimbardo

Abstract Approaches to classroom instruction have evolved considerably over the past 50 years. This progress has been spurred by the development of several learning principles and methods of instruction, including active learning, student-centered learning, collaborative learning, experiential learning, and problem-based learning. In the present paper, we suggest that these seemingly different strategies share important underlying characteristics and can be viewed as complimentary components of a broader approach to classroom instruction called *transformational teaching*. Transformational teaching involves creating dynamic relationships between teachers, students, and a shared body of knowledge to promote student learning and personal growth. From this perspective, instructors are intellectual coaches who create teams of students who collaborate with each other and with their teacher to master bodies of information. Teachers assume the traditional role of facilitating students' acquisition of key course concepts, but do so while enhancing students' personal development and attitudes toward learning. They accomplish these goals by establishing a shared vision for a course, providing modeling and mastery experiences, challenging and encouraging students, personalizing attention and feedback, creating experiential lessons that transcend the boundaries of the classroom, and promoting ample opportunities for preflection and reflection. We propose that these methods are synergistically related and, when used together, maximize students' potential for intellectual and personal growth.

Keywords Constructivism · Self-efficacy · Expectations · Modeling · Mastery · Collaborative learning · Experiential lessons · Leadership · Shared vision · Personal growth

The question of how best to promote intellectual development has long been the focus of philosophical debate and, more recently, empirical investigation. Over the past 50 years, this

G. M. Slavich (✉)
Cousins Center for Psychoneuroimmunology and Department of Psychiatry and Biobehavioral Sciences, University of California, Los Angeles, UCLA Medical Plaza 300, Room 3156, Los Angeles, CA 90095-7076, USA
e-mail: gslavich@mednet.ucla.edu

P. G. Zimbardo
Department of Psychology, Stanford University, 450 Serra Mall, Stanford, CA 94305-2130, USA

discussion has been informed by an abundance of research examining how instructors can make classes more interesting and engaging (Richardson 2008; Wood 1989). Solutions have included integrating multimedia into lectures to improve student attention (Berk 2009; Hoffman and Ritchie 1997), using classroom-based electronic voting systems to enable real-time communication between students and teachers (Caldwell 2007; Draper and Brown 2004), employing social media to foster collaboration (Kaufer *et al.* 2011; Ford *et al.* 2011), and providing audio or printed versions of lectures to reinforce learning and retention (Lewis and Harrison 2012; McKinney *et al.* 2009). These advancements have had a significant effect on how instructors teach, and this is especially true in higher education, where lecturing remains the most common form of instruction and accounts for the largest percentage of class time used (Benjamin 2002; Lammers and Murphy 2002; Twenge 2009). At the same time, advancements in lecturing style account for only a small part of the overall pedagogical progress that has been made (Mazur 2009; Ueckert *et al.* 2011).

The more impressive developments in classroom instruction have involved large-scale re-considerations of what should happen in the classroom and what teachers should aim to accomplish over the duration of a course. For example, while it was once relatively common to regard students as passive listeners in the classroom, a large number of excellent books and journal articles have now been published describing techniques for getting students more active and engaged in class (Fies and Marshall 2006; Michael 2006; Rosebrough and Leverett 2011). In addition, whereas teachers' objectives used to be relatively constrained to helping students master course content, it is not uncommon for teachers' goals to now also involve some combination of increasing students' academic self-efficacy (Caprara *et al.* 2011; Marsh and Martin 2011), improving their self-regulatory capability (Boekaerts 2002; Zimmerman and Schunk 2011), enhancing their feelings toward learning (Duncan and Arthurs 2012), and instilling in them values and skills that promote lifelong learning (Aspin *et al.* 2012). These developments have reshaped contemporary pedagogical discussions, as well as what instructors do in the classroom (Young 2005). They have also had a significant effect on learning. For example, several well-controlled studies have now shown that students demonstrate more learning, better conceptual understanding, superior class attendance, greater persistence, and increased engagement when collaborative or interactive teaching methods are used compared to when traditional lecturing is employed (Armbruster *et al.* 2009; Armstrong *et al.* 2007; Dahlgren *et al.* 2005; Deslauriers *et al.* 2011; Freeman *et al.* 2007; Haak *et al.* 2011; Knight and Wood 2005; Preszler 2009; Prince 2004; Saville *et al.* 2006; Ueckert *et al.* 2011; cf. Andrews *et al.* 2011).

The goal of the present paper is to review the major contemporary approaches to learning and classroom instruction, and to examine their similarity. Although these strategies differ in slight ways in terms of their intention, scope, and emphasis, we suggest that these theoretical perspectives and methods share several fundamental characteristics and that they can thus be viewed as part of a broader approach to classroom instruction called *transformational teaching*. To substantiate this formulation, we first review the most commonly discussed approaches to learning and classroom instruction, and highlight areas of similarity and overlap. Second, we discuss how these different approaches can be viewed in light of the superordinate framework called transformational teaching and describe the theoretical underpinnings of this framework. Third, we describe several basic principles and instructional methods that we believe are consistent with transformational teaching. Finally, we propose several topics for future clarification and research. Although we suggest that transformational teaching is a conceptually meaningful and practically useful framework for thinking about how to maximize student development, important questions remain along several lines of inquiry.

Contemporary Approaches to Learning and Classroom Instruction

As summarized in Table 1, contemporary advancements in classroom instruction have taken many different forms. Progress at the highest conceptual level has involved the formulation of several values or principles of learning that are intended to guide instruction. The two most commonly discussed principles are active learning and student-centered learning. Progress has also taken place at the teaching method level, with the development of collaborative learning, experiential learning, and problem-based learning.

Active learning and student-centered learning

At the heart of active learning is the notion that students must read, write, discuss, and engage in problem solving to maximize their potential for intellectual growth (Bonwell and Eison 1991; Meyers and Jones 1993; Svinivki and McKeachie 2011). These activities are important because they engage higher-order cognitive strategies such as analysis, synthesis, and evaluation, and are thought to be most effective when done in pairs or groups, insofar as peer interaction requires students to articulate their logic and to consider different points of view when solving problems (Smith *et al.* 2009). Examples of active learning techniques include writing short, 1-min reflection papers, analyzing and reacting to videos, debating course topics, keeping a daily journal, and publically declaring answers in class (Freeman *et al.* 2007; Johnson *et al.* 2006; Moeller 1985; Skott and Ward 2012; Slavin *et al.* 2009; Yoder and Hochevar 2005).

Central to student-centered learning, in contrast, is the principle that instructors should shape course curricula and content based on students' needs, abilities, interests, and learning styles (Brandes and Ginnis 1986; Brown Wright 2011; Estes 2004; Hannafin *et al.* 1997; Kilic 2010). Instructors engage students in active, collaborative discovery, which increases students' responsibility for learning and gives students the ability to shape their learning experience (Brown 2008). This approach can be contrasted with a lecture-based approach, in which instructors assume the role of "sage on the stage" and dictate information to students, who have little role in shaping the experience (Weimer 2002).

Collaborative learning, experiential learning, and problem-based learning

Advancements in classroom instruction have also taken place at the teaching method level. The most commonly discussed contemporary methods include collaborative learning, experiential learning, and problem-based learning. Collaborative learning is the most general of these approaches in that it involves the overarching principle that learning occurs best when done in groups (Johnson and Johnson 1974; Slavin 1977, 1995). Working with others is more dynamic and motivating than working alone (Svinivki and McKeachie 2011). It also has several benefits including the fact that it encourages students to restructure their own knowledge and understanding of concepts (O'Donnell 2006), helps students recognize gaps in their understanding (Cooper 1999), promotes social modeling of effective problem-solving strategies (Smith *et al.* 2009), and teaches students to synthesize, communicate, and discuss ideas in ways that advance conceptual understanding (Barkley *et al.* 2005). Examples of collaborative learning activities include group roundtables (e.g., students brainstorm and discuss different answers to a common question), paired annotations (e.g., students read the same article, and examine convergent and divergent reactions), and send-a-problem (e.g., students attempt to solve problems within a group and, if unsuccessful, send the problem to another group; Kuh *et al.* 2010; McManus 2005; Osborne 2010; Webb 2009).

Table 1 Contemporary approaches to learning and classroom instruction

Approach	Brief description	Example activities	Select references
Active learning	Instructors actively engage students in the learning process by assigning guided activities and exercises that require students to articulate and communicate ideas, explore attitudes and values, and utilize higher-order cognitive strategies such as analysis, synthesis, and evaluation	One minute paper Debating topics Role-playing Daily journal Think-pair-share Analyzing/reacting to videos Collaborative learning group Class discussion	Bonwell and Eison 1991; Johnson et al. 2006; Meyers and Jones 1993; Moeller 1985; Richmond and Kindelberger Hagan 2011; Yoder and Hochevar 2005
Student-centered learning	Instructors assign primacy to students' needs, abilities, interests, and learning styles by making them active learners and giving them autonomy and control over choice of subject matter, learning methods, and pace of study, which in turn increases students' responsibility for learning and helps them develop skills to actively choose and manage their educational goals	Self-initiated assignments Self-paced teaching booklets Self-directed learning kits School-based action research projects Learning logs Role-playing Class activities and fieldwork Co-creating curriculum	Brandes and Ginnis 1986; Brown 2008; Brown Wright 2011; Estes 2004; Hannafin et al. 1997; Kilic 2010; O'Neill and McMahon 2005; Tärnvik 2007; Weimer 2002
Collaborative learning	Students learn best when they tackle problems and questions with peers—especially more knowledgeable peers—insofar as such experiences provide students with opportunities to learn new problem-solving strategies and to debate ideas in a way that challenges their understanding of concepts	Jigsaw classroom Group roundtables Paired annotations Send-a-problem Think-pair-share Three-step interview	Aronson and Patnoe 1997; Barkley et al. 2005; Johnson and Johnson 1974; Millis 2010; O'Donnell et al. 2006; Slavin 1977, 1995; Smith et al. 2009; Svinivki and McKeachie 2011

Table 1 (continued)

Approach	Brief description	Example activities	Select references
Experiential learning	Instructors promote learning by having students directly engage in, and reflect on, personal experiences that takes place in four stages (concrete experience, reflection, abstract conceptualization, and active experimentation), leading to increased knowledge, skill development, and values clarification	Team pair solo Circle the sage Keeping a reflective journal Observing phenomena or behavior Conducting interviews or experiments Participating in discussion boards Playing games or simulations Taking field trips Role playing Building a model	Beard and Wilson 2006; Cantor 1995; Clements 1995; Kayes et al. 2005; Kolb 1984; Kolb and Fry 1975; Kolb and Kolb 2005; Maudsley and Strivens 2000; Miettinen 2000; Moon 2004; Svinivki and McKeachie 2011
Problem-based learning	Instructors (called "tutors" or "facilitators") facilitate learning by having students tackle complex, multifaceted problems in small groups while providing scaffolding, modeling experiences, and opportunities for self-directed learning, which enhances students' content knowledge, and increases their academic self-efficacy, problem-solving skills, collaboration skills, and self-directed learning skills	Small-group teams Clarifying concepts and terms Developing and testing hypotheses Delegating research workload Studying privately Synthesizing and reporting new information	Amador et al. 2006; Barrows 1996; Barrett 2010; Boud and Feletti 1997; Duch et al. 2001; Gasser 2011; Hmelo-Silver 2004; Karpiak 2011; Loyens et al. 2008; Schmidt 1983; Svinicki 2007

The second method, experiential learning, involves engaging students in activities that enable them to experience course content (Svinivki and McKeachie 2011). Although experiential activities can take place in the classroom, there is an expressed emphasis on assigning projects that occur outside the classroom, where concepts can be better integrated into students' lives (Svinivki and McKeachie 2011). Examples include having students observe course-relevant phenomena or behavior, conduct interviews or experiments, play games or simulations, or keep a reflective journal (Beard and Wilson 2006; Cantor 1995; Kayes *et al*. 2005; Kolb and Kolb 2005, 2009; Moon 2004).

Finally, problem-based learning focuses on providing students with opportunities to identify and tackle complex, multifaceted problems in both small groups and on their own. In this approach, which refers to both a curriculum *and* a process, teachers serve as "tutors" or "facilitators" who guide learning by modeling and scaffolding, and by maximizing students' responsibility for learning (Amador *et al*. 2006; Boud and Feletti 1997; Duch *et al*. 2001; Hmelo-Silver 2004; Loyens *et al*. 2008; Norman and Schmidt 2000; Svinicki 2007). Problem-based learning is utilized across many different educational levels and disciplines, and literally hundreds of activities have been developed for this approach (Barrows 1996).

Contemporary Approaches: Differences and Similarities

As evidenced by this brief summary, active learning, student-centered learning, collaborative learning, experiential learning, and problem-based learning are different in certain ways. For one, they constitute largely separate literatures (e.g., elementary and secondary school vs. adult education) and, partly for this reason, focus on different aspects of the teaching and learning process (e.g., engaging students in active or experiential activities vs. group-based problem solving). These approaches also differ with respect to their conceptual scope. For example, whereas active learning and student-centered learning are most appropriately described as *values* or *principles of learning*, collaborative learning, experiential learning, and problem-based learning are more like methods of teaching that have specified instructional formats or curricula. Perhaps for these reasons, there has been surprisingly little research on how these different perspectives on teaching and learning are related. There has also been relatively little discussion about whether similarities that exist across these approaches can be understood in terms of a superordinate framework of learning or instruction.

Our contention is that although these five major perspectives differ in some ways, they are actually more similar than different. At the deepest conceptual level is the fact that these approaches share similar theoretical roots. At the heart of all types of active and student-centered learning, for example, is the constructivist notion that students generate knowledge and meaning best when they have experiences that lead them to realize how new information conflicts with their prevailing understanding of a concept or idea (Piaget 1926; Vygotsky 1978). To produce the type of cognitive dissonance that promotes new understanding, though, students must do more than just listen to an instructor describe concepts. Rather, they must engage in activities or exercises that require them to reflect on their understanding and examine or explain their thinking (Jensen and Lawson 2011; Lord 1997; Stockdale and Williams 2004). Classroom formats that (for example) involve a combination of daily and weekly quizzes, extensive group work, and the use of "clickers" to promote in-class participation have these effects, whereas lecture-only formats do not (Haak *et al*. 2011). What is critical about the former experiences compared to the latter is that in the former, learners are actively involved in the discovery process, which engages them in problem-

solving that requires the higher-order cognitive skills of analysis, synthesis, and evaluation (Svinivki and McKeachie 2011). This notion that students "learn by doing" is embedded in each of the approaches to classroom instruction described in Table 1, and we propose that it can thus be seen as a common, unifying principle across these approaches.

The importance of social interactions is also embedded in each of these five major contemporary approaches to learning and classroom instruction. This emphasis derives from social constructivism, or the notion that a person's beliefs and understanding of the world are shaped to a significant extent by his or her historical, social, and culture context (Vygotsky 1978, 1986; see also Bruner and Haste 2010). Social contexts, and the interactions that occur within these contexts, enhance learning for at least two reasons: First, they teach an individual about the symbol systems (e.g., mathematical systems, logic, and particularly language) that are necessary for learning about the world; and second, they expose an individual to more knowledgeable community members (e.g., older peers, teachers) who infuse the symbols with social meaning, and model advanced problem-solving and reasoning skills (Bruner and Haste 2010; Keaton and Bodie 2011; Pritchard and Woollard 2010). These social constructivism principles thus have several direct implications for classroom instruction. For example, they imply that teachers should act as facilitators who provide students with guided opportunities to interact with each other, rather than as lecturers who simply dictate answers. In addition, they argue that teachers must focus on the needs of the learner, rather than on the content to be taught, in order to know what types of experiences will be most helpful for advancing understanding. These values are not of secondary importance to the approaches discussed here but rather are core features of the approaches themselves.

Contemporary approaches to learning and classroom instruction are also related in several more specific ways. First, as we have alluded to already, the principles of active learning and student-centered learning are either implicitly or explicitly alluded to in each of these approaches. In fact, some may argue that these five approaches form a hierarchy of modern teaching strategies, with active learning and student-centered learning at the top and, nested within these principles, collaborative learning, experiential learning, and problem-based learning. Although active learning and student-centered learning are most clearly expressed in problem-based learning, these principles are important for collaborative learning and experiential learning as well. Second, each of these approaches aims to increase students' involvement in, and their responsibility for, shaping and guiding the learning experience. Again, this theme is not simply an adjunct to these five approaches to learning and classroom instruction, but rather is a defining feature of what makes these approaches different from a traditional lecture-based approach, in which students have little control over the nature and pace of their learning experience. And third, each of these approaches focuses on transforming students' disposition toward learning by, for example, increasing students' academic self-efficacy, improving students' self-regulatory capabilities, instilling in students self-directed learning skills, enhancing students' learning-related attitudes and values, or promoting students' beliefs about their capability to acquire, synthesize, analyze, and use knowledge in a way that is meaningful for their lives. Although these approaches differ in the extent to which they discuss these goals in an explicit manner, these goals are nonetheless embedded in all five of these approaches.

Summary of differences and similarities

To summarize, although the major contemporary approaches to learning and classroom instruction differ in slight ways, these approaches also have many similarities. Most

important is the fact that they share similar theoretical roots insofar as they each derive from constructivist and social constructivist theory, which emphasize the importance of active engagement and social interactions for promoting learning (Piaget 1926; Vygotsky 1978, 1986). These approaches are also related in more specific ways, though, in the sense that they each aim to facilitate students' increased mastery of key course concepts while enhancing students' learning-related attitudes, values, beliefs, and skills. Given this high degree of theoretical overlap and the fact that all of these approaches emphasize transforming students' disposition toward learning, we suggest that these contemporary approaches may be viewed in terms of their similarity and, more specifically, as complimentary components of a broader approach to classroom instruction called *transformational teaching*.

Transformational Teaching: Definition and History

We define transformational teaching as the expressed or unexpressed goal to *increase students' mastery of key course concepts while transforming their learning-related attitudes, values, beliefs, and skills*. Based on previous discussions of transformational teaching (see below), we propose that this process involves creating dynamic relationships between teachers, students, and a shared body of knowledge in a way that promotes student learning and personal growth. From this perspective, instructors are viewed as intellectual coaches who create teams of students who collaborate with each other and with their teacher to master bodies of information. Instructors assume the traditional role of facilitating students' acquisition of key course concepts, but they do so while promoting students' personal development and enhancing their disposition toward learning. Instructors do this, we believe, by implementing the core methods of transformational teaching, which we outline later in this paper.

The term "transformational teaching" was first used by Slavich (2005, 2006a) to describe the belief that instructors can promote meaningful change in students' lives if they view courses as stages upon which life-changing experiences can occur. This early formulation focused on promoting student learning and personal development through the implementation of group-based activities that involve experiencing key course concepts while reflecting on the process. Slavich proposed that when such activities are implemented with structured guidance from an instructor, these experiences do not just "impart information to students but rather [change] something about how students learn and live" (Slavich 2005, p. 3). In subsequent papers, Slavich highlighted how instructors can serve as motivational leaders in this process by compelling students to realize a shared vision for a course, which encourages students to work together to maximize their personal and collective potential (Slavich 2006b, 2009).

Around the same time, Quinn reflected on what it means to be a transformational teacher by arguing that "Great teachers call ordinary students to embrace their own greatness" (as cited in Anding 2005, p. 488). Teachers do this, he suggested, by entering a "fundamental state of leadership" in which they become results centered, internally driven, other focused, and externally open (Anding 2005). Boyd (2009) subsequently discussed how transformational leadership can be used to help students "see the larger view of education" and to provide students with a "compelling vision of their future" (p. 53). More recently, Beauchamp and colleagues investigated the effects of transformational teaching in the context of physical education (Beauchamp and Morton 2011). In a series of elegant studies, they demonstrated that transformational teaching increases students' motivation and positive

beliefs toward physical activity (Morton *et al.* 2010), that self-determined motivation in this realm is explained by students' perceptions of their teachers' transformational behaviors (Beauchamp *et al.* 2010), and that an intervention designed to teach transformational teaching behaviors can increase such behaviors and result in higher student-reported motivation, self-efficacy, and intentions to remain physically active (Beauchamp *et al.* 2011).

Finally, one of the most recent and extensive discussions of transformational teaching was conducted by Rosebrough and Leverett (2011). In what appears to be the first book on the topic, they define transformational teaching as "an act of teaching designed to change the learner academically, socially, and spiritually" (Rosebrough and Leverett 2011, p. 16). They argue that education should be more about inspiration than information, and encourage instructors to consider the importance of equipping students with both the skills *and* attitudes that are necessary for overcoming challenges (Rosebrough and Leverett 2011). Their approach is similar with respect to its emphasis on promoting student growth through leadership, but differs from previous formulations in that the authors assign an important role to achieving "spiritual goals in the classroom" (Rosebrough and Leverett 2011, p. 30).

Central to the present formulation of transformational teaching is the idea that instructors can guide students toward making self-discoveries that shape their fundamental beliefs about themselves. In contrast with traditional lecturing, which involves a largely unidirectional transfer of information from an instructor to students, transformational teaching involves conceptualizing teachers as change agents who lead students in the process of collaborating with one another and with their instructor to develop as learners and as people. This is done by engaging students in the process of interdependent discovery, and by giving students ample time to discuss the strategies they use and the knowledge they generate. Although transformational teaching could be considered a method of classroom instruction insofar as it suggests some specific activities that can be used to achieve transformational teaching goals, it is more aptly described as a broad framework for understanding the overall instructional environment and how key players in that environment can interact to maximize students' intellectual and personal growth. The approach thus involves examining the roles that teachers may play in transforming students' attitudes, values, and beliefs, as well as the responsibility that students have for shaping their own and their peers' learning experience. In a more general sense, it involves reconsidering traditional notions of what may be accomplished in the classroom. This entails broadening teaching objectives so they include enhancing students' attitudes toward learning, and their beliefs regarding their capability to acquire, synthesize, analyze, and use knowledge in a manner that is relevant and meaningful for their lives.

Theoretical Underpinnings of Transformational Teaching

We have already described several values and principles that underlie contemporary approaches and that, we argue, are fundamental aspects of transformational teaching. These principles include the constructivist notion that learning occurs best when students are actively engaged in the discovery process (Piaget 1926), and the social constructivist notion that educational exercises are more impactful when they involve social interaction (Bruner and Haste 2010; Vygotsky 1978, 1986). There are, however, other theoretical perspectives that are not always highlighted in contemporary approaches to learning and classroom instruction, but which help form the conceptual basis for transformational teaching. These perspectives address important aspects of student learning and instructional leadership, and derive from the literatures on social cognitive theory (Bandura 1986, 1993, 1997, 2012a, b; Schunk and Mullen 2012; Schunk and Pajares 2009), transformative learning theory (Cranton

2006; Dirkx 1998; Erickson 2007; MacGregor Burns 1978; Mezirow 1978, 1991, 1994, 1995, 1996, 2000; Taylor 2007), intentional change theory (Boyatzis 2006a, b, c, 2009), and transformational leadership (Avolio and Bass 1995; Bass 1985; Bass and Bass 2008; Bass and Riggio 2006, 2010; Rafferty and Griffin 2004).

Social cognitive theory

Social cognitive theory addresses fundamental aspects of how learning occurs and is thus critical for all approaches to classroom instruction, including transformational teaching. In social cognitive theory, individuals are conceptualized as agents who exert intentional influence over their functioning and over events in their lives through their actions (Bandura 1986, 2012a). This influence is not exercised randomly, but rather in accord with one's self-efficacy beliefs, which are defined as the extent to which people think their actions will result in success (Bandura 1986, 1997, 2012a). Efficacy beliefs affect human functioning by influencing the extent to which people are optimistic versus pessimistic, make resilient versus detrimental attributions for successes and failures, apply appropriate coping strategies for dealing with difficult situations, and persist in the face of challenge (Bandura 2012b). Because of these effects, efficacy beliefs are a strong determinant of students' academic success (Bandura 1997, 2012a, b; Marsh and Martin 2011; Rubie-Davies 2010). Specifically, whereas low expectations for success are associated with relatively poor performance across several indices of success (e.g., test scores, grade point average, etc.), high expectations predict positive student beliefs and exemplary performance (Bouffard-Bouchard 1990; Gore 2006; Klassen 2004; McKown and Weinstein 2008; Rosenthal and Jacobson 1968; Rubie-Davies 2006; Tauber 1997).

Students' own efficacy beliefs are a strong determinant of success, but so too are the beliefs of others, including students' peers, parents, instructor, and principal (Bandura 1997). Moreover, because teachers' expectations determine the extent to which they utilize successful class management strategies, student success is also influenced by the beliefs that teachers hold about their *own* capabilities (Caprara *et al*. 2006; Pajares 1996; Woolfolk Hoy and Davis 2006). Compared to teachers with lower instructional efficacy, for example, those with higher efficacy manage time better (Bouffard-Bouchard *et al*. 1991), are more persistent when faced with challenges (Bandura and Schunk 1981), perceive more control over student success (Skaalvik and Skaalvik 2010), are more committed to their job (Ware 2011), and exhibit greater job satisfaction and less job burnout (Klassen 2010; Klassen and Chiu 2010). Although the effects of teacher efficacy on student outcomes are estimated to be modest based on current available research (see Klassen *et al*. 2011), the take-home point is that student success is determined by multiple sources and that, to promote transformational teaching goals, instructors must work to manage several sets of expectations, including (a) students' own beliefs regarding their likelihood of success, (b) the beliefs that others (e.g., peers, parents, and principals) harbor regarding students' potential for success, and (c) the instructor's own beliefs regarding both students' likelihood of success and their own likelihood of success. According to transformational teaching, instructors who manage these sets of expectations best will be most likely to increase students' mastery of key course concepts while transforming learning-related attitudes, values, beliefs, and skills.

Transformative learning theory

A second theoretical perspective that has informed our formulation of transformational teaching is transformative learning theory (Cranton 2006; Dirkx 1998; Erickson 2007; Mezirow 1978; Taylor 2007). According to transformative learning theory, adult learners

improve their understanding of the world by revising their "frames of reference," which include their habits of mind (e.g., broad, abstract habitual ways of thinking, feeling, and acting) and points of view (e.g., specific attitudes, values, beliefs, or judgments; Mezirow 1997). Frames of reference are initially shaped by social and cultural influences (e.g., parents, peer groups, etc.), but are amenable to modification when individuals solve problems (instrumental learning) or discuss problems (communicative learning) while critically reflecting on (or "reframing") the assumptions upon which interpretations, beliefs, and habits of mind or points of view are based (Mezirow 1996). Based on this formulation, Mezirow (2000) proposed that students can learn in four different ways. First, they can elaborate on existing frames of reference; second, they can learn new frames of reference; third, they can transform habits of mind; and fourth, they can transform points of view.

Although transformative learning theory has been the subject of much more qualitative than quantitative research, the theory nonetheless provides several intuitive steps that instructors can consider taking to promote the transformational teaching goals of enhancing students' attitudes, values, beliefs, and skills. According to transformative learning theory, for example, instructors can serve as "facilitators" and "provocateurs" who help students become aware and more critical of their assumptions. Instructors can do this, the theory suggests, by engaging students in learner-centered, participatory, and interactive experiences that require group problem-solving, autonomous thinking, critical reflectivity, and discourse (Mezirow 1997). Along more specific lines, instructors can promote changes in attitudes and beliefs by having students complete interdependent discovery learning exercises—such as group projects, role play, case studies, and simulations—that engage students with concepts in a way that is relevant and meaningful for students' lives (Mezirow 1997, 2000).

Intentional change theory

A third theoretical perspective incorporated into transformational teaching is provided by intentional change theory. Intentional change theory derives primarily from the management literature and proposes that a desirable, sustainable change in an individual's behavior, thoughts, feelings, or perceptions involves five steps, or "discoveries," which function as an iterative cycle (Boyatzis 2006a, b, c). First, individuals must establish an ideal self and a personal vision for the future (i.e., Who do you want to be?), which is based on developing an image of a desired future, fostering hope that one can achieve their goals, and identifying established strengths upon which the personal vision can be realized (Boyatzis and Akrivou 2006). Second, they must identify their "real self," which includes an honest assessment of strengths and weaknesses, and then compare it to their ideal self, or who they want to become. Third, they must devise a tailored learning plan, which establishes a set of personal standards that the individual needs to meet to "close the gap" between their real self and their ideal self. Fourth, they need to engage in activities that allow them to experiment or practice with new behaviors, thoughts, feelings, or perceptions. And finally, they must develop and maintain close, personal relationships with people who can help them move through these steps and toward their goal of realizing change.

Although intentional change theory concerns itself with all types of behavioral and attitudinal change, the steps or discoveries that are outlined by the theory can clearly be applied as a framework for understanding how instructors can enhance students' attitudes, values, and beliefs in the classroom. Several techniques, in fact, are already found in contemporary approaches to classroom instruction. For example, instructors can help students formulate an ideal self and personal vision for the future, foster hope that students can realize their desired future, aid students in identifying areas of strengths and weakness to

highlight what needs improvement, establish individualized development plans for students, engage students in activities that enable them to practice new patterns of thinking and behaving, and surround students with supportive others who promote these goals and encourage positive change.

Transformational leadership

Finally, our formulation of transformational teaching derives a great deal of conceptual inspiration from the literature on transformational leadership (e.g., Avolio and Bass 1995; Bass 1985). Transformational leadership has garnered significant attention in the fields of management, leadership, and positive psychology, and can best be thought of as a universal paradigm for empowering, inspiring, and challenging individuals to transcend their own self-interests for the purpose of achieving a higher level of functioning (Barling *et al.* 2010; Bass 1985; Bass and Bass 2008; Bass and Riggio 2010). According to Bass and Riggio (2006), transformational leadership involves "inspiring followers to commit to a shared vision and goals for an organization or unit, challenging them to be innovative problem solvers, and developing followers' leadership capacity via coaching, mentoring, and provision of both challenge and support" (p. 4). Even though transformational leadership is rarely applied for the purpose of understanding the teacher–student relationship, we believe this approach for guiding individuals is strikingly similar to what most good teachers would say they do in the classroom.

One way instructors can make use of transformational leadership is by incorporating into their instructional style the four dimensions or components of transformational leadership, which include: idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration. According to Bass and Riggio (2006), idealized influence occurs when leaders serve as role models who demonstrate high standards of ethical and moral excellence, and who engender admiration, trust, and respect from others while inspiring them to maximize their personal and collective potential. Inspirational motivation involves promoting optimism and enthusiasm, which inspires and motivates others to exceed expectations and realize a collectively shared vision of excellence. Intellectual stimulation takes place when leaders instill more flexible and creative patterns of thinking by prompting individuals to think independently, challenge commonly held assumptions, and view problems from different perspectives. Finally, individualized consideration occurs when leaders provide challenges and empathetic, supportive feedback that is tailored for each individual, and when they recognize and celebrate the personal contributions that each individual makes to the group (Bass and Bass 2008; Bass and Riggio 2010).

Although a complete review of the literature on transformational leadership's positive effects is beyond the scope of the present paper (e.g., see Bass and Bass 2008; Bass and Riggio 2006), it is worth reiterating that several observational and experimental studies have now shown that transformational leadership principles can be successfully integrated into the educational setting to achieve very favorable results. As we alluded to previously, for example, teachers' use of transformational leadership has been associated with more positive student attitudes and beliefs, greater motivation, more enjoyment out of class, greater satisfaction with the class and teacher, and greater self-determined motivation, as well as with significant improvements in self-efficacy and intrinsic motivation (for a review, see Beauchamp and Morton 2011). We suggest, therefore, that transformational leadership is a critical feature of transformational teaching and that, when applied successfully, transformational teaching can maximize students' potential for academic success, and significantly enhance students' attitudes, values, beliefs, and skills.

Basic Principles of Transformational Teaching

To substantiate our formulation of transformational teaching, we have reviewed the theoretical roots that underlie contemporary approaches to learning (i.e., constructivism and social constructivism), as well as several theoretical perspectives (i.e., social cognitive theory, transformative learning theory, intentional change theory, and transformational leadership) that we believe underlie transformational teaching. We summarize each of these perspectives in Table 2. As can be seen from this brief overview, the theoretical perspectives that underlie transformational teaching overlap and are interrelated in many ways. For example, the principles of constructivism and social constructivism are invoked in each of the other theoretical perspectives listed in Table 2, and they are also embedded in each of the contemporary approaches to learning and classroom instruction described in Table 1. To distill these perspectives into techniques that instructors can use to achieve transformational teaching goals, we take these perspectives and present them as three overarching transformational teaching principles, which include: (1) facilitate students' acquisition and mastery of key course concepts; (2) enhance students' strategies and skills for learning and discovery; and (3) promote positive learning-related attitudes, values, and beliefs in students.

Facilitate acquisition and mastery of key course concepts

Facilitating students' acquisition and mastery of key course concepts is central to all contemporary approaches to classroom instruction and is not unique to transformational teaching. However, several steps can be taken to make these approaches transformational in nature. First, as suggested by social constructivism (Vygotsky 1978, 1986), transformative learning theory (Mezirow 2000), and intentional change theory (Boyatzis 2009), instructors can increase students' prospects for personal development by having students work in interdependent teams where communicating ideas, sharing knowledge, delegating responsibility, negotiating relationships, and obtaining consensus is necessary for solving problems and completing assignments. Second, as highlighted in constructivism (Piaget 1926), social cognitive theory (Bandura 2012a), transformative learning theory (Mezirow 2000), and intentional change theory (Boyatzis 2009), instructors can increase students' involvement in, and responsibility for, shaping the course curriculum, course content, and learning experience. They can accomplish this by giving students assignments that may be completed at their own pace, adapting assignments to match students' stated interests, offering several topics or assignment options that all fulfill a particular requirement, selecting lectures based on students' interests or priorities, and assigning projects that occur outside the classroom, where students have more opportunities for self-directed and self-paced learning. Third, in accord with all of the theories described in Table 2, instructors can increase the amount of class time that is devoted to exploring and challenging students' questions, views, and perspectives. This can be done by answering questions, debating viewpoints, role-playing interactions or situations, analyzing and reacting to stories or videos, and shaping the course content based on students' input, preferences, and needs. Finally, as suggested especially by constructivism (Piaget 1926), transformative learning theory (Mezirow 2000), and intentional change theory (Boyatzis 2009), instructors can design methods for evaluation that are themselves learning experiences. This can involve developing exam questions that encourage students to synthesize or integrate information in new ways, permitting students to consult with a partner during an exam, giving students the opportunity to correct and resubmit answers for an exam, or allowing students to revise and resubmit papers after integrating feedback or meeting with the instructor. The take-home message here is that learning should be active, collaborative, and shaped by students' input and needs.

Table 2 Theoretical underpinnings of transformational teaching

Theory	Key features	Select references
Constructivism	Knowledge is generated via experiences that challenge current understanding and beliefs (i.e., "learn by doing")	Piaget 1926; see also Lord 1997; Vygotsky 1978, 1986
	Learning activities and exercises must involve reflection and discourse	
	Instructors involve students in the discovery process to engage higher-order cognitive skills (e.g., analysis, synthesis, evaluation)	
Social constructivism	Social contexts and interactions are critical for learning because they (1) provide information about important symbol systems (e.g., logic, language) and (2) expose students to more knowledgeable peers	Vygotsky 1978, 1986; see also Bruner and Haste 2010; Keaton and Bodie 2011; Pritchard and Woollard 2010
	Instructors provide guided opportunities for interaction and discourse, and focus on students' individual needs	
Social cognitive theory	Individuals exert intentional control over their functioning and life through their actions	Bandura 1986, 1993, 1997, 2012a, b; Schunk and Mullen 2012; Schunk and Pajares 2009
	Actions are determined by efficacy beliefs (i.e., judgments regarding likely success), which are self-generated but also influenced by others	
	High self-efficacy is associated with several desirable outcomes (e.g., more positive attitudes, and greater persistence and academic success)	
Transformative learning theory	Students learn by revising their habits of mind (i.e., ways of thinking, acting, etc.) and points of view (i.e., attitudes, values, beliefs, etc.)	Cranton 2006; Dirkx 1998; Erickson 2007; MacGregor Burns 1978; Mezirow 1978, 1991, 1994, 1995, 1996, 2000; Taylor 2007
	Change occurs when students solve and discuss problems while reflecting on their interpretations, habits of mind, and points of view	
	Instructors serve as facilitators who engage students in interdependent discovery involving problem-solving, discourse, and critical reflection	
Intentional change theory	Sustainable change in behavior, thoughts, feelings, and perceptions involves five steps: (1) identify ideal self and vision for future; (2) identify real self and compare to ideal self; (3) devise development plan with personalized standards; (4) experiment and practice with new behaviors, thoughts, and perceptions; and (5) develop helpful personal relationships	Boyatzis 2006a, b, c, 2009; Boyatzis and Akrivou 2006
	Instructors can promote attitudinal and behavioral change by guiding students through these five steps or "discoveries"	

Table 2 (continued)

Theory	Key features	Select references
Transformational leadership	Leaders empower, inspire, and challenge individuals to transcend their own self-interests in order to exceed traditional expectations, and realize a shared vision of personal and collective excellence	Avolio and Bass 1995; Bass 1985; Bass and Bass 2008; Bass and Riggio 2006, 2010; Rafferty and Griffin 2004
	Instructors accomplish this by employing the four components of transformational leadership, which include: idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration	

Enhance strategies and skills for learning and discovery

A second principle of transformational teaching involves providing students with strategies and skills that are important for learning and discovery. This theme is common to all of the major approaches to classroom instruction described in Table 1 and is necessary, we believe, for transformational teaching. To accomplish this transformational teaching goal, instructors regard classrooms as "learning labs" in which students collaborate with each other and with their instructor to evaluate ideas and solve problems for the purposes of mastering bodies of information and acquiring new skills for discovery. We call this principle "learning by doing with others," which derives from the social constructivism notion that students gain valuable information and tools from working with peers (Piaget 1926; Vygotsky 1978, 1986); from social cognitive theory, which argues that successful experiences using learning-related tools are critical for increasing students' efficacy and likelihood of employing such tools in the future (Bandura 1986, 1997, 2012a); and from transformative learning theory, which emphasizes that students must be engaged in collaborative problem solving and discussion in order to transform learning-related skills, attitudes, and beliefs (Cranton 2006; Dirkx 1998; Erickson 2007; Mezirow 2000; Taylor 2007).

Collaborative interdependence is very important for maximizing the likelihood that students will gain valuable skills from each other, including those that are involved in analysis, synthesis, evaluation, reasoning, problem-solving, and communication. To promote an educational environment in which students successfully collaborate for this purpose, instructors can use strategies that are described in the literature on transformational leadership (Barling et al. 2010; Bass 1985; Bass and Bass 2008; Bass and Riggio 2010). Instructors begin by establishing a shared vision for a course that involves having students and the instructor work together to acquire and implement tools and strategies that are important for synthesizing information, identifying alternatives, answering questions, solving problems, resolving contradictions, communicating ideas, and completing projects (Robbins and Alvy 2004). At the beginning of this process, instructors describe skills, strategies, and tools for students, and model their implementation. Once students have a good grasp of how the skills and tools may be applied, however, instructors begin to share the responsibility for promoting personal growth with students, who are called upon to support, encourage, and teach one another. In accord with social constructivism and transformative

learning theory, students in such classrooms are not passive, but rather are highly active and engaged in guiding and shaping the discovery process (Mezirow 1978, 1996, 2000; Vygotsky 1978, 1986). Indeed, as a class progresses, they even come to teach one another the concepts and skills. The specific skills that students acquire during this process are influenced by the shared vision for the course, but in accordance with intentional change theory, instructors can also work with students to establish individualized learning goals that involve person-specific skills and beliefs that are identified as targets for enhancement or change (Boyatzis 2006a; Boyatzis and Akrivou 2006). Although enhancing students' learning-related skills in this way is common to all contemporary forms of instruction (see Table 1), we believe the application of transformative learning theory, intentional change theory, and transformational leadership for accomplishing these goals is relatively (if not entirely) unique to transformational teaching.

Promote positive learning-related attitudes, values, and beliefs

The third principle of transformational teaching involves promoting positive learning-related attitudes, values, and beliefs through the application of strategies from transformative learning theory (Erickson 2007; Mezirow 2000; Taylor 2007), intentional change theory (Boyatzis 2006a, b), and transformational leadership (Bass 1985; Bass and Bass 2008; Bass and Riggio 2006, 2010). Common to these three perspectives is the notion that changes in specific attitudes, values, and beliefs occur when leaders facilitate individuals' direct engagement with questions and problems in a way that challenges prevailing views on a topic. These changes result when students solve questions and problems that center on particular concepts, but also when students discuss and debate ideas while reflecting on their beliefs and on alternative points of view (Mezirow 1997, 2000; Smith *et al*. 2009). As suggested by both transformative learning theory and intentional change theory, changes in attitudes and beliefs are most likely to occur in social contexts, insofar as social interactions expose individuals to different viewpoints and to supportive others who can encourage positive change (Boyatzis 2009; Brock 2010; Mezirow 2000). Engaging students in collaborative, interdependent problem solving and discussion is thus critical for promoting positive learning-related attitudes, values, and beliefs in transformational teaching.

Implicit in this formulation of transformational teaching is the transformational leadership-inspired principle that individuals are capable of transcending self-interests and traditional expectations in order to achieve higher personal and collective goals (Avolio and Bass 1995; Bass 1985; Bass and Riggio 2010). Instructors use strategies from intentional change theory and transformational leadership to encourage students to set high but attainable goals, and strategies from social cognitive theory and transformative learning theory to cultivate in students the expectations and skills that are necessary to meet those goals. Transforming attitudes, values, and beliefs in this way involves employing a strength-based, process-focused, self-efficacy-based approach to personalized feedback that identifies for students what they did well and how their capabilities contributed to their success (e.g., "Your persistence revealed several different solutions, which helped you answer the question"). Because sustained task engagement is a key determinant of students' long-term intellectual development (Bandura 1997, 2012a; Dahlgren *et al*. 2005; Dweck 2006), the role of dispositional intelligence is deemphasized and the use of strategies that students can develop and practice (e.g., persistent employment of personal capabilities) is underscored. Although instructors' objectives for student development may vary, what relates them to transformational teaching is their goal to address learning-related attitudes, values, and beliefs. This can include (for example) enhancing students' beliefs that they can solve difficult problems if they utilize their capabilities and persist in the face of challenge, their

belief that working with others can reveal different viewpoints and (oftentimes) better solutions, their general appreciation for learning, and their overall belief that they can acquire, share, and apply ideas in ways that are relevant for their lives. From this perspective, enhancing *how* students regard learning and discovery is as important as having students master more content.

Although the three principles described here may seem normal to instructors who regularly use active learning, student-centered learning, collaborative learning, experiential learning, or problem-based learning, their novelty should not be missed. First, these principles extend beyond the goals of traditional lecturing, which emphasizes the importance of having students master key course concepts but does not provide students with tools for learning or for developing positive learning-related attitudes, values, and beliefs. These goals are embedded in each of the major contemporary approaches described in Table 1, however, and for this reason we believe it is difficult (and in certain instances impossible) to regard the approaches as wholly different from one another. Second, each of the approaches that utilize these principles aims to increase students' mastery of key course concepts; what makes these approaches transformational, in turn, is their implicit or explicit goal to enhance students' skills while transforming learning-related attitudes, values, and beliefs. We suggest, therefore, that the contemporary approaches described in Table 1 can be viewed within the context of a superordinate framework called transformational teaching, and that to promote transformational teaching goals, instructors can employ strategies derived from constructivism, social constructivism, social cognitive theory, transformative learning theory, intentional change theory, and transformational leadership.

Core Methods of Transformational Teaching

To describe in greater detail how these theoretical perspectives and principles translate into strategies that can be employed in the classroom, we turn now to the core methods of transformational teaching. There are several ways to achieve transformational teaching objectives. Here, we propose one framework for thinking about these strategies that is organized around the following six core methods: (1) establishing a shared vision for a course; (2) providing modeling and mastery experiences; (3) intellectually challenging and encouraging students; (4) personalizing attention and feedback; (5) creating experiential lessons that transcend the boundaries of the classroom; and (6) promoting ample opportunities for preflection and reflection.

Establishing a shared vision for a course

Establishing a shared vision for a course is the first core method of transformational teaching. As suggested here, cultivating an educational environment in which students model successful learning strategies and promote attitudinal change can be challenging. One of the most difficult aspects of this process involves identifying, clarifying, and communicating transformational teaching goals to students. To accomplish this, instructors can employ strategies used by transformational leaders (Bass 1985; Rafferty and Griffin 2004). One such strategy, which was alluded to in the previous section, involves establishing a shared vision for a course (Bass and Bass 2008; Bass and Riggio 2006, 2010).

A shared vision is an idea or statement that, when applied to teaching, describes for students what the class, students, and teacher should aim to achieve over the quarter or semester (Robbins and Alvy 2004). It provides students with a descriptive picture of their

personal and collective future, and motivates students to achieve goals that will help them realize their desired future (Bass and Bass 2008; Bass and Riggio 2006, 2010). One benefit of a shared course vision is that it serves as a sort of "internal compass" that helps students and the instructor to organize their time, priorities, and expectations (Bass and Riggio 2010). Another benefit is that it motivates and inspires students to enact desired behaviors for their intrinsic value, such as for the purpose of realizing the collective goals and vision for a course, instead of to receive extrinsic rewards, such as to gain points or please the instructor (Bass and Riggio 2010; Rafferty and Griffin 2004).

One way to establish a shared vision for a course is to announce early on (e.g., in the first class meeting) that an explicit goal of the course is to ensure that by the end, all students will have mastered a list of key points or skills, and that they will have explored their perspectives and thinking on a set of key issues. Setting such goals early in the course is critical, given the potential for such interventions to shape student satisfaction and motivation (Hermann et al. 2010; Wilson and Wilson 2007). Instructors continue by saying that while they will help facilitate this process, students will be called upon to make sure the vision is realized. More specifically, the instructor will rely on students to set a collaborative tone for the class, promote high expectations for one another, and encourage each other to participate in lectures and discussions. Inherent in this message is the social constructivist perspective that social interactions are necessary for learning (Keaton and Bodie 2011; Pritchard and Woollard 2010; Vygotsky 1978, 1986), the social cognitive notion that students' expectations for success guide learning-related behavior and predict academic success (Bandura 2012a, b), and the transformative learning (Dirkx 1998; Erickson 2007; Mezirow 2000; Taylor 2007) and intentional change theory (Boyatzis 2006a, 2009) idea that students must engage in collaborative, interdependent problem solving and discussion to achieve meaningful, sustainable changes in their attitudes and behaviors. In the context of transformational teaching, therefore, the overall vision for the classroom is not one of a competitive playing field, but rather of a collaborative idea lab, filled with questions such as: What do we know? What do we wish we knew? How do we work together to acquire that knowledge? And, how will that knowledge move us forward?

Once instructors are comfortable with their ability to create a shared vision, they can choose to do so in real-time, with input from students (Haynes 2009; Hudd 2003). This can be done during the first or second class meeting, during which time student expectations are especially malleable (Hermann et al. 2010; Wilson and Wilson 2007). The centerpiece of this classroom activity is the collaborative creation of a mission statement for the course (Svinivki and McKeachie 2011). The statement should be brief and should address the following questions: What's our purpose? What do we hope to achieve? And, how will we go about realizing our goals? A mission statement for an undergraduate statistics course, for example, might read: "We will learn how to use statistical analysis techniques so we can describe data and answer basic research questions from the natural and social sciences. To realize this goal, we will attend class and complete assignments to the best of our ability; encourage each other to persist in the face of challenge; and share skills and insights that will enable us to realize our fullest collective potential." Consistent with intentional change theory (Boyatzis 2006a, b, 2009), a mission statement should help individuals identify their real self and ideal self, their plan for developing their real self into their ideal self, a description of what students will do to achieve personal change, and an explanation for how students' will interact, encourage, and support one another in this process. To maximize the likelihood that students will adopt the shared vision for a course, students and the instructor should work together to revise the course's mission statement until reasonable consensus is achieved. Once finalized, the course vision and mission statement should be

communicated clearly and frequently—and included in the course's syllabus, assignment sheets, and website—to maximize the likelihood that the shared course vision will translate into meaningful change in students' lives (Bass and Bass 2008; Bass and Riggio 2006, 2010).

Creating and continually promoting a shared course vision is important because as a shared vision propagates, classroom environments and the actors within them change. In social cognitive terms, the individual and environmental factors that promote success are "reciprocally deterministic": Students' expectations for success beget personal successes, and these successes engender both higher personal expectations and higher collective expectations for what is possible (Bandura 1986, 1997, 2012a, b). By establishing a compelling vision of intellectual and personal growth early on, therefore, instructors can put into motion an entire system that enhances students' beliefs regarding their ability to organize and execute actions that are required for academic success and personal growth. Such a vision espouses a hopeful view on students' likelihood of success and conveys to students that they are responsible for promoting the collective intellectual and personal growth of the class (Bandura 1997; Haynes 2009). Although establishing a shared vision does not ensure that transformational goals will be realized, it does maximize students' chances for development by distributing the responsibility for intellectual and personal growth among all parties involved. This notion of collective influence and responsibility for individuals' personal successes is inherent in social cognitive theory and transformational leadership (Bandura 2012a; Bass and Riggio 2010), and is a defining characteristic of transformational teaching.

Providing modeling and mastery experiences

The second core method of transformational teaching involves providing modeling and mastery experiences that promote learning, and transform students' attitudes, values, and beliefs. To do this, instructors are thought of as coaches within the transformational teaching framework, insofar as they provide modeling and mastery experiences that are central to social cognitive perspectives on learning (Bandura 1997, 2012a, b; Gore 2006; Marsh and Martin 2011; Rubie-Davies 2010). Like coaches, for example, instructors possess information about a variety of strategies and skills, and their goal is to train students to apply those strategies and skills. In doing so, they encourage students to rely on one another to overcome obstacles and solve problems, which are key aspects of transformative learning theory (e.g., collaborative, interdependent discovery is critical for promoting critical reflectivity and discourse; Mezirow 1997, 2000) and intentional change theory (e.g., individuals must maintain close relationships with others who support their goal of realizing change; Boyatzis 2006a, b, 2009).

Consistent with social cognitive theory (Bandura 2012a, b), when a problem-solving strategy or skill is new, instructors serve as models that provide crucial information about how to approach a task. For example, if the objective is to teach students how to critically evaluate research, then an instructor might begin by assigning a scientific paper or article to read. Next, he or she might review the paper in class while describing out loud the scientific method and the principles that go into judging a paper (Tang *et al.* 2010). Once students understand how the scientific method and review process work, then they can evaluate an article or study in pairs or small groups. The deliverable for this activity can be a class presentation or a written summary of a scientific paper or study. Students can also be asked to write a research report based on a class exercise or group experiment (Moskovitz and Kellogg 2011). Some initial assistance is needed for these activities to work, but once some

students understand the task at hand, the responsibility for teaching specific skills can be increasingly transferred to them. This peer-guided instruction is beneficial for the student "teachers" because it promotes mastery, but it is also good for the student "learners" insofar as peer instruction has been found to improve students' conceptual learning and problem-solving capabilities (Cortright *et al.* 2005; Crouch and Mazur 2001; Lasry *et al.* 2008).

Modeling and mastery experiences are critical for improving students' critical thinking and problem-solving skills, but as underscored by social cognitive theory (Bandura 1986, 1997, 2012a) and transformative learning theory (Cranton 2006; Dirkx 1998; Erickson 2007; Mezirow 2000), direct engagement in the discovery process also has the ability to enhance students' disposition toward learning, which is a fundamental goal of transformational teaching. To accomplish this goal, instructors can utilize the transformational leadership principles of inspirational motivation (i.e., promote optimism, inspire students to exceed expectations and realize the shared vision) and intellectual stimulation (i.e., encourage students to think independently, challenge assumptions, and view problems from different perspectives; Bass and Riggio 2006). Consistent with social cognitive theory (Bandura 2012a, b), instructors can also model a variety of attitudes, values, and beliefs for students. One of the strongest determinants of academic persistence and student outcomes, for example, concerns whether students regard difficult problems as threatening and as barriers to success, or, alternatively, as opportunities to practice new skills and as challenges to overcome (Dweck 2006; Dweck and Master 2009; Giroux 2010). To encourage students to appraise challenging situations as opportunities and not barriers to success, which promotes persistence and enhances learning, instructors can frame problems as surmountable and as a chance to practice and demonstrate specific skills (Dweck and Master 2009). Consistent with social cognitive theory, instructors can also underscore the fact that students have the personal capabilities and resources needed to meet the demands of the situation (Bandura 1997, 2012a; Schunk and Pajares 2009). Doing this helps students view difficult circumstances as challenging instead of threatening, which decreases the likelihood that such events will elicit biological stress responses that interfere with learning (Blascovich and Tomaka 1996; Kassam *et al.* 2009; O'Donovan *et al.* 2010; Seery 2011; Slavich *et al.* 2010a, b).

Another way instructors can increase mastery experiences and enhance learning-related beliefs is by creating study groups, or "educational ensembles," that enable students to confront difficult problems together (Svinivki and McKeachie 2011; Zimbardo *et al.* 2003). Consistent with social constructivism and transformative learning theory, such experiences expose students to peers who can provide support, model new cognitive and problem-solving skills, and promote new habits of mind (e.g., ways of thinking, feeling, and acting) and points of view (e.g., specific attitudes, values, and beliefs; Bruner and Haste 2010; Mezirow 1997, 2000; Taylor 2007; Vygotsky 1978, 1986). Completing assignments together can also help students see that feeling challenged is inherent to some problems (i.e., an external attribution) and not a sign of personal weakness (i.e., an internal attribution; Bandura 1997). As a result, the likelihood of despondency is reduced (Abramson *et al.* 1989; Pekrun *et al.* 2006, 2007, 2009). Study groups also focus students' attention toward intrinsic values, such as collaborative discovery, and away from extrinsic reinforcements, such as points and grades (Aronson and Patnoe 1997; Schunk and Mullen 2012). The effects of promoting modeling and mastery experiences in the context of a partner- or group-based classroom format can be significant. For example, when students work collaboratively as opposed to solitarily, and when teachers convey expectations of excellence as opposed to hopes of avoiding failure, students' collective efficacy improves, leading to better group performance and student outcomes (Conciatore 1990; Pekrun 2011; Schunk and Hanson 1985; Stajkovic *et al.* 2009; Treisman 1992).

Instructors can also greatly impact students' learning-related attitudes and beliefs—as well as classroom performance—by shaping students' thoughts about whether intellectual faculties are largely fixed and unchangeable or, rather, improvable with persistent engagement and practice (Dweck 2006; Dweck and Master 2009). A large body of research on this topic has demonstrated that students who view talents and abilities as improvable—that is, they approach learning with a "growth" mindset—exhibit several beneficial behaviors compared to their counterparts who view intellectual faculties as fixed (see Dweck 2006; Mercer and Ryan 2010). Most important for learning and academic success is the fact that they stayed engaged in tasks longer following incorrect answers in order to learn what they did wrong (Dweck 2006; Dweck and Master 2009). Students with a fixed mindset, in contrast, disengage following failure experiences and thus miss opportunities to improve their skills, knowledge, and performance over time (Dweck 2006). To promote a growth mindset approach to learning, instructors can frame students' intellectual abilities and traits as improvable through persistent engagement and practice, which increases students' engagement in problems and shows students that valuable information can be gleaned from both success and "failure" experiences (Dweck 2006; Mercer and Ryan 2010).

As suggested by social cognitive theory (Bandura 1997, 2012a, b), a final method for promoting mastery experiences involves providing students with relevant, authentic information about their capabilities. Practice is important for learning, and when students thrive in the face of challenge, they are given opportunities to learn that they have the capabilities that are required to succeed (Schunk and Mullen 2012; Schunk and Pajares 2009). Successful experiences like this increase task-specific self-efficacy (Bandura 1997, 2012a). These successes also increase the likelihood that students will persist when faced with challenges (Bandura 1997, 2012a, b; Dweck 2006; Mercer and Ryan 2010). To accomplish transformational teaching goals, therefore, instructors should create as many opportunities for experiencing mastery as possible. This can be done in several ways. For example, instructors can adopt learning goals rather than performance goals, create class routines that enable students to practice skills, present students with tasks that are incrementally more difficult over time, and allow students to revise and improve assignments or exam answers after receiving feedback (Attali and Powers 2010; Moskovitz and Kellogg 2011; Shaughnessy 2004).

In sum, instructors can promote modeling and mastery experiences in many different ways, leading to positive outcomes along several different lines. Modeling and mastery experiences are thus central to transformational teaching. In order to maximize the potential for these experiences to transform students' attitudes, values, and beliefs, however, instructors should pair mastery experiences with social validation of personal efficacy. This is because students have been found to perform better when they are reminded that they are exercising control over tasks by using the strategies being taught, which increases the extent to which they believe they can control factors that are required for success (Britner and Pajares 2006; Schunk and Mullen 2012; Schunk and Pajares 2009; Schunk and Rice 1986). When this is done, mastery experiences do not just have the ability to promote learning, they can also enhance students' attitudes and beliefs about themselves and about the learning process, which is a key feature of transformational teaching.

Intellectually challenging and encouraging students

The third core method of transformational teaching involves intellectually challenging and encouraging students. This is done not simply to promote learning, which is a common goal

across all instructional methods, but rather to transform students' attitudes, values, and beliefs, which is relatively unique to transformational teaching. The inspiration for affecting change along these lines comes from transformative learning theory, which posits that challenging and encouraging students to examine their assumptions and beliefs is critical for promoting learning (Mezirow 1997, 2000); from intentional change theory, which argues that individuals must be challenged to realize a more desirable self in order for sustainable changes to occur in peoples' behavior, thoughts, feelings, or perceptions (Boyatzis 2006a, b, c); and from transformational leadership, which describes "inspirational motivation" and "intellectual stimulation" as core components of experiences that can lead individuals to transcend their own self-interests and achieve a higher level of functioning (Avolio and Bass 1995; Barling et al. 2010; Bass and Bass 2008; Bass and Riggio 2006, 2010).

One way instructors can transform students' attitudes and beliefs about learning is by framing questions in terms of students' current level of understanding and by presenting problems that are of appropriate difficulty, given students' prior knowledge and current skill level (Erickson 2007; Taylor 2007; see Mezirow 1997). Instructors can do this, for example, by beginning classes at a universally comprehensible level of difficulty; then, over time, instructors can pose questions and present problems that are incrementally more difficult. This strategy increases the likelihood that students will understand the key course concepts being described while maintaining students' sense of efficacy (Bandura 1997, 2012a; Schunk and Mullen 2012). This approach of making questions and problems increasingly more difficult over time also creates opportunities for instructors to change how students think about difficult problems and about their ability to solve such problems. To do this, instructors can frame difficult tasks not as threatening or as barriers to success, but rather as opportunities to practice skills that have been taught, and as a chance for students to exercise control over their academic success and personal development (Bandura 1997, 2012a; Bass and Avolio 1990; Bass and Riggio 2010; Boyatzis 2006a; Dweck 2006; Dweck and Master 2009; Schunk and Pajares 2009).

Appropriate levels of emotional and instrumental support are important during this process to help ensure that intellectual challenges engender more (and not less) hope and efficacy (Bandura 1997, 2012a). To provide emotional support, instructors can create course guidelines that recognize and respect students' differences, needs, and welfare (Avolio and Bass 1995; Podsakoff et al. 1990). In contrast, instrumental support can be increased by giving students the time, resources, and assistance that are required to master the key course concepts and skills (Shaughnessy 2004). Instrumental support can also involve structuring assessments in ways that acknowledge individual differences in learning preferences and styles (Furnham et al. 2011; Loo 2004; Price 2004; Zhang et al. 2012). This can be done by creating study guides, providing sample exam questions, and, when possible, relaxing or removing time limits for exams. Instructors can also consider alternative exam formats, including oral, open-book, and partner or group tests (Stark 2006). Changing even this one feature of a course may in fact enhance multiple educational outcomes. For example, several studies have found that students who take exams with a partner or in the context of a team perform better on exams, feel less anxious and more confident during exams, and report having learned more from the course than students who take exams by themselves (e.g., Kapitanoff 2009; Reinig et al. 2011; Zimbardo et al. 2003). There is also evidence that these students are more satisfied with their courses (Reinig et al. 2011).

A final approach to intellectually challenging and encouraging students involves delivering lectures and appeals that motivate students to transcend self-interested goals to maximize their potential and realize the shared vision for the course. In the tradition of social cognitive theory, this involves articulating a desired goal (e.g., mastering key course

concepts), describing how students can realize that goal (e.g., assist each other, hold each other accountable to the vision for the course), and inspiring a general confidence that students can achieve the goal if they work together and utilize their capabilities (Bandura 1997, 2012a, b; Schunk and Mullen 2012). These messages should be accurate and realistic, and should underscore the amount of personal capability that students must employ to achieve their goals (Schunk and Rice 1986). Instructors can also motivate and encourage students from a transformative learning theory or an intentional change theory perspective, which, in either case, involves having students identify specific attributes (e.g., attitudes, perspectives, behaviors, etc.) that they would like to enhance and then guiding students through collaborative, interdependent exercises that facilitate personal and collective progress toward enhancing those attributes (Boyatzis 2006a, b; Cranton 2006; Erickson 2007; Mezirow 2000). Instructors act as facilitators and provocateurs in this process, motivating students to critically reflect on prevailing attitudes and alternative perspectives (Mezirow 2000).

Finally, instructors may intellectually challenge and encourage students by using techniques from transformational leadership (Bass and Bass 2008; Bass and Riggio 2006, 2010). In fact, a key purpose of transformational leadership is to empower, inspire, and challenge individuals to achieve their fullest personal and collective potential (Bass and Riggio 2006; Beauchamp and Morton 2011). To do this, instructors apply the core components of transformational leadership including inspirational motivation, which involves inspiring and motivating others to exceed expectations and realize a collectively shared vision of excellence, and intellectual stimulation, which involves challenging students to be more flexible and creative by prompting them to think independently, challenge commonly held assumptions, and view problems from different perspectives. Attention must be paid to how much arousal is elicited by these motivational strategies, given that physiological arousal can reduce students' efficacy if the arousal is interpreted as a sign of anxiety or inadequacy rather than excitement (Bandura 2012a; Cioffi 1991). However, when solving challenging problems is framed as an interesting and exciting endeavor, and when students' resources and capabilities are underscored during the process, intellectually challenging and encouraging students is critical for learning and, in fact, a key feature of transformational teaching.

Personalizing attention and feedback

The fourth core method of transformational teaching involves personalizing attention and feedback. The importance of personalized attention and feedback is highlighted in several of the theoretical perspectives discussed earlier, including social constructivism (e.g., instructors focus on students' needs, rather than on the content to be taught, to know what experiences will be most helpful; Vygotsky 1978, 1986), social cognitive theory (e.g., students must be presented with appropriately difficult challenges, and instructors must highlight students' personal capabilities and how they should use their capabilities to achieve success; Bandura 1997, 2012a), transformative learning theory (e.g., instructors promote learning by guiding students through the process of identifying and challenging personal habits of mind and points of view; Mezirow 1978, 2000; Taylor 2007), intentional change theory (e.g., instructors help students identify current strengths and weaknesses, a personalized vision for the future, a tailored learning plan, and exercises that allow them to practice new skills and achieve their ideal self; Boyatzis 2009; Boyatzis and Akrivou 2006), and transformational leadership (e.g., to optimize their effectiveness, instructors shape inspirational appeals based on students' goals, needs, and motives; Bass and Bass 2008; Bass and Riggio 2010). To maximize students' potential for personal and collective growth, transformational teachers combine aspects of these perspectives in the classroom.

Instructors can personalize attention and feedback in several different ways within the transformational teaching framework. From a social cognitive perspective, for example, instructors can assess what students know and do not know about a topic, and pose problems and questions that are of appropriate difficulty (Bandura 1997, 2012a). Instructors can also use this information to provide students with individualized feedback regarding their resources and capabilities, and how they are using these attributes to accomplish their goals (Schunk and Mullen 2012; Schunk and Pajares 2009). Instructors must have a general sense for each student's current ability level to do this, because if they make appraisals that are markedly different from reality, the feedback is not likely to be taken seriously (Bandura 1997, 2012a). In accord with transformative learning theory, in contrast, instructors can help students identify specific attitudes, beliefs, and ways of thinking about or approaching problems that can become individualized targets for critical reflection and transformation (Erickson 2007; Mezirow 1978, 2000). Instructors can then target these attributes by (for example) having students debate topics that reveal and challenge their preconceived notions about a topic, or by having students complete case studies, reports, role plays, projects, or simulations that require them to consider different values, interpretations, and beliefs (Mezirow 1997, 2000). A final method for providing personalized attention and feedback involves creating an individualized "intentional change plan," based on principles derived from intentional change theory (Boyatzis 2006a, b, c). To do this, instructors work with students to identify a personal vision for the future, a summary of current strengths and weaknesses, a personalized learning plan that will help them realize their learning goals, a list of exercises that will engage new thinking and behavioral patterns, and a personal support team of peers who have agreed to help the individual achieve his or her goals (Boyatzis 2006a; Boyatzis and Akrivou 2006).

It may not always be easy for instructors to acquire the type of knowledge that is necessary for personalizing attention and feedback. This may be especially true in large classes, where there are many students and where one-on-one face time is limited. Even in these contexts, though, instructors can do several things to learn about each student's needs, goals, motivations, and current levels of comprehension and skill. For example, instructors can have students come to the podium after class to ask questions, complete progress reports in which they reflect on their current understanding and future goals for learning, email the instructor when they have questions or problems, and attend office hours to discuss their strengths, weaknesses, and goals for development (Isbell and Gilbert Cote 2009). Instructors can also consider assigning students to smaller working groups or to sections that either they monitor or that are facilitated by teaching assistants, who report back to the instructor (Bailey et al. 2012).

One reason for personalizing attention and feedback is that students do not come to class with the same goals, abilities, or learning-related characteristics. Rather, they tend to differ along many dimensions that are important for learning, including prior scholastic achievement (Kuhn and Holling 2009), level of academic self-efficacy (Bandura 1997, 2012a), availability of positive role models (Carrington et al. 2008), interest in learning (Maurer et al. 2008), valuation of learning (Lebens et al. 2011), quality of studying and test-taking ability (Barry et al. 2010), and motivation for learning (Wolters and Taylor 2012). By personalizing attention and feedback, and by providing students with an engaging and structured learning experience, instructors can help narrow the achievement gap between students who are well-prepared for success when they come to class and those who need some additional attention to realize their fullest potential (Gaskill and Woolfolk Hoy 2002; Haak et al. 2011). At first, personalizing attention and feedback in this way might appear to conflict with transformational teaching's goal of pursuing a shared vision for a course.

Because transformational teaching involves maximizing each individual student's potential for intellectual and personal growth, however, some degree of personalization is necessary. Personalizing attention and feedback is thus a key feature of transformational teaching.

Creating experiential lessons

The fifth core method of transformational teaching involves creating experiential lessons that immerse students in a topic and, often, transcend the boundaries of the classroom. The importance of engaging students in learning exercises and activities is highlighted in all of the theoretical perspectives discussed earlier. For example, this concept is central to both constructivism (Piaget 1926) and social constructivism (Bruner and Haste 2010; Pritchard and Woollard 2010; Vygotsky 1978, 1986), and is critically important for fostering learning and transformational change in the context of social cognitive theory (Bandura 1997, 2012a), transformative learning theory (Cranton 2006; Erickson 2007; Mezirow 1978; Taylor 2007), intentional change theory (Boyatzis 2006a, b, c), and transformational leadership (Bass 1985; Bass and Bass 2008; Bass and Riggio 2010). The reasons for why experiential lessons are important differ between these perspectives, but center on the fact that such lessons enable students to reshape their understanding of a concept through experience, develop self-confidence and self-efficacy by applying their capabilities to achieve success, challenge prevailing thoughts and attitudes through problem-solving and debate, and enhance attitudes and beliefs about learning by experiencing ideas as relevant and meaningful (Bandura 2012a; Bass 1985; Boyatzis 2006a; Mezirow 2000; Piaget 1926; Vygotsky 1978).

Hundreds of activities have been developed for the purpose of creating experiential lessons (see Buskist and Davis 2006; Hebb *et al*. 2000; James *et al*. 2011; Kolb 1984; Nodine *et al*. 1999; Ware and Johnson 2000). Experiential lessons that occur inside the classroom are beneficial for the many reasons described above. From the perspective of transformational teaching, however, the most beneficial activities are those that are introduced inside the classroom but that take place outside the classroom. An example of such an activity (used for teaching lifespan and development at the college level) involves creating a brief interview that students administer to friends or family members in different age groups (e.g., 12–18, 19–25, 26–45, 46–64, and 65+). The interview inquires about social-cognitive factors that change with age, such as number of friends, closeness to friends and family, motivational goals, and personal priorities. The activity thus enables students to experience concepts that are related to psychology and aging (see Slavich and Zimbardo, *Experiential activities for transformational teaching in psychology*, unpublished). Another activity has students be "deviant for a day". Students are provided with a list of options for dressing or acting deviantly, and they then monitor how they were treated, how their social interactions differed from normal, how the interactions made them feel, and how they believed their deviancy shaped their experience (see Zimbardo 2005). These activities are preceded by a lecture that reviews the principles being explored and are followed by a reflection exercise that has students discuss their experiences in class or in a private reaction paper on the subject. Instructors must provide alternative activities and options for reflection that give all students the ability to comfortably complete the assignment. When this care is taken, though, students generally find the lessons to be useful and enjoyable (Harcum and Friedman 1991). Also, as we noted at the outset of this review, several studies have now shown that interactive activities such as these enhance a wide range of educational outcomes (e.g., see Armbruster *et al*. 2009; Armstrong *et al*. 2007; Deslauriers *et al*. 2011; Freeman *et al*. 2007; Haak *et al*. 2011).

Although a complete discussion of activities that can be used to create experiential lessons is beyond the scope of this paper, we believe that such lessons are an important component of transformational teaching for several reasons. First, as suggested by social constructivism (Vygotsky 1978, 1986), experiential lessons provide students with an opportunity to experience concepts first-hand and, as such, give students a richer, more meaningful understanding of course concepts and of how they operate in the real world. Second, consistent with transformative learning theory (Mezirow 1978, 2000), they enhance the affective quality of the course content. This occurs both when students are engaged in solving problems that are part of the activities, and when they are analyzing, sharing, discussing, and reflecting on their personal reactions to the activities (Gross Davis 2009). The affective quality that lessons take on is important because it makes the lessons more interesting, but also because it can significantly improve students' memory for concepts insofar as the information gets stored in autobiographical memory (Bower and Gilligan 1979; Holland and Kensinger 2010; Thompson *et al*. 1998; VanderStoep *et al*. 2000; Westmacott *et al*. 2003). Finally, in accord with social cognitive theory (Bandura 1997, 2012a), transformative learning theory (Mezirow 1978, 2000), intentional change theory (Boyatzis 2006a, b), and transformational leadership (Bass and Bass 2008; Bass and Riggio 2010), experiential lessons have the ability to shape students' beliefs about learning and about the self. As discussed previously, for example, they can increase students' efficacy for understanding concepts and solving problems, enhance students' beliefs that they can distill and share knowledge in a private paper or public discussion, give students the impression that learning can be dynamic and fun, and lead to a whole range of other attitudinal and behavioral changes that might be the targets of such activities. Perhaps most unique to transformational teaching (compared to other teaching methods) is the notion that, if the experiential lessons employed involve examining personally held thoughts or beliefs, then they can also lead to significant personal insights, including a greater awareness of one's personally held perspectives—as well as an improved awareness of other people's experience—with the possibility to enhance these attributes through critical reflection. Attitudinal and behavioral change resulting from experiential lessons is a worthy byproduct of any course, we believe, and one of the most unique and important features of transformational teaching.

Promoting preflection and reflection

The sixth and final core method of transformational teaching involves promoting preflection and reflection. Preflection and reflection are critical for translating educational activities and exercises into meaningful, sustainable change in students' lives. These techniques are thus a defining characteristic of all transformational teaching activities. In short, preflection concerns all types of reflective actions that occur before a particular assignment or activity has begun; reflection, in contrast, concerns reflective actions that occur after an assignment or activity has ended (Shellenbarger *et al*. 2005). Given the central importance that preflection and reflection play in promoting learning and personal growth, these concepts are embedded in all of the major approaches to learning and classroom instruction described in Table 1, and they are either explicitly discussed or implicitly referred to in each of the theoretical cornerstones to transformational teaching described in Table 2 (i.e., social cognitive theory, transformative learning theory, intentional change theory, and transformational leadership).

Preflection is not as commonly used as reflection, but can nonetheless provide students with meaningful insights into their capabilities, perspectives, and possible strategies. As alluded to above, preflection involves critiquing one's assumptions

regarding the content of an idea—or one's approach to answering a question or solving a problem—before beginning an assignment. This process allows students to identify their attitudes and knowledge about a concept, question, or problem, and to consider possible strategies for examining an issue or tackling a problem. If done in a public manner, such activities can also expose students to the preconceived attitudes, knowledge, and capabilities of their peers, which can serve as a way to identify others' strengths and capabilities that might be useful. This process can also provide students with different perspectives on tackling a problem. As suggested here, preflection activities can be public or private exercises, and can come in many different forms. For example, instructors can have students write a *preflection letter* in which they discuss their thoughts or feelings about an idea or problem, their strategies for getting started with an assignment, or the ways in which an assignment could influence or affect them. Depending on the goals for the exercise, this letter can be kept private, posted in an online forum, discussed with a partner, or shared with the class. Alternatively, instructors can engage students in a guided *preflection discussion*, which involves discussing a topic, question, or problem with a partner or in a small group based on a set of general guidelines. In this context, students can describe their attitudes or feelings toward a question, problem, or assignment; their proposed strategies for examining the issue or tackling the problem; their past experiences dealing with similar questions or problems; and the ways in which they expect the activity or experience will affect them (Shellenbarger *et al.* 2005; van Merriënboer and Sluijsmans 2008).

In contrast, reflection occurs after an assignment or activity has ended. As described by Mezirow (1998), reflection (or "critical reflection") can occur alone or in a group discussion and, as alluded to earlier, involves critiquing assumptions about the content of an idea or the process of solving a problem for the purpose of revealing something new. Doing this exposes an individual to different viewpoints and perspectives on an issue or problem, which in turn becomes the basis for a person's attitudinal or behavioral transformation. Numerous activities have been developed for the purpose of promoting critical reflection. These activities include: *journaling*, where students reflect on their attitudes, insights, perceptions, and experiences by writing in a paperback or web-based journal; *guided reading*, which involves having students read a story or article and then reflect on their thoughts, reactions, perceptions, and attitudes by answering questions related to the piece; *guided discussion*, in which students pair-up and engage in a guided discussion that includes careful listening, supportive responding, idea expression, idea expansion, and respectful discourse; *microlabs*, which is where groups of two-to-four students get together for the purpose of considering questions inspired by a lecture, article, video, or discussion; *structured debating*, in which students debate an idea or issue from different perspectives; and *fishbowl*, which is where students form a circle in the middle of the room, and share their ideas and perspectives on a topic while the rest of the class listens (Sullivan and Glanz 2009). Instructors can have students focus on many different topics in these reflective activities, including, for example: how their attitudes or beliefs changed as part of an educational experience, how they applied their capabilities to solve a problem, what problem-solving strategies worked particularly well, what aspects of an issue they found most troublesome or compelling, what ideas they were most surprised or inspired by, what they learned about themselves in the process of examining the issue, or how the activity changed their life or their perspective on others or the world (for a list of themes that characterize successful reflection experiences, see Shellenbarger *et al.* 2005).

Regardless of which preflection and reflection exercises an instructor chooses to implement, we believe that the process of examining one's thoughts and attitudes is a key feature of transformational teaching that, when paired with experiential lessons, differentiates

transformational teaching from other forms of classroom instruction. In addition to helping facilitate students' acquisition and mastery of key course concepts, which is common to all forms of instruction, we believe that reflective experiences play a critical role in enhancing students' skills and strategies for discovery. Consistent with transformative learning theory (Mezirow 1978, 2000), intentional change theory (Boyatzis 2006a), and transformational leadership (Bass 1985; Bass and Bass 2008), we believe that reflective experiences also play a critical role in promoting positive learning-related attitudes, values, and beliefs. For these reasons, we view preflection and reflection as important core methods of transformational teaching.

Topics for Further Clarification and Research

We have proposed that several of the major contemporary approaches to learning and classroom instruction share similar fundamental characteristics and may be understood as part of a broader approach to classroom instruction called transformational teaching (See Fig. 1). We believe this is especially true in instances where the approaches involve enhancing students' learning-related attitudes, values, beliefs, and skills. We then described the basic principles and core methods that we believe constitute this approach. Although this endeavor may help to re-contextualize discussions about contemporary learning and classroom instruction, several important questions remain unanswered based on current thinking and research. We outline some of the most important and pressing issues below.

What is transformational teaching and what is it not?

First, what exactly is transformational teaching, and what is it not? In defining this approach, we have emphasized that transformational teaching represents an attempt to "increase students' mastery of key course concepts while transforming their learning-related attitudes, values, beliefs, and skills." We believe that to be transformational in nature, teaching must enhance students' mastery of course concepts, their learning-related skills, *and* their disposition toward learning. Without all three of these components, the approach would seem to fall within the constraints of traditional classroom instruction (i.e., if it only focuses on mastering course content or on acquiring skills), or motivationally guided personal exploration (i.e., if it only focuses on examining or enhancing attitudes, values, or beliefs). The contemporary approaches to learning and classroom instruction described in Table 1 fall within the framework of "transformational teaching" insofar as they accomplish these goals. What transformational teaching is *not* is an attempt to simply get students excited about learning, or to persuade students to adopt a particular worldview. The main objective of transformational teaching is to improve students' mastery of a topic in a way that also impacts their learning-related skills and beliefs. Promoting other messages or persuading students to adopt certain beliefs (e.g., about politics, sexuality, religion, etc.) is not part of our formulation of transformational teaching.

What are the necessary components of transformational teaching?

Second, what are the necessary components of transformational teaching? We have proposed a set of coherent principles and methods that we believe form the basis of transformational teaching, which is based on a comprehensive review of all relevant theoretical perspectives. However, research is needed to clarify how each of these components contributes to transformational teaching and, in addition, if all of the components are necessary for transformational
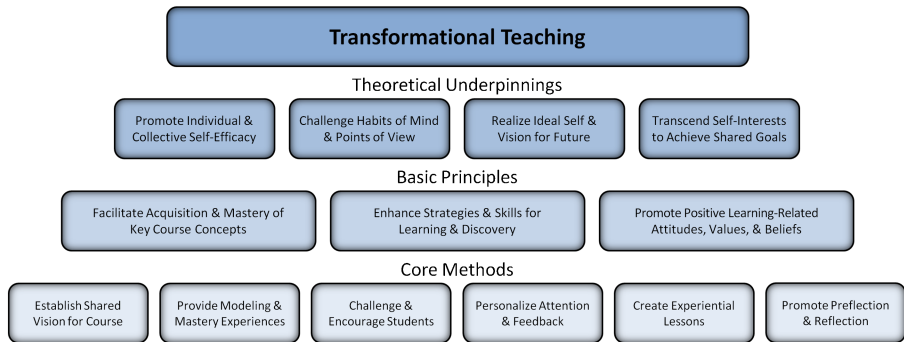
Transformational Teaching

Theoretical Underpinnings

| Promote Individual & Collective Self-Efficacy | Challenge Habits of Mind & Points of View | Realize Ideal Self & Vision for Future | Transcend Self-Interests to Achieve Shared Goals |

Basic Principles

| Facilitate Acquisition & Mastery of Key Course Concepts | Enhance Strategies & Skills for Learning & Discovery | Promote Positive Learning-Related Attitudes, Values, & Beliefs |

Core Methods

| Establish Shared Vision for Course | Provide Modeling & Mastery Experiences | Challenge & Encourage Students | Personalize Attention & Feedback | Create Experiential Lessons | Promote Preflection & Reflection |

Fig. 1 Theoretical underpinnings, basic principles, and core methods of transformational teaching. Transformational teaching is an approach to classroom instruction that involves increasing students' mastery of key course concepts while transforming their learning-related attitudes, values, beliefs, and skills. The approach is rooted in social cognitive theory (e.g., instructors promote students' individual and collective efficacy), transformative learning theory (e.g., instructors challenge students' habits of mind and points of view), intentional change theory (e.g., instructors help students' realize their ideal self and vision for the future), and transformational leadership (e.g., instructors motivate and empower students to transcend self-interests to maximize their potential and achieve shared goals). These theoretical perspectives can be distilled into three basic principles, which include: facilitating students' acquisition and mastery of key course concepts, enhancing students' strategies and skills for learning and discovery, and promoting students' positive learning-related attitudes, values, and beliefs. Instructors accomplish these goals by establishing a shared vision for a course, providing modeling and mastery experiences, challenging and encouraging students, personalizing attention and feedback, creating experiential lessons that transcend the boundaries of the classroom, and promoting ample opportunities for preflection and reflection. These methods are synergistically related and, when used together, maximize students' potential for intellectual and personal growth

teaching to occur. For example, can transformational teaching occur in a lecture-only environment (i.e., without student interaction or experiential lessons), or is collaborative, interdependent discovery and discussion necessary? Are personalized attention and feedback necessary for enhancing students' learning-related attitudes, values, and beliefs, or is general feedback regarding students' collective progress sufficient? And, what is the added value in creating and sharing a vision for a course? Can instructors and students work toward transformational teaching goals if they are not explicitly aware that they are doing so, or does having a shared vision in mind fundamentally elevate what students and instructors are able to achieve? We believe initial answers to these questions can be found in the theoretical perspectives reviewed here, but some of these theories are more well-supported by existing empirical research than others. In short, our point is simply that transformational teaching is a complex construct and that, like any relatively new construct, additional research is needed to interrogate its coherency, utility, and validity.

What does transformational teaching look like at different levels of instruction?

Third, what does transformational teaching look like at different levels of instruction? In the present discussion, we have presented a general formulation of transformational teaching that may be applied for understanding learning at any level of instruction (e.g., preschool, elementary school, middle school, secondary school, higher education, and adult education). Exactly how transformational teaching is represented at these different levels of instruction, however, remains an open question. It seems reasonable to hypothesize that the amount of structure that is required to realize transformational teaching goals will differ in a significant way across different levels of instruction. So, too, will the types of attitudinal and behavioral changes that instructors can reasonably pursue during a course. To examine these important issues in greater

detail, additional research and thinking is needed that considers the goals of transformational teaching in combination with the specific skills and capabilities that learners of different ages bring to the classroom.

How is transformational teaching assessed?

Fourth, what is the best way to assess transformational teaching, and how can this information be used to improve student learning and development? To our knowledge, one self-report questionnaire has been developed to date to assess transformational teaching within the context of school-based physical education (see Beauchamp et al. 2010). However, several important questions remain unanswered. For example, should assessments measure instructor implementation, student adoption, or both? Research can focus on developing new ways for assessing the extent to which instructors accomplish transformational objectives (e.g., they enhance students' mastery of course concepts, provide students with learning-related skills, or enhance students' learning-related attitudes, values, or beliefs), the extent to which instructors implement transformational teaching methods (e.g., they establish a shared vision for a course, provide modeling and mastery experiences, intellectually challenge and encourage students, personalize attention and feedback, create experiential lessons, or promote preflection and reflection), or the extent to which students achieve transformational teaching goals (e.g., they exhibit changes in learning-related skills, their attitudes about learning, or their beliefs about the value of knowledge). At the same time, it must be asked whether assessing these factors changes the experience in any way. For example, does measuring instructors' or students' progress decrease their intrinsic motivation for teaching or learning? That is, do people start performing simply to excel on measures of transformational teaching? Assessments can change the motivation and dynamics of the individuals being assessed, and this should be taken into consideration.

How do we develop transformational teachers?

Finally, assuming that employing transformational teaching is a goal, how can departments and institutions develop instructors who utilize this approach? This is not an easy problem to solve since teachers at all levels of instruction typically have too many demands and very little time. One solution for addressing this practical problem involves summarizing transformational teaching in an easily digestible format—for example, using handouts or videos that require minimal time or that can be read or watched in short intervals. These summaries can cover the main aspects of transformational teaching, and can address the most common questions and issues.

    Perhaps a more difficult issue involves the question of how to address teachers' instructional efficacy and their likelihood to adopt new pedagogical techniques. In this context, there is evidence that compared to less-efficacious teachers, efficacious teachers are more likely to praise students for accomplishments, improve students' perceptions of their academic abilities, promote student autonomy, and create mastery experiences that help students learn (Ashton and Webb 1986; Gibson and Dembo 1984; Saklofske et al. 1988; Tschannen-Moran and Woolfolk Hoy 2001). There is also evidence that efficacious teachers are more likely to learn new approaches for teaching (Berman and McLaughlin 1977; Ross 1994). Importantly, however, this effect differs based on a teacher's stage of professional development, with less experienced instructors generally being more willing to adopt new techniques (Maskit 2011). Although promoting a healthy sense of efficacy among instructors may

thus be one way to increase the adoption of transformational teaching (or any other teaching method for that matter), additional research is clearly needed along these lines.

Since expectations and social norms also exist at the collective level, it may be equally important to research how department- and institution-wide factors influence whether teachers adopt transformational teaching and other new methods (Bandura 1997, 2012a). If collective instructional efficacy does play a role in the adoption of new techniques, then instructors may be able to promote transformational teaching and other new approaches by enacting initiatives that give instructors the time that is necessary to adopt new techniques, by modeling transformational teaching for each other, and by communicating to others that acquiring new techniques is possible, celebrated, and rewarded (Bandura 1993, 1997). These strategies do not guarantee that new methods will be adopted, but they do lower the barriers for success.

Concluding Comments

Classroom instruction has changed remarkably in recent years. Blackboards were replaced by whiteboards and then by PowerPoint presentations; student notebooks by laptops and most recently by tablet PCs. Approaches to classroom instruction and discussions about what teachers should accomplish have also evolved, and we currently have several well-developed approaches to classroom instruction that emphasize different aspects of teaching and learning. Our goal in the present review has not been to diminish the importance or unique contribution that each of these approaches has made, but rather to highlight their impressive degree of overlap and convergence, which is evident at both the theoretical and methodological level. Doing so has enabled us to propose an overarching approach to classroom instruction called transformational teaching, which involves increasing students' mastery of key course concepts while enhancing their learning-related attitudes, values, beliefs, and skills. Important questions remain unanswered regarding the coherency, utility, and validity of transformational teaching, and we believe these questions provide several fruitful avenues for future thinking and research. At the least, transformational teaching would seem to capture the main similarities that exist across the major contemporary approaches to learning and classroom instruction. We therefore suggest that it can be used as an overarching framework for thinking about how to maximize students' potential for intellectual and personal growth.

References

Abramson, L. Y., Metalsky, G. I., & Alloy, L. B. (1989). Hopelessness depression: A theory-based subtype of depression. *Psychological Review, 96*, 358–372.

Amador, J. A., Miles, L., & Peters, C. B. (2006). *The practice of problem-based learning: A guide to implementing PBL in the college classroom*. San Francisco: Jossey Bass.

Anding, J. M. (2005). An interview with Robert E. Quinn—Entering the fundamental state of leadership: Reflections on the path to transformational teaching. *Academy of Management Learning & Education, 4*, 487–495.

Andrews, T. M., Leonard, M. J., Colgrove, C. A., & Kalinowski, S. T. (2011). Active learning not associated with student learning in a random sample of college biology courses. *CBE Life Sciences Education, 10*, 394–405.

Armbruster, P., Patel, M., Johnson, E., & Weiss, M. (2009). Active learning and student-centered pedagogy improve student attitudes and performance in introductory biology. *CBE Life Sciences Education, 8*, 203–213.

Armstrong, N., Chang, S. M., & Brickman, M. (2007). Cooperative learning in industrial-sized biology classes. *CBE Life Sciences Education, 6*, 163–171.

Aronson, E., & Patnoe, S. (1997). *The jigsaw classroom: Building cooperation in the classroom* (2nd ed.). New York: Addison Wesley Longman.

Ashton, P. T., & Webb, R. B. (1986). Teachers' sense of efficacy, classroom behavior, and student achievement. In P. T. Ashton & R. B. Webb (Eds.), *Teachers' sense of efficacy and student achievement* (pp. 125–144). New York: Longman.

Aspin, D. N., Chapman, J., Evans, K., & Bagnall, R. (Eds.). (2012). *Second international handbook of lifelong learning*. New York: Springer.

Attali, Y., & Powers, D. (2010). Immediate feedback and opportunity to revise answers to open-ended questions. *Educational and Psychological Measurement, 70*, 22–35.

Avolio, B. J., & Bass, B. M. (1995). Individual consideration viewed at multiple levels of analysis: A multi-level framework for examining the influence of transformational leadership. *The Leadership Quarterly, 6*, 199–218.

Bailey, C. P., Minderhout, V., & Loertscher, J. (2012). Learning transferable skills in large lecture halls: Implementing a POGIL approach in biochemistry. *Biochemistry and Molecular Biology Education, 40*, 1–7.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs: Prentice-Hall.

Bandura, A. (1993). Perceived self-efficacy in cognitive development and functioning. *Educational Psychologist, 28*, 117–148.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: W. H. Freeman and Company.

Bandura, A. (2012a). On the functional properties of perceived self-efficacy revisited. *Journal of Management, 38*, 9–44.

Bandura, A. (2012b). Social cognitive theory. In P. A. M. Van Lange, A. W. Kruglanski, & E. T. Higgins (Eds.), *Handbook of theories of social psychology* (pp. 349–374). Thousand Oaks: Sage.

Bandura, A., & Schunk, D. H. (1981). Cultivating competence, self-efficacy and intrinsic interest through proximal self-motivation. *Journal of Personality and Social Psychology, 41*, 586–598.

Barkley, E. F., Cross, K. P., & Major, C. H. (2005). *Collaborative learning techniques: A handbook for college faculty*. San Francisco: Jossey-Bass.

Barling, J., Christie, A., & Hoption, C. (2010). Leadership. In S. Zedeck (Ed.), *APA handbook of industrial and organizational psychology* (pp. 183–240). Washington, D.C.: American Psychological Association.

Barrett, T. (2010). The problem-based learning process as finding and being in flow. *Innovations in Education and Teaching International, 47*, 165–174.

Barrows, H. S. (1996). Problem-based learning in medicine and beyond: A brief overview. In L. Wilkerson & W. H. Gijselaers (Eds.), *Bringing problem-based learning to higher education: Theory and practice* (pp. 3–13). San Francisco: Jossey-Bass.

Barry, C. L., Jeanne Horst, S., Finney, S. J., Brown, A. R., & Kopp, J. P. (2010). Do examinees have similar test-taking effort? A high-stakes question for low-stakes testing. *International Journal of Testing, 10*, 342–363.

Bass, B. M. (1985). *Leadership and performance beyond expectations*. New York: The Free Press.

Bass, B. M., & Avolio, B. J. (1990). The implications of transactional and transformational leadership for individual, team, organizational development. *Research in Organizational Change and Development, 4*, 231–272.

Bass, B. M., & Bass, R. (2008). *The Bass handbook of leadership: Theory, research, managerial applications*. New York: Free Press.

Bass, B. M., & Riggio, R. E. (2006). *Transformational leadership* (2nd ed.). Mahwah: Lawrence Erlbaum Associates.

Bass, B. M., & Riggio, R. E. (2010). The transformational model of leadership. In G. Robinson Hickman (Ed.), *Leading organizations: Perspectives for a new era* (2nd ed., pp. 76–86). Thousand Oaks: Sage Publications.

Beard, C., & Wilson, J. P. (2006). *Experiential learning: A best practice handbook for trainers and educators* (2nd ed.). London: Kogan Page.

Beauchamp, M. R., Barling, J., Li, Z., Morton, K. L., Keith, S. E., & Zumbo, B. D. (2010). Development and psychometric properties of the transformational teaching questionnaire. *Journal of Health Psychology, 15*, 1123–1134.

Beauchamp, M. R., Barling, J., & Morton, K. L. (2011). Transformational teaching and adolescent self-determined motivation, self-efficacy, and intentions to engage in leisure time physical activity: A randomised controlled pilot trial. *Applied Psychology: Health and Well-Being, 3*, 127–150.

Beauchamp, M. R., & Morton, K. L. (2011). Transformational teaching and physical activity engagement among adolescents. *Exercise and Sport Sciences Reviews, 39*, 133–139.

Benjamin, L. T., Jr. (2002). Lecturing. In S. F. Davis & W. Buskist (Eds.), *The teaching of psychology: Essays in honor of Wilbert J. McKeachie and Charles L. Brewer* (pp. 57–67). Mahwah: Lawrence Erlbaum Associates.

Berk, R. A. (2009). Multimedia teaching with video clips: TV, movies, YouTube, and mtvU in the college classroom. *International Journal of Technology in Teaching and Learning, 5*, 1–21.

Berman, P., & McLaughlin, M. W. (1977). *Federal programs supporting educational change. Vol. 7, Factors affecting implementation and continuation (R-1589/7-HEW)*. Santa Monica: Rand Corporation.

Blascovich, J., & Tomaka, J. (1996). The biopsychosocial model of arousal regulation. In M. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 28, pp. 1–51). New York: Academic Press.

Boekaerts, M. (2002). Bringing about change in the classroom: Strengths and weaknesses of the self-regulated learning approach—EARLI Presidential Address, 2001. *Learning and Instruction, 12*, 589–604.

Bonwell, C. C., & Eison, J. A. (1991). *Active learning: Creating excitement in the classroom*. San Francisco: Jossey-Bass.

Boud, D., & Feletti, G. I. (Eds.). (1997). *The challenge of problem-based learning* (2nd ed.). London: Kogan Page.

Bouffard-Bouchard, T. (1990). Influence of self-efficacy on performance in a cognitive task. *Journal of Social Psychology, 130*, 353–363.

Bouffard-Bouchard, T., Parent, S., & Larivée, S. (1991). Influence of self-efficacy on self-regulation and performance among junior and senior high-school age students. *International Journal of Behavioral Development, 14*, 153–164.

Bower, G. H., & Gilligan, S. G. (1979). Remembering information related to one's self. *Journal of Research in Personality, 13*, 420–432.

Boyatzis, R. E. (2006a). An overview of intentional change from a complexity perspective. *Journal of Management Development, 25*, 607–623.

Boyatzis, R. E. (2006b). The ideal self as the driver of intentional change. *Journal of Management Development, 25*, 624–642.

Boyatzis, R. E. (2006c). Intentional change. *Journal of Organizational Excellence, 25*, 49–60.

Boyatzis, R. E. (2009). Creating sustainable, desired change in teams through the application of intentional change and complexity theories. In P. Doucherty, M. Kira, & A. B. Shani (Eds.), *Creating sustainable work systems: Developing social sustainability* (2nd ed., pp. 103–116). New York: Routledge.

Boyatzis, R. E., & Akrivou, K. (2006). The ideal self as the driver of intentional change. *Journal of Management Development, 25*, 624–642.

Boyd, B. L. (2009). Using a case study to develop the transformational teaching theory. *Journal of Leadership Education, 7*, 50–59.

Brandes, D., & Ginnis, P. (1986). *A guide to student-centered learning*. Oxford: Blackwell.

Britner, S. L., & Pajares, F. (2006). Sources of science self-efficacy beliefs of middle school students. *Journal of Research in Science Teaching, 43*, 485–499.

Brock, S. E. (2010). Measuring the importance of precursor steps to transformative learning. *Adult Education Quarterly, 60*, 122–142.

Brown, J. K. (2008). Student-centered instruction: Involving students in their own education. *Music Educators Journal, 94*, 30–35.

Brown Wright, G. (2011). Student-centered learning in higher education. *International Journal of Teaching and Learning in Higher Education, 23*, 92–97.

Bruner, J. S., & Haste, H. (Eds.). (2010). *Making sense: The child's construction of the world*. New York: Routledge.

Buskist, W., & Davis, S. F. (Eds.). (2006). *Handbook of the teaching of psychology*. Malden: Blackwell.

Caldwell, J. E. (2007). Clickers in the large classroom: Current research and best-practice tips. *CBE Life Sciences Education, 6*, 9–20.

Cantor, J. A. (1995). *Experiential learning in higher education: Linking classroom and community*. San Francisco: Jossey-Bass.

Caprara, G. V., Barbranelli, C., Steca, P., & Malone, P. S. (2006). Teachers' self-efficacy beliefs as determinants of job satisfaction and students' academic achievement: A study at the school level. *Journal of School Psychology, 44*, 473–490.

Caprara, G. V., Vecchione, M., Alessandri, G., Gerbino, M., & Barbaranelli, C. (2011). The contribution of personality traits and self-efficacy beliefs to academic achievement: A longitudinal study. *British Journal of Educational Psychology, 81*, 78–96.

Carrington, B., Tymms, P., & Merrell, C. (2008). Role models, school improvement and the 'gender gap'—Do men bring out the best in boys and women the best in girls? *British Educational Research Journal, 34*, 315–327.

Cioffi, D. (1991). Beyond attentional strategies: A cognitive-perceptual model of somatic interpretation. *Psychological Bulletin, 109*, 25–41.

Clements, A. D. (1995). Experiential-learning activities in undergraduate developmental psychology. *Teaching of Psychology, 22*, 115–118.

Conciatore, J. (1990). From flunking to mastering calculus: Treisman's retention model proves to be "too good" on some campuses. *Black Issues in Higher Education, 6*, 5–6.

Cooper, M. A. (1999). Classroom choices from a cognitive perspective on peer learning. In A. M. O'Donnell & A. King (Eds.), *Cognitive perspectives on peer learning* (pp. 215–234). Hillsdale: Lawrence Erlbaum Associates.

Cortright, R. N., Collins, H. L., & DiCarlo, S. E. (2005). Peer instruction enhanced meaningful learning: Ability to solve novel problems. *Advances in Physiology Education, 29*, 107–111.

Cranton, P. (2006). *Understanding and promoting transformative learning: A guide for educators of adults* (2nd ed.). San Francisco: Jossey-Bass.

Crouch, C. H., & Mazur, E. (2001). Peer instruction: Ten years of experience and results. *American Journal of Physics, 69*, 970–977.

Dahlgren, D. J., Wille, D. E., Finkel, D. G., & Burger, T. (2005). Do active learning techniques enhance learning and increase persistence of first-year psychology students? *Journal of The First-Year Experience & Students in Transition, 17*, 49–65.

Deslauriers, L., Schelew, E., & Wieman, C. (2011). Improved learning in a large-enrollment physics class. *Science, 332*, 862–864.

Dirkx, J. M. (1998). Transformative learning theory in the practice of adult education: An overview. *PAACE Journal of Lifelong Learning, 7*, 1–14.

Draper, S. W., & Brown, M. I. (2004). Increasing interactivity in lectures using an electronic voting system. *Journal of Computer Assisted Learning, 20*, 81–94.

Duch, B. J., Groh, S. E., & Allen, D. E. (Eds.). (2001). *The power of problem-based learning*. Sterling: Stylus.

Duncan, D. K., & Arthurs, L. (2012). Improving student attitudes about learning science and student scientific reasoning skills. *Astronomy Education Review, 11*, 010102.

Dweck, C. S. (2006). *Mindset: The new psychology of success*. New York: Random House.

Dweck, C. S., & Master, A. (2009). Self-theories and motivation: Students' beliefs about intelligence. In K. R. Wentzel & A. Wigfield (Eds.), *Handbook of motivation at school* (pp. 123–140). New York: Routledge.

Erickson, D. M. (2007). A developmental re-forming of the phases of meaning in transformational learning. *Adult Education Quarterly, 58*, 61–80.

Estes, C. (2004). Promoting student-centered learning in experiential education. *Journal of Experiential Education, 27*, 141–161.

Fies, C., & Marshall, J. (2006). Classroom response systems: A review of the literature. *Journal of Science Education and Technology, 15*, 101–109.

Ford, N., Bowden, M., & Beard, J. (2011). Learning together: Using social media to foster collaboration in higher education. In L. A. Wankel & C. Wankel (Eds.), *Higher education administration with social media (cutting-edge technologies in higher education, volume 2)* (pp. 105–126). United Kingdom: Emerald Group Publishing Limited.

Freeman, S., O'Connor, E., Parks, J. W., Cunningham, M., Hurley, D., Haak, D., et al. (2007). Prescribed active learning increases performance in introductory biology. *CBE Life Sciences Education, 6*, 132–139.

Furnham, A., Batey, M., & Martin, N. (2011). How would you like to be evaluated? The correlates of students' preferences for assessment methods. *Personality and Individual Differences, 50*, 259–263.

Gaskill, P. J., & Woolfolk Hoy, A. (2002). Self-efficacy and self-regulated learning: The dynamic duo in school performance. In J. Aronson & D. Cordova (Eds.), *Improving education: Classic and contemporary lessons from psychology* (pp. 183–206). New York: Academic Press.

Gasser, K. W. (2011). Five ideas for 21st century math classrooms. *American Secondary Education, 39*, 108–116.

Gibson, S., & Dembo, M. H. (1984). Teacher efficacy: A construct validation. *Journal of Educational Psychology, 76*, 569–582.

Giroux, H. (2010). Teachers as transformative intellectuals. In K. Ryan & J. M. Cooper (Eds.), *Kaleidoscope: Contemporary and classic readings in education* (pp. 35–40). Belmont: Wadsworth.

Gore, P. A., Jr. (2006). Academic self-efficacy as a predictor of college outcomes: Two incremental validity studies. *Journal of Career Assessment, 14*, 92–115.

Gross Davis, B. (2009). *Tools for teaching* (2nd ed.). San Francisco: Jossey-Bass.

Haak, D. C., HilleRisLambers, J., Pitre, E., & Freeman, S. (2011). Increased structure and active learning reduce the achievement gap in introductory biology. *Science, 332*, 1213–1216.

Hannafin, M. J., Hill, J. R., & Land, S. M. (1997). Student-centered learning and interactive multimedia: Status, issues, and implications. *Contemporary Education, 68*, 94–97.

Harcum, E. R., & Friedman, H. (1991). Students' ethics ratings of demonstrations in introductory psychology. *Teaching of Psychology, 18*, 215–218.

Haynes, A. (2009). Student empowerment: Student-designed syllabus. In K. McKinney & B. S. Heyl (Eds.), *Sociology through active learning: Student exercises* (2nd ed., pp. 267–270). Thousand Oaks: Pine Forge Press.

Hebb, M. R., Brewer, C. L., & Benjamin, L. T., Jr. (2000). *Handbook for teaching introductory psychology* (2nd ed.). Mahwah: Lawrence Erlbaum Associates.

Hermann, A. D., Foster, D. A., & Hardin, E. E. (2010). Does the first week of class matter? A quasi-experimental investigation of student satisfaction. *Teaching of Psychology, 37*, 79–84.

Hmelo-Silver, C. E. (2004). Problem-based learning: What and how do students learn? *Educational Psychology Review, 16*, 235–266.

Hoffman, B., & Ritchie, D. (1997). Using multimedia to overcome the problems with problem based learning. *Instructional Science, 25*, 97–115.

Holland, A. C., & Kensinger, E. A. (2010). Emotion and autobiographical memory. *Physics of Life Reviews, 7*, 88–131.

Hudd, S. S. (2003). Syllabus under construction: Involving students in the creation of class assignments. *Teaching Sociology, 31*, 195–202.

Isbell, L. M., & Gilbert Cote, N. (2009). Connecting with struggling students to improve performance in large classes. *Teaching of Psychology, 36*, 185–188.

James, A. N., Allison, S. B., & McKenzie, C. Z. (2011). *Active lessons for active brains: Teaching boys and other experiential learners, grades 3–10*. Thousand Oaks: Sage.

Jensen, J. L., & Lawson, A. (2011). Effects of collaborative group composition and inquiry instruction on reasoning gains and achievement in undergraduate biology. *CBE Life Sciences Education, 10*, 64–73.

Johnson, D. W., & Johnson, R. T. (1974). Instructional goal structure: Cooperative competitive or individualistic. *Review of Education Research, 44*, 213–240.

Johnson, D. W., Johnson, R. T., & Smith, K. A. (2006). *Active learning: Cooperation in the college classroom* (8th ed.). Edina: Interaction Book Company.

Kapitanoff, S. H. (2009). Collaborative testing: Cognitive and interpersonal processes related to enhanced test performance. *Active Learning in Higher Education, 10*, 56–70.

Karpiak, C. P. (2011). Assessment of problem-based learning in the undergraduate statistics course. *Teaching of Psychology, 38*, 251–254.

Kassam, K. S., Koslov, K., & Mendes, W. B. (2009). Decisions under distress: Stress profiles influence anchoring and adjustment. *Psychological Science, 20*, 1394–1399.

Kaufer, D., Gunawardena, A., Tan, A., & Cheek, A. (2011). Bringing social media to the writing classroom: Classroom salon. *Journal of Business and Technical Communication, 25*, 299–321.

Kayes, A. B., Kayes, D. C., & Kolb, D. A. (2005). Experiential learning in teams. *Simulation and Gaming, 36*, 330–354.

Keaton, S. A., & Bodie, G. D. (2011). Explaining social constructivism. *Communication Teacher, 25*, 192–196.

Kilic, A. (2010). Learner-centered micro teaching in teacher education. *International Journal of Instruction, 3*, 77–100.

Klassen, R. M. (2004). A cross-cultural investigation of the efficacy beliefs of South Asian immigrant and Anglo Canadian nonimmigrant early adolescents. *Journal of Educational Psychology, 96*, 731–742.

Klassen, R. M. (2010). Teacher stress: The mediating role of collective efficacy beliefs. *The Journal of Educational Research, 103*, 342–350.

Klassen, R. M., & Chiu, M. M. (2010). Effects on teachers' self-efficacy and job satisfaction: Teacher gender, years of experience, and job stress. *Journal of Educational Psychology, 102*, 741–756.

Klassen, R. M., Tze, V. M. C., Betts, S. M., & Gordon, K. A. (2011). Teacher efficacy research 1998–2009: Signs of progress or unfulfilled promise? *Educational Psychology Review, 23*, 21–43.

Knight, J. K., & Wood, W. B. (2005). Teaching more by lecturing less. *Cell Biology Education, 4*, 298–310.

Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. New Jersey: Prentice-Hall.

Kolb, D. A., & Fry, R. (1975). Toward an applied theory of experiential learning. In C. Cooper (Ed.), *Theories of group process*. London: Wiley.

Kolb, A. Y., & Kolb, D. A. (2005). Learning styles and learning spaces: Enhancing experiential learning in higher education. *Academy of Management Learning and Education, 4*, 193–212.

Kolb, A. Y., & Kolb, D. A. (2009). The learning way: Meta-cognitive aspects of experiential learning. *Simulation and Gaming, 40*, 297–327.

Kuh, G. D., Kinzie, J., Schuh, J. H., & Whitt, E. J. (2010). *Student success in college: Creating conditions that matter*. San Francisco: Jossey-Bass.

Kuhn, J.-T., & Holling, H. (2009). Gender, reasoning ability, and scholastic achievement: A multilevel mediation analysis. *Learning and Individual Differences, 19*, 229–233.

Lammers, W. J., & Murphy, J. J. (2002). A profile of teaching techniques used in the university classroom. *Active Learning in Higher Education, 3*, 54–76.

Lasry, N., Mazur, E., & Watkins, J. (2008). Peer instruction: From Harvard to the two-year college. *American Journal of Physics, 76*, 1066–1069.

Lebens, M., Graff, M., & Mayer, P. (2011). The affective dimensions of mathematical difficulties in school-children. *Education Research International, 2011*, 1–13.

Lewis, J. S., & Harrison, M. A. (2012). Online delivery as a course adjunct promotes active learning and student success. *Teaching of Psychology, 39*, 72–76.

Loo, R. (2004). Kolb's learning styles and learning preferences: Is there a linkage? *Educational Psychology: An International Journal of Experimental Educational Psychology, 24*, 99–108.

Lord, T. R. (1997). A comparison between traditional and constructivist teaching in college biology. *Innovative Higher Education, 21*, 197–216.

Loyens, S. M. M., Magda, J., & Rikers, R. M. J. P. (2008). Self-directed learning in problem-based learning and its relationships with self-regulated learning. *Educational Psychology Review, 20*, 411–427.

MacGregor Burns, J. M. (1978). *Leadership*. New York: Harper & Row Publishers.

Marsh, H. W., & Martin, A. J. (2011). Academic self-concept and academic achievement: Relations and causal ordering. *Journal of Educational Psychology, 81*, 59–77.

Maskit, D. (2011). Teachers' attitudes toward pedagogical changes during various stages of professional development. *Teaching and Teacher Education, 27*, 851–860.

Maudsley, G., & Strivens, J. (2000). Promoting professional knowledge, experiential learning and critical thinking for medical students. *Medical Education, 34*, 535–544.

Maurer, T. J., Lippstreu, M., & Judge, T. A. (2008). Structural model of employee involvement in skill development activity: The role of individual differences. *Journal of Vocational Behavior, 72*, 336–350.

Mazur, E. (2009). Farewell, lecture? *Science, 323*, 50–51.

McKinney, D., Dyck, J. L., & Luber, E. S. (2009). iTunes University and the classroom: Can podcasts replace professors? *Computers & Education, 52*, 617–623.

McKown, C., & Weinstein, R. S. (2008). Teacher expectations, classroom context, and the achievement gap. *Journal of School Psychology, 46*, 235–261.

McManus, D. A. (2005). *Leaving the lectern: Cooperative learning and the critical first days of students working in groups*. San Francisco: Jossey-Bass.

Mercer, S., & Ryan, S. (2010). A mindset for EFL: Learners' beliefs about the role of natural talent. *ELT Journal, 64*, 436–444.

Meyers, C., & Jones, T. B. (1993). *Promoting active learning: Strategies for the college classroom*. San Francisco: Jossey-Bass.

Mezirow, J. (1978). *Education for perspective transformation: Women's re-entry programs in community college*. New York: Center for Adult Education, Teachers College, Columbia University.

Mezirow, J. (1991). *Transformative dimensions of adult learning*. San Francisco: Jossey-Bass.

Mezirow, J. (1994). Understanding transformation theory. *Adult Education Quarterly, 44*, 222–232.

Mezirow, J. (1995). Transformative theory of adult learning. In M. R. Welton (Ed.), *In defense of the lifeworld: Critical perspectives on adult learning* (pp. 39–70). Albany: State University of New York Press.

Mezirow, J. (1996). Contemporary paradigms of learning. *Adult Education Quarterly, 46*, 158–172.

Mezirow, J. (1997). Transformative learning: Theory to practice. In P. Cranton (Ed.), *Transformative learning in action: Insights from practice. New directions for adult and continuing education, no. 74* (pp. 5–12). San Francisco: Jossey-Bass.

Mezirow, J. (1998). On critical reflection. *Adult Education Quarterly, 48*, 185–198.

Mezirow, J. (2000). *Learning as transformation: Critical perspectives on a theory in progress*. San Francisco: Jossey-Bass.

Michael, J. (2006). Where's the evidence that active learning works? *Advances in Physiology Education, 30*, 159–167.

Miettinen, R. (2000). The concept of experiential learning and John Dewey's theory of reflective thought and action. *International Journal of Lifelong Education, 19*, 54–72.

Millis, B. J. (Ed.). (2010). *Cooperative learning in higher education: Across the disciplines, across the academy*. Sterling: Stylus.

Moeller, T. G. (1985). Using classroom debates in teaching developmental psychology. *Teaching of Psychology, 12*, 207–209.

Moon, J. A. (2004). *A handbook of reflective and experiential learning: Theory and practice*. New York: Routledge.

Morton, K. L., Keith, S. E., & Beauchamp, M. R. (2010). Transformational teaching and physical activity: A new paradigm for adolescent health promotion? *Journal of Health Psychology, 15*, 248–257.

Moskovitz, C., & Kellogg, D. (2011). Inquiry-based writing in the laboratory course. *Science, 332*, 919–920.

Nodine, B. F., Ernst, R. M., Broeker, C. B., & Benjamin, L. T. (Eds.). (1999). *Activities handbook for teaching psychology*. Washington, D.C.: American Psychological Association.

Norman, G. R., & Schmidt, H. G. (2000). Effectiveness of problem-based learning curricula: Theory, practice and paper darts. *Medical Education, 34*, 721–728.

O'Donnell, A. M. (2006). The role of peers and group learning. In P. A. Alexander & P. H. Winne (Eds.), *Handbook of educational psychology* (2nd ed., pp. 781–802). Mahwah: Lawrence Erlbaum Associates.

O'Donnell, A. M., Hmelo-Silver, C. E., & Erkens, G. (Eds.). (2006). *Collaborative learning, reasoning, and technology*. Mahway: Lawrence Erlbaum Associates.

O'Donovan, A., Hughes, B. M., Slavich, G. M., Lynch, L., Cronin, M. T., O'Farrelly, C., *et al.* (2010). Clinical anxiety, cortisol, and interleukin-6: Evidence for specificity in emotion–biology relationships. *Brain, Behavior, and Immunity, 24*, 1074–1077.

O'Neill, G., & McMahon, T. (2005). Student-centered learning: What does it mean for students and lecturers? In G. O'Neill, S. Moore, & B. McMullin (Eds.), *Emerging issues in the practice of university learning and teaching*. Dublin: All Ireland Society for Higher Education.

Osborne, J. (2010). Arguing to learn in science: The role of collaborative, critical discourse. *Science, 328*, 463–466.

Pajares, F. (1996). Self-efficacy beliefs in academic settings. *Review of Educational Research, 66*, 543–578.

Pekrun, R. (2011). Emotions as drivers of learning and cognitive development. In R. A. Calvo & S. K. D'Mello (Eds.), *New perspectives on affect and learning technologies: Explorations in the learning sciences, instructional systems and performance technologies* (pp. 23–39). New York: Springer.

Pekrun, R., Elliot, A. J., & Maier, M. A. (2006). Achievement goals and discrete achievement emotions: A theoretical model and prospective test. *Journal of Educational Psychology, 98*, 583–597.

Pekrun, R., Elliot, A. J., & Maier, M. A. (2009). Achievement goals and achievement emotions: Testing a model of their joint relations with academic performance. *Journal of Educational Psychology, 101*, 115–135.

Pekrun, R., Frenzel, A., Goetz, T., & Perry, R. P. (2007). The control-value theory of achievement emotions: An integrative approach to emotions in education. In P. A. Schutz & R. Pekrun (Eds.), *Emotion in education* (pp. 13–36). San Diego: Academic Press.

Piaget, J. (1926). *The language and thought of the child*. New York: Harcourt, Brace & Company.

Podsakoff, P. M., MacKenzie, S. B., Moorman, R. H., & Fetter, R. (1990). Transformational leader behaviors and their effects on followers' trust in leader, satisfaction, organizational citizenship behaviors. *The Leadership Quarterly, 1*, 107–142.

Preszler, R. W. (2009). Replacing lecture with peer-led workshops improves student learning. *CBE Life Sciences Education, 8*, 182–192.

Price, L. (2004). Individual differences in learning: Cognitive control, cognitive style, and learning style. *Educational Psychology: An International Journal of Experimental Educational Psychology, 24*, 681–698.

Prince, M. (2004). Does active learning work? A review of the research. *Journal of Engineering Education, 93*, 223–231.

Pritchard, A., & Woollard, J. (2010). *Psychology for the classroom: Constructivism and social learning*. New York: Routledge.

Rafferty, A. E., & Griffin, M. A. (2004). Dimensions of transformational leadership: Conceptual and empirical extensions. *The Leadership Quarterly, 15*, 329–354.

Reinig, B. A., Horowitz, I., & Whittenburg, G. E. (2011). The effects of team-based learning on student attitudes and satisfaction. *Decisions Sciences Journal of Innovative Education, 9*, 27–47.

Richardson, D. (2008). Don't dump the didactic lecture; fix it. *Advances in Physiology Education, 32*, 23–24.

Richmond, A. S., & Kindelberger Hagan, L. (2011). Promoting higher level thinking in psychology: Is active learning the answer? *Teaching of Psychology, 38*, 102–105.

Robbins, P., & Alvy, H. B. (2004). *The new principal's fieldbook: Strategies for success*. Alexandria: Association for Supervision and Curriculum Development.

Rosebrough, T. R., & Leverett, R. G. (2011). *Transformational teaching in the information age: Making why and how we teach relevant to students*. Alexandria: Association for Supervision and Curriculum Development.

Rosenthal, R., & Jacobson, L. (1968). *Pygmalion in the classroom: Teacher expectations and pupils' intellectual development*. New York: Holt, Rinehart and Winston.

Ross, J., A. (1994, June). Beliefs that make a difference: The origins and impacts of teacher efficacy. Paper presented at the annual meeting of the Canadian Association for Curriculum Studies.

Rubie-Davies, C. M. (2006). Teacher expectations and student self-perceptions: Exploring relationships. *Psychology in the Schools, 43*, 537–552.

Rubie-Davies, C. M. (2010). Teacher expectations and perceptions of student attributes: Is there a relationship? *British Journal of Educational Psychology, 80*, 121–135.

Saklofske, D. H., Michayluk, J. O., & Randhawa, B. S. (1988). Teachers' efficacy and teaching behaviors. *Psychological Reports, 63*, 407–414.

Saville, B. K., Zinn, T. E., Neef, N. A., Van Norman, R., & Ferreri, S. J. (2006). A comparison of interteaching and lecture in the college classroom. *Journal of Applied Behavior Analysis, 39*, 49–61.

Schmidt, H. G. (1983). Problem-based learning rationale and description. *Medical Education, 17*, 11–16.

Schunk, D. H., & Hanson, A. R. (1985). Peer models: Influence on children's self-efficacy and achievement. *Journal of Educational Psychology, 77*, 313–322.

Schunk, D. H., & Mullen, C. A. (2012). Self-efficacy as an engaged learner. In S. J. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 219–235). New York: Springer.

Schunk, D. H., & Pajares, F. (2009). Self-efficacy theory. In K. R. Wentzel & A. Wigfield (Eds.), *Handbook of motivation at school* (pp. 35–54). New York: Routledge.

Schunk, D. H., & Rice, J. M. (1986). Extended attributional feedback: Sequence effects during remedial reading instruction. *Journal of Early Adolescence, 6*, 55–66.

Seery, M. D. (2011). Challenge or threat? Cardiovascular indexes of resilience and vulnerability to potential stress in humans. *Neuroscience and Biobehavioral Reviews, 35*, 1603–1610.

Shaughnessy, M. F. (2004). An interview with Anita Woolfolk: The educational psychology of teacher efficacy. *Educational Psychology Review, 16*, 153–176.

Shellenbarger, T., Palmer, E. A., Labant, A. L., & Kuzneski, J. L. (2005). Use of faculty reflection to improve teaching. In M. H. Oermann & K. T. Heinrich (Eds.), *Annual review of nursing education volume 3, 2005: Strategies for teaching, assessment, and program planning*. New York: Springer.

Skaalvik, E. M., & Skaalvik, S. (2010). Teacher self-efficacy and teacher burnout: A study of relations. *Teaching and Teacher Education, 26*, 1059–1069.

Skott, B. P., & Ward, M. (Eds.). (2012). *Active learning exercises for research methods in social science*. Thousand Oaks: Sage.

Slavich, G., M. (2005, October). Transformational teaching. E-xcellence in Teaching, Volume 5. Retrieved from http://www.teachpsych.org/ebooks/eit2005/eit05-11.html.

Slavich, G. M. (2006a). Transformational teaching. In T. Zinn, B. Saville, & J. Williams (Eds.), *Essays from e-xcellence in teaching: 2005* (Vol. 5). Washington, D.C.: American Psychological Association.

Slavich, G. M. (2006b). On becoming a teacher of psychology. In J. G. Irons, B. C. Beins, C. Burke, B. Buskist, V. Hevern, & J. E. Williams (Eds.), *The teaching of psychology in autobiography: Perspectives from exemplary psychology teachers* (pp. 92–99). Washington, D.C.: American Psychological Association.

Slavich, G. M. (2009). On 50 years of giving psychology away: An interview with Philip Zimbardo. *Teaching of Psychology, 36*, 278–284.

Slavich, G. M., O'Donovan, A., Epel, E. S., & Kemeny, M. E. (2010). Black sheep get the blues: A psychobiological model of social rejection and depression. *Neuroscience and Biobehavioral Reviews, 35*, 39–45.

Slavich, G. M., Way, B. M., Eisenberger, N. I., & Taylor, S. E. (2010). Neural sensitivity to social rejection is associated with inflammatory responses to social stress. *Proceedings of the National Academy of Sciences of the United States of America, 107*, 14817–14822.

Slavin, R. E. (1977). Classroom reward structure: An analytical and practical review. *Review of Educational Research, 47*, 633–650.

Slavin, R. E. (1995). *Cooperative learning: Theory, research, and practice* (2nd ed.). Boston: Allyn and Bacon.

Slavin, R. E., Madden, N. E., Chambers, B., & Haxby, B. (2009). *Two million children: Success for all*. Thousand Oaks: Corwin.

Smith, M. K., Wood, W. B., Adams, W. K., Wieman, C., Knight, J. K., Guild, N., *et al.* (2009). Why peer discussion improves student performance on in-class concept questions. *Science, 323*, 122–124.

Stajkovic, A. D., Lee, D., & Nyberg, A. J. (2009). Collective efficacy, group potency, and group performance: Meta-analyses of their relationships, and test of a mediation model. *Journal of Applied Psychology, 94*, 814–828.

Stark, G. (2006). Stop "going over" exams! The multiple benefits of team exams. *Journal of Management Education, 30*, 818–827.

Stockdale, S. L., & Williams, R. L. (2004). Cooperative learning groups at the college level: Differential effects on high, average, and low exam performers. *Journal of Behavioral Education, 13*, 37–50.

Sullivan, S. S., & Glanz, J. G. (2009). *Supervision that improves teaching and learning: Strategies and techniques* (3rd ed.). Thousand Oaks: Sage.

Svinicki, M. D. (2007). Moving beyond "it worked": The ongoing evolution of research on problem-based learning in medical education. *Educational Psychology Review, 19*, 49–61.

Svinivki, M., & McKeachie, W. J. (2011). *McKeachie's teaching tips: Strategies, research, and theory for college and university teachers* (Thirteenthth ed.). Wadsworth: Belmont, CA.

Tang, X., Coffey, J. E., Elby, A., & Levin, D. M. (2010). The scientific method and scientific inquiry: Tensions in teaching and learning. *Science Education, 94*, 29–47.

Tärnvik, A. (2007). Revival of the case method: A way to retain student-centered learning in a post-PBL era. *Medical Teacher, 29*, 32–36.

Tauber, R. T. (1997). *Self-fulfilling prophecy: A practical guide to its use in education*. Westport: Praeger Publishers.

Taylor, E. W. (2007). An update of transformative learning theory: A critical review of the empirical research (1999-2005). *International Journal of Lifelong Education, 26*, 173–191.

Thompson, C. P., Skowronski, J. J., Larsen, S. F., & Betz, A. L. (1998). *Autobiographical memory: Remembering what and remembering when*. Hillside: Lawrence Erlbaum Associates.

Treisman, U. (1992). Studying students studying calculus: A look at the lives of minority mathematics students in college. *The College Mathematics Journal, 23*, 362–372.

Tschannen-Moran, M., & Woolfolk Hoy, A. (2001). Teacher efficacy: Capturing an elusive construct. *Teaching and Teacher Education, 17*, 783–805.

Twenge, J. M. (2009). Generational changes and their impact in the classroom: Teaching Generation Me. *Medical Education, 43*, 398–405.

Ueckert, C., Adams, A., & Lock, J. (2011). Redesigning a large-enrollment introductory biology course. *CBE Life Sciences Education, 10*, 164–174.

van Merriënboer, J. J. G., & Sluijsmans, D. M. A. (2008). Toward a synthesis of cognitive load theory, four-component instructional design, and self-directed learning. *Educational Psychology Review, 21*, 55–66.

VanderStoep, S. W., Fagerlin, A., & Feenstra, J. S. (2000). What do student remember from introductory psychology. *Teaching of Psychology, 27*, 89–92.

Vygotsky, L. S. (1978). *Mind in society: The development of higher mental processes*. Cambridge: Harvard University Press.

Vygotsky, L. S. (1986). *Thought and language, revised edition*. Cambridge: MIT Press.

Ware, M. E., & Johnson, D. E. (2000). *Handbook of demonstrations and activities in the teaching of psychology* (2nd ed.). Mahwah: Lawrence Erlbaum Associates.

Ware, H. W., & Kitsantasa, A. (2011). Predicting teacher commitment using principal and teacher efficacy variables: An HLM approach. *The Journal of Educational Research, 104*, 183–193.

Webb, N. M. (2009). The teacher's role in promoting collaborative dialogue in the classroom. *British Journal of Educational Psychology, 79*, 1–28.

Weimer, M. (2002). *Learner-centered teaching: Five key changes to practice*. San Francisco: Jossey-Bass.

Westmacott, R., Black, S. E., Freedman, M., & Moscovitch, M. (2003). The contribution of autobiographical significance to semantic memory: Evidence from Alzheimer's disease, semantic dementia, and amnesia. *Neuropsychologia, 42*, 25–48.

Wilson, J. H., & Wilson, S. B. (2007). The first day of class affects student motivation: An experimental study. *Teaching of Psychology, 34*, 226–230.

Wolters, C. A., & Taylor, D. J. (2012). A self-regulated learning perspective on student engagement. In S. J. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 635–651). New York: Springer.

Wood, E. J. (1989). Makin lectures more exciting. *Biomedical Education, 17*, 9–12.

Woolfolk Hoy, A., & Davis, H. A. (2006). Teacher self-efficacy and its influence on the achievement of adolescents. In F. Pajares & T. Urdan (Eds.), *Self-efficacy beliefs of adolescents* (pp. 117–138). Greenwich: Information Age Publishing.

Yoder, J. D., & Hochevar, C. M. (2005). Encouraging active learning can improve students' performance on examinations. *Teaching of Psychology, 32*, 91–95.

Young, M. R. (2005). The motivational effects of the classroom environment in facilitating self-regulated learning. *Journal of Marketing Education, 27*, 25–40.

Zhang, L. F., Sternberg, R. J., & Rayner, S. (Eds.). (2012). *Handbook of intellectual styles: Preferences in cognition, learning, and thinking*. New York: Springer.

Zimbardo, P. G. (2005). Optimizing the power and magic of teaching. *Journal of Social and Clinical Psychology, 24*, 11–21.

Zimbardo, P. G., Butler, L. D., & Wolfe, V. A. (2003). Cooperative college examinations: More gain, less pain when students share information and grades. *The Journal of Experimental Education, 71*, 101–126.

Zimmerman, B. J., & Schunk, D. H. (Eds.). (2011). *Handbook of self-regulation of learning and performance*. New York: Routledge.