5

The purpose of the chapter is to introduce the T-shaped professional and advance it as an organizing rubric for curriculum development in higher education as a strategy to enhance employability. The chapter explores the T-shaped professional by investigating its history, considering the context creating demand for T-shaped people, and outlining curricular and pedagogical strategies for a developing T-shaped people.

Enhancing Employability Through Developing T-Shaped Professionals

Laura L. Bierema

Learners spend years in higher education developing deep disciplinary knowledge in areas such as engineering, education, business, arts, or sciences. Yet, deep disciplinary knowledge is not sufficient to outpace constantly changing global contexts, exponentially increasing knowledge, growing market competition, advancing technology, and intensifying political volatility. If tomorrow's graduates are to maintain cutting-edge skills, they need to become lifelong learners today. Higher education must also reflect on its ability to develop graduates able to keep pace with the changing world (Boffo, 2018). Higher education effectively creates "I-shaped professionals"—graduates who have narrow and deep training in a single discipline—just like the metaphorical vertical capital letter "I" depicted in Figure 5.1.

Armed with their professional identities as engineer, accountant, teacher, artist, or chemist, these graduates seek careers within their narrow training. Yet, increasingly, there is a demand not only for disciplinary expertise, but also the ability to span and cooperate across disciplines. Knowledge is the currency of the future where the professionals nimbly seek and share learning across disciplinary lines and social contexts, and continually hone the ability to flex, adapt, and change along with the environment. These skills enhance employability. "Employability represents a process of change which prepares and accompanies the transition [from university to the workforce] process. It represents . . . pedagogical awareness of the educational actions that need to be developed to obtain a Degree" (Boffo, 2018, p. 125). Demirikan and Spohrer (2018) noted that "I-shaped" education evolved when change was slower and information technology was relatively static. Workers could perfect their disciplinary knowledge across their career span. The I-shaped professional is not

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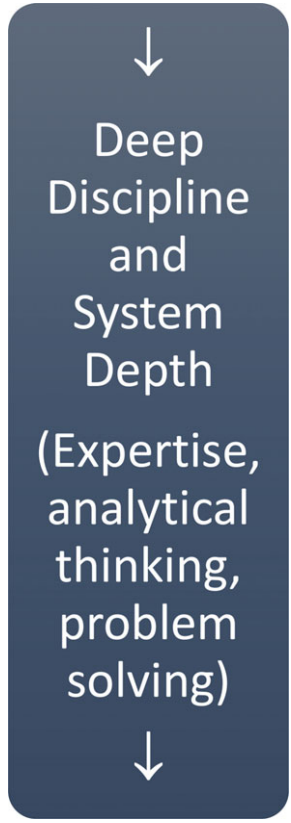
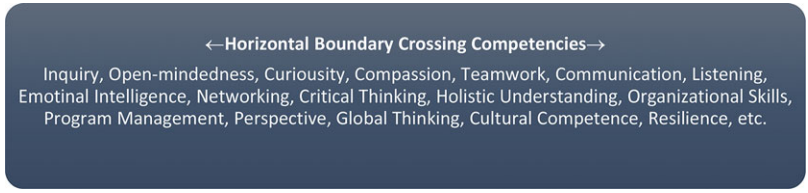
Figure 5.1. The I-shaped professional.



enough to meet current demands for workers who can keep up with advances in technology, engage in deep problem-solving skills across disciplines, and engage in multidisciplinary teamwork. As Fredrik Nael said, "It takes two sides to build a bridge." The "T-shaped professional" (TSP) bridges the specialist training of the I-shaped professional with universal skills, hence the TSP.

The TSP adds generalist, boundary spanning abilities to the I-shaped specialist such as collaboration, problem solving, business acumen, technical savvy, interpersonal skills, cultural adeptness, conflict management, teambuilding, and lifelong learning to the disciplinary expertise to create a metaphorical "T" with the addition of the horizontal, cross-functional skills to the top of the "I." Figure 5.2 depicts the horizontal bar of a TSP. "A T-shaped professional is endowed with the creativity and critical thinking necessary to develop several kinds of innovation leveraging not only on problem solving skills but also—and primarily—on decision making capabilities" (Barile, Franco, Nota, & Saviano, 2012, p. 161).

Figure 5.2. Horizontal bar of the T-shaped professional.



Barile, Simone, Calabrese, and Sala (2016) suggested that TSPs have the capabilities in our current knowledge economy to face a variety of wicked problems that do not have readily apparent solutions (e.g., climate change, world hunger, war, political deadlock, etc.). These competencies allow professionals to powerfully connect to engage in inquiry, collaboration, and problem solving.

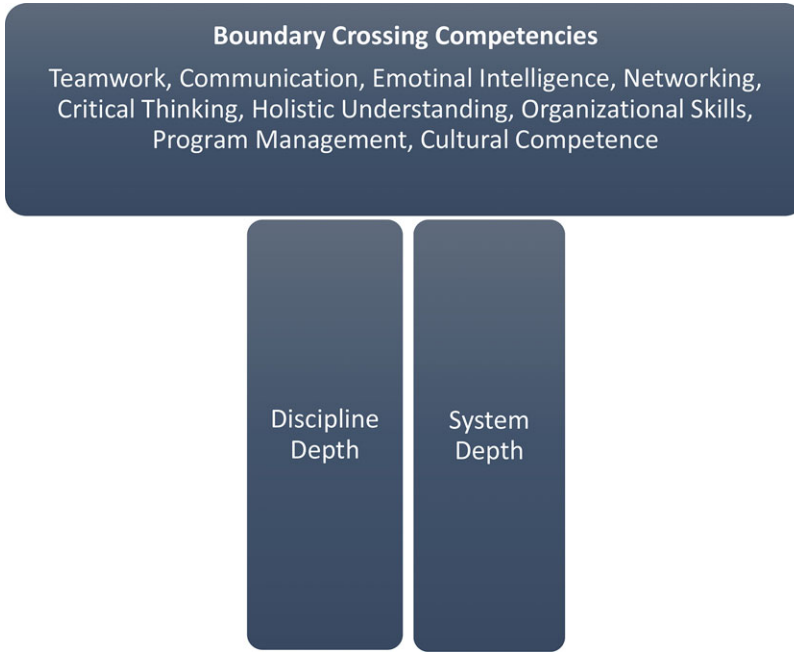
There is not a common definition of the TSP and that should not be alarming, as each field or discipline should define TSP according to the key skills, knowledge, and attitudes necessary for effectiveness. Demirkan and Spohrer (2018) questioned whether educational systems should prioritize hyperspecialization, hyperflexibility, or something else (p. 98). They argued that education should foster the development of TSPs and citizens who are prepared to combine specialized knowledge with the flexibility to build high performing teams that generate innovation. The TSP is one who acquires both depth and breadth of skills and knowledge (Cotter, 2015; Harris, 2009). TSPs "are deep problem solvers in their home discipline but also capable of interacting with and understanding specialists from a wide range of disciplines and functional areas" (Ing, 2008, n.p.). TSPs meld deep, expert knowledge with the dexterity to collaborate across disciplines and contexts to address problems. They have the capacity to blend business acumen, technical savvy, interpersonal skills, and cultural insight with their expertise, which makes them valued problem solvers and collaborators (Harris, 2009). See Figure 5.3 for a model of the TSP.

This chapter introduces the TSP and advances it as an organizing rubric for curriculum development in higher education as a strategy to enhance employability. Pedagogical implications will be outlined for faculty and academic programs seeking a systemic approach to curriculum design that creates well-rounded, employable, TSPs. The chapter explores the TSP by investigating its history, considering the context creating demand for T-shaped people, and outlining curricular and pedagogical strategies for a developing T-shaped people.

The History of the "T"

The term "T-shaped people" first appeared in the popular press in a 1991 London newspaper editorial by David Guest, who likened them to Renaissance

Figure 5.3. T-shaped professional.



people (Demirkan & Spohrer, 2018). The term "T-shaped man" was adopted in the 1980s by McKinsey and Company in their recruitment and development of both women and men consultants, based on an article by Johnston (1978). The shape of professionals takes many forms: "I-shaped" have deep specialization in one area; "Pi-shaped" or "H-shaped" have deep specialization in two areas; "A-shaped" (or Y-shaped) have depth in more than one discipline and are professionally "bilingual" in that they can provide synthesis between the two professions for others; "dash-shaped" have breadth across many areas, although lack disciplinary depth; "O-shaped" are considered well-rounded; and "E-shaped" are entrepreneurial (Demirkan & Spohrer, 2018; Tranquillo, 2017). "T-shaped" professionals, in contrast, possess deep disciplinary specialization and breadth across several areas that equip them to engage in deep problem solving in their discipline, culture, and/or system (vertical part of the "T"), and communicate and collaborate using skills that cross many areas and fields (horizontal part of the "T") (Demirkan & Spohrer, 2018). Universities specialize in producing "I-shaped" professionals, yet organizations demand "T-shaped" professionals. T-shaped people are uniquely equipped to work in an interdisciplinary or transdisciplinary fashion. They embrace lifelong learning, collaboration, wicked problems, empathy, nimble analysis, and adaptive leadership. TSPs are discussed across disciplines such as accounting (Tuck,

2010), digital professions (Demirkan & Spohrer, 2018), engineering (Boehm & Mobasser, 2015; Delicado, Salado, & Mompó, 2018; Tranquillo, 2017), higher education (Saviano, Polese, Caputo, & Walletzký, 2016), hydrology (Sanchez, Ruddell, Schiesser, & Merwade, 2016), law (Smathers, 2014), and service (Barile, Saviano, & Simone, 2015).

Demand for T-Shaped People

VUCA—shorthand for volatile, uncertain, complex, and ambiguous—is a widely adopted term that captures the daily struggle to make sense of the ever-changing global, technical, diverse, digitized, politically uncertain, economic unstable, and environmentally fragile world we live in today (van der Steege, 2017). The VUCA state generates "wicked problems" (Rittell & Webber, 1973)—stubborn, unsolvable dilemmas due to their erratic nature and humanity's inability to predict, fully understand, or agree on how to address them, such as climate change, border security, or economic strategy.

How do we prepare students to face VUCA challenges where they will encounter chaos, experience information overload, make decisions with incomplete information, and have to collaborate across disciplines? Demirkan and Spohrer (2018) lamented that we are training professionals to remain siloed (I-shaped) into functional disciplines that are not appropriate for today's challenges. This is problematic as graduates confront exponential surges in information, pressure to become more inter-and transdisciplinary, and increasing demands to function in a T-shaped society.

Information Overload

We live in an age where information increases exponentially—Demirkan and Spohrer (2018) noted that the total quantity of data multiplies at an approximate rate of 70% per year. Increasingly, we have automated processes from banking to grocery scanning, homes are inhabited by smart machines (e.g., IBM Watson or Amazon Alexa), and self-driving cars will soon be common. Robots are already replacing some workers. Many students are data-rich in this context, although are they knowledge-poor? A peek at data production underscores VUCA context as data generation is predicted to reach 1.7 megabytes per person per second by 2020, and the accumulated volume of big data will increase from 4.4 zettabytes to approximately 44 zettabytes or 44 trillion GB (New Gen Apps, 2018). Further, 40,000 search queries are performed per second on Google alone, totaling 3.46 million searches per day and 1.2 trillion per year. Facebook users send approximately 31.25 million messages and watch 2.77 million videos *per minute* (New Gen Apps, 2018). Barile et al. (2016) suggested that the emergence of the knowledge economy has a corresponding need for information variety. This age is also characterized by blurred boundaries between industries and the need for flexibility and creativity in innovation.

Becoming Interdisciplinary and Transdisciplinary in a VUCA World

VUCA context creates challenges and information technology proves a facilitator of knowledge creation and exchange, while simultaneously contributing to the ambiguity and chaos due to its sheer volume. Nicolaides (2015) called this new normal "liquid modernity," meaning it is a fluid, unruly state that requires communication and collaboration between interdependent professionals to face the relentless change and ambiguity of the world. "Dealing with these realities requires today's workforce to be collaborative and conversational across departments, skill sets and geographies" (Cotter, 2015, p. 12). Most college graduates are trained to respect rigid disciplinary boundaries, yet cross-disciplinary responses that connect to social and economic context are needed to confront the VUCA problems (Lou & Ma, 2015). Terms often get bantered about, so it is worth understanding what is meant by creating an interdisciplinary or transdisciplinary workforce.

Choi and Pak (2006) conducted a literature review of the terms multidisciplinary, interdisciplinary, and transdisciplinary to clarify meanings of these terms that are often confused in discussion and publications. Their recommended definitions are as follows:

- Multidisciplinary: Draws on knowledge from different disciplines although stays within each field's boundaries.
- Interdisciplinary: Synthesizes and harmonizes links between disciplines and arrives at a coherent whole.
- Transdisciplinary: Integrates disciplines to arrive at a transcendent understanding or solution that moves beyond traditional disciplinary boundaries (p. 359).

TSPs promote interdisciplinary and transdisciplinary approaches as they create synthesis between ideas that sometimes transcend the participating disciplines to create new solutions to wicked problems. The trend toward inter-and transdiciplinarity is increasing globally (Kruusmaa, 2015; Van Noorden, 2015), yet "there is not interdisciplinarity without disciplinarity" (Kruussmaa, 2015, p. 33). The importance and value of training deep experts has not changed. What has changed is ensuring they are able to engage with people and organizations outside their discipline. Kruusmaa (2015) advocated team-based interdisciplinarity observing, "... the most interesting, fruitful, and mutually beneficial collaborations happen between experts in different fields with good team-working and interpersonal skills" (p. 34).

The T-Shaped Society

Preparing for and thriving in a VUCA world requires new ways of learning and being for individuals, groups, organizations, communities, and nations.

How can education prepare learners to function in VUCA context? The work to build this capacity extends beyond preparing individuals for future careers. It requires T-shaped thinking about a T-shaped society. Meeting this task will require T-shaped leaders, T-shaped collectives, and beyond.

T-shaped educational leaders need to lead curricular innovation ensuring learners are prepared for VUCA context. TSPs are also needed in groups and teams, organizations, communities and beyond. Unfortunately, organizations tend to squander human resources because they are ineffective at managing knowledge (Hansen & Oetinger, 2001). Knowledge could be more effectively managed and shared if leaders and organizations practiced T-shaped management by shedding hierarchical roles to allow freer flow of knowledge and horizontal collaboration (Hansen & Oetinger). Kruusmaa (2015) suggested that interdisciplinarity within the "T" is not found in individuals, but rather in teams of professionals and how they engage since "the team is glued together by matching horizontal bars of team-working skills and secondary expertise whereas every individual remains responsible for providing deep knowledge in his or her area of expertise" (p. 30). Organizations can also be assessed on the competence of their T-shape and even forge market niches with their vertical and horizontal competences (Kruusmaa, 2015). Yet, organizations tend to function as if they were I-shaped (Hansen & Oetinger, 2001) sticking to their safe silos, even when it means market share loss and potential decline. Few organizations recognize, value, or practice T-shaped management, so there are opportunities to incorporate this into academic programs and management development. Hoarding knowledge in I-shaped silos is marginally effective, instead T-shaped managers facilitate cross-unit collaboration that results in knowledge sharing and collaboration (Hansen & Oetinger, 2001). T-shaped managers connect people from different parts of the organization and encourage joint problem solving. Their task is to create horizontal value (Hansen & Oetinger) by:

- Transferring best practices horizontally.
- Improving decision making through peer advice.
- Sharing expertise to grow revenue.
- Developing new business innovations through cross-pollination of ideas.
- Promoting coordinated implementation (Hansen & Oetinger, 2001).

Hansen and Oetinger (2001) recommended the following practices to promote T-shaped management:

- Create clear incentives.
- Develop economic transparency
- Formalize cross-unit interactions.
- Curb cross-unit interactions when not productive.
- Create human portals for idea exchange (connect those who need to be connected).

Figure 5.4. T-shaped expertise matrix.

Boundary Spanning Competencies		
Low	Discipline or System Depth	*High*
Novice Low Boundary Spanning Capacity Low Discipline Depth	*Low*	**Horizontal Expert** High Boundary Spanning Capacity Low Discipline Depth
I-shaped Expert Low Boundary Spanning Capacity High Discipline Depth	*High*	**T-shaped Expert** High Boundary Spanning Capacity High Discipline Depth

Organization architecture supporting a T-shaped culture values the vertical and horizontal dimensions of individual skills, promotes more complex thinking that is I-shaped by valuing multiple perspectives and being inclusive, and gives people the freedom to experiment (Barile et al., 2016). "It is an organizational model that tips the search for economies of flexibility, creativity, and the integration of knowledge rather than the conquest of economies of scale" (Barile et al., 2016, p. 18). Visions of a T-shaped society are nice but will not be realized unless there is a process for developing T-shaped people.

Developing T-Shaped People

The idea of a T-shaped society is a challenging vision. What is the best way to build capacity to create T-shaped people? This section discusses T-shaped education and learning and how it might take shape in the curriculum and pedagogy of higher education.

The T-Shaped Expertise Matrix

Becoming a TSP is a developmental process that raises questions. When is the best time to develop people into a T-shape? Does everyone need this type of training? Do professionals grow into expert T-learners and leaders? What curriculum and pedagogy facilitate T-shaped development? The prospect of creating T-shaped learners and leaders is daunting. Educators are faced with the problem of having too much to teach and too little time to teach it. (Demikran & Sporher, 2018). Yet, addressing society's most pressing problems depends on TSPs, and employers expect their workers prepared to do their jobs.

Becoming a T-shaped person is a developmental process. Thinking about T-shaped learning progression by distinguishing developmental stages building up to the T-shape is one approach (Figure 5.4).

Learners new to both discipline and boundary spanning competencies would possess low levels of both—*Novice level*. Novices begin by building disciplinary competence, interpersonal and collaborative wisdom. Usually I-shaped expertise develops more quickly in higher education settings because the curriculum is driven by the discipline. *I-shaped expertise* is characterized by high discipline depth and low boundary spanning capacity. A good indicator of an individual's vertical "T" (I-shape) is whether they can complete the phrase, "I *am an expert in* . . . " (Kruusmaa, 2015, p. 30). A person at this stage of expertise development will likely prioritize their disciplinary knowledge and advocate from that perspective. There may be rigidity when flexibility is needed in problem solving or considering issues from new perspectives. *Horizontal* experts, also known as dash-shaped, have highly functioning collaborative and boundary spanning skills, although they lack depth in a discipline. They might be likened to the adage, "*A jack of all trades, a master of none*," meaning the individual knows a lot about a little, or has knowledge across a number of areas, but lacks mastery in any of them. Finally, *T-shaped expertise* represents a person who is well-rounded with deep disciplinary and system expertise combined with high levels of boundary spanning capacity. They are valued collaborators and may even develop capacity to mentor or teach others how to become more T-shaped.

T-Shaped Curriculum: Developing the I—Vertical Professional Depth

Vertical professional depth in the T-shaped model is concerned with discipline and system depth. Both need to be considered when teaching for expertise development.

Discipline Depth. Professionals spend careers developing discipline and system knowledge and expertise. Benner's (1982) work with nurses provided a developmental trajectory for how people develop depth in their field progressing through stages of novice, beginner, competent, proficient, and expert. Bierema (2018) adapted Benner's model (Table 5.1) by adding an adaptive leadership stage recognizing the outward sharing of expertise and ability to motivate collectives (groups, teams, organizations, systems, communities) to address problems with resiliency, flexibility, and collaboration. Discipline-level learning requires deep expertise in the system itself since it depends on the learner engaging with the embedded VUCA (volatile, uncertain, complex, and ambiguous) nature of the system, not merely acting on it and standing back to see what occurs.

System Depth. Being an expert at a discipline is necessary but not sufficient to being a high performing TSP. Expertise in the system entails building an understanding of the culture and developing sensitivity to the context. For example, an engineer working on civil projects should understand the community where the project is being undertaken and think through what local opposition or concerns might be, as well as learn the history about the

Table 5.1. Professional Knowing Based on Development Stage (I-Shaped Expertise Development)

Novice	Shows minimal or textbook knowledge of the discipline and needs close supervision. Demonstrates little understanding of complexity or big picture comprehension of the discipline.
Beginner	Displays a working knowledge of key aspects of practice and accomplishes straightforward tasks with supervision.
Competent	Possesses a solid background and experiential knowledge. Uses judgment, planning, and analysis to cope with complex situations.
Proficient	Demonstrates depth of understanding of practice/discipline and takes a holistic approach to the profession and performs efficiently and effectively. Takes full responsibility for work (and perhaps others) and is confident in decision-making.
Expert	Possesses authoritative knowledge and deep tacit understanding of the discipline. Sees the overall big picture and has a holistic grasp of the field. Demonstrates mastery and the ability for visionary thinking beyond conventional standards and practices of the profession. Mentors and teaches others in the discipline.
Generative Leader and Learner	Demonstrates expertise plus the ability to adapt to ambiguous and unpredictable social contexts and situations in the moment and take mindful action across diverse contexts, disciplines, and systems. Engages in continual reflection in and on experience, learns from it, and teaches others, regardless of discipline.

Bierema (2018)

land. T-shaped learners and leaders balance discipline and system knowledge that results in generative learning among stakeholders. This might mean that accountants master deep disciplinary expertise in their field such as budgeting, financial statements, financial analysis, cost accounting, auditing and so on. Yet, technical knowledge about accounting is not sufficient. Accountants function in a larger economic system and may interface with government, industry, education, and other systems where they have to help solve complex problems that are shaped by the larger social context. Plus, they have to learn how to explain accounting technicalities to lay people.

T-Shaped Curriculum: Developing the Horizontal Collaborative Breadth

Most education focuses on the discipline and system depth—the vertical part of the "T," although a fully rounded professional needs the horizontal part that spans disciplines and promotes inquiry, exploration, tolerance, and collaboration. A well-rounded TSP is able to engage in problem solving with people representing a range of disciplines and social contexts. Each field needs to determine what their primary horizontal skills represent. Typically, they incorporate capacity to maximize the whole T in ways that promote inquiry, understanding, compassion, collaboration, and cultural sensitivity. Two key

competencies in this regard are developing generative knowledge and adaptive leadership.

Generative Knowledge. How do TSPs cultivate horizontal breadth? Building generative knowledge is one strategy—the capacity for learners to pay attention to their learning, reflect on practice, adapt to VUCA context, learn from mistakes, and realize new insights about themselves and others in the process (Nicolaides, 2013). Developing a T-shape requires lifelong learning. Yorks and Nicolaides (2013) defined lifelong generative learning as scrutinizing learning, analyzing thought and action, shifting with the environment, and realizing and applying new insights. They deemed generative learning a key capacity for making sense of VUCA context and its contradictions, as well as helping learners be productive collaborators on wicked problems. Learning how to engage in reflective dialogical inquiry is key to cultivating generative learning—the ability to have a productive conversation when all parties are not in agreement.

Yorks and Nicolaides (2013) envisioned generative learning occurring when people approach challenges with openness and creativity to realize new, disruptive strategies that create shifts in thinking and practice, and build capacity to face wicked problems. They observed,

> By an enhanced capacity for engaging in generative learning through inquiry, we mean having an immediate awareness of how one is in relationship with ambiguity and uncertain challenges of one's environment while maintaining and continually testing one's actions with one's intentionality. (Yorks & Nicolaides, 2013, pp. 4–5)

Generative learning helps test assumptions, alter thought or action, and proactively face disruptive environments where dominant assumptions are no longer valid (Chiva, Grandio, & Alegre, 2010).

Adaptive Leadership. VUCA context requires organizations adopt adaptive leadership: "the practice of mobilizing people to tackle tough challenges and thrive" (Heifetz, Grashow, & Linsky, 2009, p. 14). Adaptability equips leaders to effectively deal with ambiguous, wicked problems. Adaptive leaders distinguish between adaptive challenges and technical problems. When leaders fail to separate technical and adaptive issues, they tend to fail (Heifetz et al., 2009). *Technical problems* are complicated and imperative to fix, but their solutions are attainable with current understanding and leadership—I-shaped solutions. Alternatively, *adaptive challenges* demand learning to both define and solve them and require motivating stakeholders to change their goals, minds, habits, and loyalties and work across boundaries to find T-shaped solutions. Table 5.2 contrasts traditional and adaptive leadership behaviors. Adaptive leadership follows a recycling process of observation (collecting data), interpretation (analyzing findings), and intervention (choosing and attempting a solution). Academic programs adopting the process of action

Table 5.2. Shifting From Traditional to Adaptive Leadership

Traditional	Adaptive
• Struggling in VUCA context • Directing people • Confusing technical and adaptive problems • Dealing with difference through domination or compromise • Playing safe	• Thriving in VUCA context • Mobilizing people • Tackling adaptive/wicked problems • Dealing with difference through integration • Embracing risk • Connective

(Heifetz et al., 2009; Lipman-Blumen, 1996)

and reflection can create new insights that change thoughts, actions, and practices, and become more T-shaped in the process.

Designing T-Shaped Curriculum and Pedagogy

Real-world experience challenges learners to grapple with wicked problems that cross-disciplinary boundaries, cultures, and systems. Trying to solve wicked problems gives learners opportunities to deal with contested, contradictory ideas and solutions. Authentic learning activities have been advocated for developing TSPs and Sanchez et al. (2016) engaged their hydrology students in a data-driven simulation activity that included modeling from a real-life case and visualization. They found significant positive impacts on learning and mastery among their students. They advocated situated, experiential, active learning pedagogy. Shifting toward a T-shaped curriculum involves embracing multi-, inter-, and transdisciplinary approaches to curricular design. Saviano et al. (2016) encouraged taking multi-and trans-disciplinary approaches to higher education to develop TSPs in "the hyper-specialized, knowledge-based society in which we all live" (p. 53). They noted problems with current educational approaches as being too incremental and fragmented in terms of integrating solutions and ideas, discipline-centric, reductionist, and rooted in the existing system with limited ability to see beyond it. They recommended developing more well-rounded forms of cross-disciplinary education, applying interpretive approaches, introducing systems thinking, and teaching learners to support holistic organizations. Demirkan and Spohrer (2018) advised that T-shaped curricula require helping learners connect with multi-disciplinary teams and problems that simulate future work contexts. Learning is powerful when students apply theoretical principles to real-life cases in conjunction with students from other disciplines. Technical skills are relatively easy to learn. Cross-discipline and cross-cultural collaboration are much more challenging and time consuming. What is the best way to promote such learning and development? I-shaped programs are at risk of creating discipline expertise, but knowledge poor graduates. The following guidelines are recommended for designing international, interdisciplinary T-shaped curriculum:

- Identify a common goal—a wicked problem members care about that crosses disciplines.
- Find the right T-shaped collaborators—diverse collaborators from different disciplines who have effective communication and teamwork skills.
- Listen—take time to understand the interests and goals of the stakeholders.
- Expect interdisciplinary work to take longer and build in time for it.
- Learn and respect the standards and culture in other disciplines (Kruusmaa, 2015, pp. 34–35).

Tranquillo (2017) outlined a pedagogy for developing T-shaped engineers with principles generalizable to higher education and noted that "Teaching the T-shape . . . brings natural contact with the messiness of the real works and . . . exercises the capacity for complex and contextual thinking" (p. 20). Tranquillo critiqued the engineering curricula at his institution for "compartmentaliz[ing] the depth and breadth into different courses" (p. 12). He identified institutional barriers to delivering T-shaped pedagogy as a bias toward privileging technical depth over breadth, along with ideology—that the T-shape is neither important to individuals or society. He challenged engineering students to move outside their comfort zone by giving them a project where they applied their engineering skills to building nontraditional musical instruments for music students. Refer to Tranquillo (2017) for a full account of the course. What made his course so realistic and powerful for students was that multiple sources were imposing constraints on the engineering students' projects—just like in real life. Below are strategies based on Tranquillo's lessons on designing and facilitating T-shaped curricula:

- Pedagogy needs to facilitate learning in both the horizontal part of the "T" or the vertical part of the "T."
- Educators play more of a coaching role than an expert role and may not know the answer.
- Regular reflection about what is and is not working is essential.
- Team teaching across disciplines enriches the experience for both the students and faculty.
- Linking the curriculum to wider issues is powerful (e.g., current political, cultural, economic, or social issues).
- Provide opportunities for learners co-create content.
- Incorporate a self-directed project using a methodology from a discipline outside their major.
- Help learners see the permeability of boundaries of their field.
- Foster a culture of trust and respect so students can safely experiment crossing boundaries and working with new ideas and practices.
- Use and discuss readings that challenge discipline and world views.

Tranquillo (2017) recommended T-shaped pedagogy focused on mindset, real world, and reflection. Mindsets are maps learners use to make sense

of the world through their process of trial and error, and self-discovery. Challenging learners to adopt a growth mindset (asking: "What have I learned?" or "What should I do now?" or "How can I make an impact?") create very different learning than learners who approach problems with a fixed mindset (asking: "How can I prove myself" or "What if I fail?" or "Will I be accepted or rejected?" or "Will I win or lose?"). Growth mindsets focus students on learning versus the presence or lack of goal attainment.

The opportunity to create T-shaped people is before us. Boffo and Fedeli (2018) urged that it takes courage to transform teaching for learning and transformation. The TSP model provides a map for actualizing the challenge of creating educational experiences that enhance employability.

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LAURA L. BIEREMA, EdD, is professor in the Lifelong Education, Administration, and Policy Department in the College of Education the University of Georgia, program coordinator of the Adult Learning, Leadership, and Organization Development Program, and director of the Organization Coaching Graduate Certificate.