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Chapter 1
Changing Views of Knowledge and Practice in American Higher Education

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American colleges and universities have undergone tremendous growth and change over the last 100 years, known around the world for excellence in undergraduate education, doctoral training, and research excellence. Back at home, there has been an increasing tension with a growing disconnect between the American Academy and the rest of society. The purpose of a liberal education, the value of doctoral education and research excellence are undervalued by most.

Due to the perception of a gap between what students learn, what researchers produce, and the return on America's investment in higher education, there has been a progressive shift to consider how knowledge is viewed within American higher education. At the undergraduate level, there has been a shift toward more practice-based approaches to learning and attempts have been made to change toward more student-centered curricula. Simultaneously, with research, there has been an increasing focus on issues of relevance and broader impacts of the research being carried out, with a focus on end use.

In this chapter, we examine the changing views of knowledge and practice within the American academy, looking closely at what has been said to be a gap between knowledge and practice. Adopting a longitudinal approach, we first examine changing notions of knowledge and practice in discussions of under-graduate education with a specific focus on what it means to be liberally educated. Next, we shift to examine changing notions of knowledge and practice through an examination of research. Typically, the study of liberal education and the research university are distinct. In this chapter, we will not only review changing views of

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knowledge and practice in each of these two areas, but also raise the question of whether trends in each area are related and whether these can be tied to new theory and research in the area of the developmental and learning sciences during the same time period. It will be argued that both the conceptual frameworks and strategies guiding the organization of American higher education have yet to fully draw upon emerging perspectives from the development and learning sciences.

Liberal Education and the Turn to Practice

> When we ask about the relationship of a liberal education to citizenship, we are asking a question with a long history in the Western philosophical tradition. We are drawing on Socrates' concept of 'the examined life,' on Aristotle's notions of reflective citizenship, and above all on Greek and Roman Stoic notions of an education that is 'liberal' in that it liberates the mind from bondage of habit and custom, producing people who can function with sensitivity and alertness as citizens of the whole world.
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> — Nussbaum (1998, p. 8)

Since the origins of liberal education in the USA, ongoing discussion of what exactly a liberal education is has focused on what (if anything) it affords students. At the same time, a parallel discussion has been taking place that focuses on liberal education and its value as a public good. There has been an outcry suggesting that a liberal education is disconnected from everyday needs of all, but the elite for whom job security is believed to be guaranteed. Too many do not fully understand whether and how a liberal education prepares students to live lives of meaning and purpose. Not only has there been concern for rising costs, but also questions of relevance especially for students moving to work positions outside the ivory tower. In this section, we turn to consider liberal education and issues of relevance.

What Is Meant (and Is Not Meant) by the Phrase Liberal Education?

What is meant by liberal education has not been well understood, either in the public sphere or in higher education more specifically. One common misunderstanding and source of confusion is the distinction between liberal arts and liberal education. As Carol Geary Schneider (past President of the Association of American Colleges and Universities) has argued:

> A quest for the key to America's historic world leadership in higher education brings interested visitors into a notably confusing aspect of postsecondary learning: the contested standing of liberal or liberal arts education. Even for Americans, contemporary perspectives on this important educational tradition are conflicted and often contradictory." Schneider (2008, p. 30)

Schneider goes on to provide clarification of several terms, most relevant here are the definitions she provides for the terms "liberal education," "liberal arts," and "liberal arts college"[1]:

Liberal Education: A philosophy of education that empowers individuals, liberates the mind, cultivates intellectual judgment, and fosters ethical and social responsibility.

Liberal Arts: Specific disciplines (humanities, arts, social sciences, and sciences).

Liberal Arts College: A particular type of institution—often small, often residential—that facilitates close interaction between faculty and students, and whose curriculum is grounded in the liberal arts disciplines.

Much of the tension around liberal education has roots in one of the three confusions:

1. The assumption that liberal education is reserved for the elite who attend selective liberal arts colleges.
2. The assumption that liberal education specifies particular areas of study (e.g., the humanities as opposed to STEM fields) and the related assumption that these fields are less practical or do not prepare students for entry into the workforce.
3. The assumption that liberal education is rooted in a liberal political stance (e.g., for Democrats rather than Republicans).

While we will not discuss all of these issues, it is important to be clear that in this chapter when referring to liberal education I am focusing on a particular view of undergraduate education. Here, liberal education is viewed as *an approach*, one that can be adopted at any college and university (small or large, private or public), and an approach to education that is not inherently linked to one or another political viewpoint. With this clarified, we can turn to a historical overview of American liberal education and its relation to practice.[2]

Liberal Education 1.0

For as long as the concept of a liberal education has existed in the United States, so too have extended conversations about its purpose. Early on there was a strong belief that education was strongly linked to the character of society (see Dewey 1916, 1933). In terms of its role in students' intellectual development, liberal education has been associated with a commitment for students to have both breadth and depth of knowledge. The influential Yale Report of 1928/1929 provides a nice

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[1]A complete list that Schneider provides in the 2008 article can be found here: https://www.aacu.org/leap/what-is-a-liberal-education.

[2]Our review makes the trajectory from liberal education 1.0 to liberal education 2.0 seem more linear than it actually is. See Harkavy (2015) for a discussion of some of the nuance to this debate, as well as an exploration of the discussion of practice back to Jefferson's time.

summary of a theme that has been the source of much debate throughout American history—do students need a common curriculum similar for all students or a college curriculum that is more loosely structured. Why Yale faculty would propose a common curriculum links directly to their view of the purpose of a liberal education. The overall aim was to prepare undergraduates for life rather than a particular vocation:

> Our object is not to teach that which is peculiar to any one of the professions; but to lay the foundation which is common to them all.

If the nineteenth century left colleges and universities to question the need for a classical education and whether a core curriculum versus a more elective curriculum was optimal, the twentieth century began to focus more on the distinction between the division of "the major" and "general education." During this period, questions about the diversity of modes of thought introduced by distinct disciplines as well as discussions about the need for all students to acquire a common set of skills and capacities and what those might be has been debated on most college and university campuses.

What is remarkable is that the notion of general education is alive on most campuses despite increasing fragmentation of the disciplines today (see Boyer 1987). What core kinds of knowledge or intellectual skills and capacities should be acquired have varied across time and across institutions, but the majority of baccalaureate degrees in the USA place emphasis on both the acquisition of core knowledge and intellectual skills and capacities in addition to a student's completion of a specific major. While the particulars have been debated, the statement below, adopted just before the beginning of the twentieth century, nicely summarizes the breadth of knowledge and skills that a liberally educated student was said to hold:

> Liberal education requires that we understand the foundations of knowledge and inquiry about nature, culture and society; that we master core skills of perception, analysis, and expression; that we cultivate a respect for truth; that we recognize the importance of historical and cultural context; and that we explore connections among formal learning, citizenship, and service to our communities. *Adopted by the Board of Directors of the Association of American Colleges & Universities, October 1998*

More specifically, foundational knowledge across a range of disciplinary areas (arts and sciences) as well as intellectual skills (perception, analysis, and communication) is at the heart of what learning is about. It is not that the ability to put these skills to use was not relevant, but rather that the ability to integrate and apply knowledge was taken for granted.

As discussions of the purpose of breadth requirements have intensified across the twentieth century, campuses simultaneously began to give increased attention to the importance of specialization or depth of expertise any student was learning. During this period, discussions of American liberal education gained razor-sharp focus on

the notion of the major, and students and their families increasingly have seen this as the core element of an undergraduate degree. With this focus on the major came the realization that a single writing or formal reasoning course was an insufficient way to introduce writing, reasoning or other basic skills. Writing across the curriculum and other campus initiatives were implemented to assure students had the habits of mind associated not only at a general level, but also tied to their majors. Across the twentieth century as the disciplines became more strongly tied into the organizational fabric of universities and colleges, they came to play an increasing role in the nature of undergraduate education. Taken together, these various developments resulted in an increasing differentiation between two central strands of a liberal education with minimal connection between the general education program and the major. For many, this became a problem in urgent need of fixing (see Boyer 1987; Deblanco 2012).

One might ask what all of this has to do with liberal education and notions of practice. The answer is everything. Focus on the separate curricular structures (the major and general education programs) as well as de-emphasizing consideration of a holistic view of the student became common in the rapid explosion of disciplines and co-curricular opportunities on US campuses in support of liberal education. As focus has drilled down to individual programming and disciplines, there has been equal concern expressed about the loss of connection with campuses as anchor institutions in their communities. Noted was a general decline in focus on the connection between education and civic life (whether in terms of organizational connections or with regard to student learning). Harkavy (2015) argues that central to student liberal learning and a more holistic approach to liberal education is a return to the views of Boyer, Dewey, Franklin, and others who see integration with one's community as central to American liberal education.

As we entered the twenty-first century and as liberal education in America approached its centennial, there were numerous indicators suggesting the need for re-examination and clarification about what a liberal education means in America. Early on, little thought was given to specifically American ways of introducing liberal education into the American higher education scene, and it was largely imported as is from Europe. Over the twentieth century, the development of and importance granted to department cultures and the disciplines led to increasing barriers that hindered the ability to provide a holistic education to American undergraduates. As we will note, around the same time, on many campuses, research became a primary engine of prestige and thus student learning not only became increasingly disconnected from research, but also from civic life. All of this left many feeling that liberal education had become detached from its larger purposes of preparing individuals for citizenship and work.

Liberal Education 2.0: Practice, Application, and Real-World Experience

While for most of the twentieth century many assumed that the goals of a liberal education were quite distinct from an education that helps students become employable, in recent years, this view has changed. As Schneider (2009, p. 2) notes:

> In the twentieth century, proponents of liberal learning drew a sharp dividing line between "practical" or career studies and the "true liberal arts. Today, we contend, we need to erase that distinction…

In this section, we explore some of the new ways of thinking about liberal learning that infuse notions of practice into conceptualizations of liberal education. Why this turn is taking place appears to stem from multiple reasons including new theories of learning and economic issues leaving college students unprepared and often without jobs. Some of the shift to more engaged learning pedagogies has been introduced within the context of typical college learning contexts such as within the classroom, while others have focused on the application of classroom learning to real-world problems, typically beyond the university campus.

One of the most well-known movements has been the focus on what is called active learning or engaged learning where students, typically in traditional classroom settings, are encouraged to take on more active roles. One such effort has been labeled the "flipped classroom:" where students watch lectures at their own pace using technological assistance and class time involves activity-based learning. Carl Wieman has become a lead advocate for more active pedagogies, spending significant time learning about why learning and developmental scientists believe more active learning strategies enhance student learning. It is becoming increasingly common for faculty to go well beyond the lecture mode, using an array of strategies to keep students focused on large-scaled lectures and seminars.[3]

Increasing focus though also has been given to student learning that takes place outside the traditional classroom. Two common reasons given for this shift are that (a) students become more motivated when learning takes place in contexts of use, and (b) these experiences provide the kind of "real-world" application of knowledge and skills that will guide their success after college graduation. Experiential learning is viewed as a process whereby knowledge and skills acquired in the context of formal teaching get applied in concrete activities. A good summary of this perspective is described by Kolb (1984) who argues forcefully that experience is the driver of learning and development and several colleges and universities have picked up on this work.[4]

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[3]See   http://www.npr.org/sections/ed/2016/04/14/465729968/a-nobel-laureates-education-plea-revolutionize-teaching for a summary of this work.

[4]See link for good summary of how one university explains experiential learning https://facultyinnovate.utexas.edu/teaching/strategies/overview/experiential-learning.

Eyler, one of the deepest thinkers on experiential learning in the context of undergraduate education notes that too often we get lost in "the doing" and forget about the key role that integrative learning and reflection play. She notes:

> …students need the capacity to perceive and address ill-structured problems, tolerate ambiguity, make warranted judgments, and act while continuously seeking and refining further information. Neither tolerance for ambiguity nor critical thinking is simply a function of information, skill, and social ability or even of repeated practice, but rather both require intellectual capabilities that are not now generally attained before college graduation. (Eyler 2009, p. 27)

Eyler goes on to point out that the quality of the experience, as well as the related intellectual work that goes on during the experience, is central to deep learning. This requires explicit training in helping students learn about the ways learning takes place in authentic contexts as well as in how to optimize the necessary reflection required for significant learning to take place. As Eyler (2009) and others such as Hodge et al. (2009) have argued, central here is that students not only acquire habits of mind, but also the identities of knowers or the self-authorship required to evaluate knowledge autonomously. As Hodge et al. (2009, p. 18) go on to explain "The promotion of self-authorship entails a fundamental shift in how we imagine and structure the whole undergraduate experience.[5]

It has becoming increasingly common to use more active pedagogies and incorporate experiences for undergraduate students that mimic what has been referred to as learning in "real-world settings" (e.g., undergraduate research, internships, service learning). No group has invested more thought into building sustained intentional leadership and resources to liberal learning and authentic application than the Association of American Colleges and Universities with their work on the LEAP Challenge. The LEAP Challenge is designed flexibly to be a framework utilized by a variety of kinds of institutions (community colleges, liberal arts colleges, state institutions, private and public research universities) embodying a blended model of liberal education and vocational training. The heart of the framework, which focuses on integrative liberal learning, is an attempt to build developmental pathways that provide opportunities for students to take on increasing agency in integrating and applying their work to complex or "unscripted" problems. Significant here is the attempt to outline potential ways a liberal education can add up to be greater than the sum of a series of individual course.[6]

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[5]The 2009 Clark/AAC&U conference on Liberal Education and Effective Practice not only led to many papers cited here, but also to a new curricular framework for liberal learning based on revised notions of effective practice. A description of the new curricular framework, its developmental science underpinnings, and building faculty capacity for this work can be found in Budwig (2013), Budwig et al. (2015).

[6]Further information and many resources stemming from AAC&U's LEAP Challenge can be found here: https://www.aacu.org/leap-challenge; also see Budwig and Jessen-Marshall (2018) for illustrations of signature and capstone work at several institutions.

Re-centering: Liberal Education and Practice

Thus far, we have drawn a distinction between the approach to liberal education during much of the twentieth and twenty-first centuries. The twentieth-century views focused on breadth of knowledge about the arts and sciences, as well as intellectual skills typically associated with a liberal education such as critical thinking, analysis, information literacy. While holding on to this view, a twenty-first century also witnessed a turn toward approaches to liberal education that weave in notions of practice. Two caveats are in order. First, the turn toward practice should be viewed as one of degree of focus. From the get-go, one can find views that link liberal education and practice, for instance, in the writings of Jefferson (see Harkavy 2015 for an excellent review of this work). Second, much of the work currently being done to engage students through a "learn through doing approach" does not fully draw on research from developmental and learning science theory and research. While some features of active learning pedagogy are referred to in revised notions of liberal learning, for the most part this work has been devoid of deep connection with new theory and research in the area of human learning and development and driven more by a belief that engaged learning is a preferred pedagogy as the range of students leaving high schools for college increases.

In short, although by the start of the twenty-first century one finds some changes in how liberal education is viewed that move in the direction of modern day research on how people learn, this movement actually has little connection to research in this area. This leads to the question of why. One answer which is worth considering further is put forward by Deblanco (2012). He notes that by the beginning of the twentieth century the commitment to character formation and the habits of mind that foster creativity began to be in sharp tension with a commitment to professionalization in higher education. As he points out, other changes have taken place within the academy that have influenced focus on liberal education, for instance—at the beginning of the twentieth century, colleges were becoming universities. He argues that as universities began to build up research, a holistic approach to the ungraduated community took a back seat to expertise, and schools once exclusively devoted to undergraduate learning sought prestige through the development of graduate and professional schools. It is not that individuals lost interest in liberal education, but as Tritelli (2007) notes, the structures in place as well as the incentives provided have created structural impediments for achieving the goals of a twenty-first-century liberal education. We turn now to consider the emergence of research in the university, shifts in how practice is viewed over time, and whether there are connections between the turn toward practice found in liberal learning and that discussed in the context of research.

Framing American Research: The Turn Toward Practice

Currently, there is little dispute that knowledge production and dissemination are central to the economic competitiveness and the social welfare of nations. At the same time, others fail to understand what purpose research serves and question the large investment being made with federal and state dollars. Current dialogue across difference has also raised issues of knowledge and practice, questioning what the appropriate balance is between basic research and application. We turn now to discuss three critical phases in American history that have shaped understanding of the changing views on the relation between knowledge and practice.

The Emergence of the American Research University

It is remarkable that as recently as the middle part of the 1800s, American universities gave little attention to research and had minimal infrastructure to support it. By the end of the 1800s, as increasing numbers of scientists headed to German to study with leading scholars, professors brought back with them new ideas about the goals of science and new models for how to organize universities to support this work. At a time when universities primarily were organized around a vision of science that was instrumental in nature, the idea that American universities might adopt a framework that emphasized science for purposes of understanding took off like wildfire among a group of elite entrepreneurs. In the last few decades of the nineteenth century, several individuals instigated ambitious plans that called for a new kind of university—one that was organized around the goals of research and graduate study. The individual stories varied in some specifics, but it has been well noted that there was a wave of change across American higher education at this time. More than a dozen American research universities became dedicated to a firm grounding in models of scientific autonomy that remains largely unchanged today (see Crow and Tucker 2001; Menand et al. 2017; Stokes 1997; Veysey 1965).

This entrepreneurial period characterized by several new university leaders such as Gilman at Hopkins, G. Stanley Hall at Clark, and others forming private universities borrowed in part ideas from Europe, especially Germany. This led to numerous changes in American higher education. For instance, the interest in basic research at these institutions led to the formation of programs uniquely designed to train a new generation of scientists and resulted in the formation of graduate education in the USA that was not grounded in professional disciplines such as medicine or law. This transition led to a move away from university courses providing general education and led to the buildup over time of several independent disciplines. It also led to the formation of extensive laboratories in the sciences modeled after the German laboratories. Funding primarily was provided by

individual universities or philanthropists, and consequently, there was no formal organization beyond the level of individual universities to foster a national platform of research. The dramatic developments witnessed across the country by the early 1900s had a tremendous impact on the American higher education system, especially with regard to emphasizing a less utilitarian view of science and a new design of knowledge transmission, such as the introduction of the seminar to higher education in the USA.

The emergence of the American University has been viewed as a somewhat sudden and unplanned sequence of events that has had a profound impact on current American university life for professors, students, and academic administrative leaders (see Veysey 1965). It is remarkable that so many changes could take place with so little explicit reflection in such a short span of time, especially given what is known about the pace of organizational change in American universities today. The model of the German research university played a significant role in the thinking of the entrepreneurial leaders of the time, but the Americans responsible for building up the new research universities included their own nuances that were indicative of differences that would impact the structure of higher education in America and has led to its global success. Two major differences will be discussed here.

One significant difference between the structure of higher education in Germany and America had to do with the development in America of the structure that has come to be known as the department. In Germany, areas of study at the university level were more likely to be organized around a single professor who had the energy and authority to determine the direction of scientific focus of that area of study. In contrast, the America research universities developed departments which were areas of specialization of knowledge that brought along the formation of increasingly specific disciplines (Rudolph 1962; Veysey 1965). Departments came to be a structural unit that existed between individual professors and their particular areas of research interests and larger university administration (see Stokes 1997). As departments formed so too did disciplinary societies, and both of these new structures led to increasing specialization of areas of inquiry that fostered distinct ideas about methodology and graduate training. The egalitarian nature of departments and disciplines not only has led to an increased role of peer evaluation, but also (though not through any known planning) has provided a mechanism for new scholars to bring innovative ideas to the frontiers of knowledge construction in ways that were not necessarily fostered in European universities around the turn of the century. In short, the creation of departments created space at the time for innovation.

A second important difference between German and American research universities had to do with the organization of the connection between science and technology. In Germany, as Stokes (1997) points out, alongside the buildup of research universities to support pure science were a set of technical schools that supported training and research in the applied disciplines of technological advance. Students were placed on one path or the other at an early age, and there was little

connection between basic and applied science. In contrast, America has had one integrated university system with what has been known as the pure and applied sciences existing side by side. In many cases, both pure science and the more technical fields existed within one and the same university in America. It appears that whether in the university setting or in separate research laboratories in the USA, American scientists have been able to hold together views of basic science (understanding) and applied science (use) in ways that were not common in Germany (see Stokes 1997). It has been argued that the progressive movement influenced research universities such as University of Chicago and others to not draw too firm a separation between basic and applied research. Overall, though basic science was introduced around the turn of the century, it is clear that issues of use have had a significant role to play in American conceptions of research in the modern era. Clearly, harnessing scientific knowledge significantly impacted American political strategy during the years surrounding World War II.

Formulating a National Approach to Research: The Post World War II Years

One of the most significant moments in the development of a framework for American research came just after World War II. Bush's (1945) Science: The Endless Frontier report clearly played a significant role in shaping a change in course in the conceptual framework of knowledge and practice and the report influenced the financial affiliation between research universities and governmental agencies. To most, this represented an abrupt end to a period during the war years when basic science played a significant role in warfare. Prior to the war, significant reluctance on the part of basic scientists had been expressed with regard to drawing upon federal support due to a fear that such a move would lead to reduced scientific autonomy. During the war years, the Office of Scientific Research and Development, run by Bush, led to significant funding of basic science research that fed into the application of nuclear research to warfare. The report outlined an approach to science that called for a centralized governmental approach that nevertheless protected scientific research from political accountability.

While not the first time such a proposal had been made in America, the report was well timed and resulted in both the formation of the National Science Foundation (NSF) and a tenfold increase in national support for research funding between 1940 and 1960. It is important to recognize that although Bush's Science: The Endless Frontier led to a national steering of research; for the most part, there was little change to the organizational structure of American Universities. As some have noted, Bush's reframing was primarily rhetorical, and yet for quite a long while the consequence the conceptualization of the relationship between knowledge and practice has been at best linear (see Crow 2008; Stokes 1997).

New Language and New Frameworks: Twenty-First Century Views of Research and Practice

By the beginning of the turn to the twenty-first century, the compact forged by Vannevar Bush between science and government has again come into question. Across the humanities, sciences, and social sciences, issues of the connection between research and practice have surfaced with new energy.

In the sciences, Stokes (1997) introduced the words "use-inspired" research into the discussion in his book Pasteur's Quadrant where he argued that the linear distinction between applied and basic research was too simplistic. For Stokes, use-inspired research is similar to basic research in that it focuses on fundamental understanding, and at the same time, like applied research, focuses on considerations of use. Other labels in the social sciences have surfaced including usable knowledge and publically engaged scholarship, and one finds increasing interest and debate into issues of public humanities surfacing as well.

In recent years, funders have begun to consider contexts of use such as the National Science Foundation's interest in "broader impacts" formalized as one of two criterion for proposals under review (the other being intellectual merit) in 1997 for all NSF proposals. Similarly, in recent years, the Spencer Foundation has problematized the construct of practice in considering not just how fundamental research might be used, but also key questions dealing with context such as why and how and for whom findings hold as part of the foundations interest in research–practice partnerships. And the National Institute of Health has reimagined its work to accelerate the connection between what we know and therapeutic development pipeline, examining the pipeline for bottlenecks and the like, in its National Center for Advancing Translational Sciences. The National Endowment for the Humanities has invested in an agency-wide initiative, The Common Good: The Humanities in the Public Square, which aims to connect the study of the humanities to the current conditions of national life, especially issues that require more than one form of understanding and representing the humanities.

While conceptually each of the terms used above involves slightly different frames or metaphors on the connection between knowledge and practice, what holds these various examples together is reference to a subtle but growing shift away from basic and fundamental research to research that more closely connects (albeit in different ways) with public issues and problem solving. One of the most prolific writers on this issue is Crow (2008, p. 16) who has argued that the increasing specialization of knowledge located in the disciplines has led to institutional inertia in American universities:

> In our effort to produce abstract knowledge without regard for its impact, many universities have lost sight of the fact that they are also institutions with the capacity to create products and processes and ideas with entrepreneurial potential.... We must instead design some of our institutions to allow us to be competitive and address the challenges that will confront global society in the decades ahead. Our universities must recover an entrepreneurial edge if they are to be relevant and useful on a global scale.

As was the case just after World War II, the American research agenda and its framing have less to do with new intellectual and research trends related to knowledge and practice and instead framed in light of economic development and reasons for why the great American research university must be protected (see Cole 2009).[7]

Is There a Gap Between Knowledge and Practice in Higher Education

The Gap Metaphor

The first two sections of this chapter have argued that both within the areas of student learning and research in higher education, the conceptual framing of student learning and research has highlighted a gap between a view of abstract knowledge and issues of practice. In this section, we will review the conceptual framework presented in the student learning and research literature, examine similarities and differences in these frameworks, and consider evidence for whether common underlying issues have led to the emergence of the view of a gap.

The gap between knowledge and practice in both liberal learning and research areas of higher education

Our review of the modern day conceptual framework for liberal learning has increasingly included discussions of the role of application and practice. The image most commonly used is one of a student acquiring knowledge and skills and then traveling out beyond the university to apply what they know in the context of "real-world" or complex problems. On such a view, practice is viewed as central to liberal learning. The Association of American Colleges and Universities (AAC&U) include this as part of their discussion of the Essential Learning Outcomes (see College Learning for the New Global Century 2007). Learning Outcome 4 is called "Integrative and Applied Learning" and includes "synthesis and advanced accomplishment across general and specialized studies, demonstrated through the application of knowledge, skills, and responsibilities to new settings and complex problems."

The notion of application of prior learned knowledge is central throughout discussions of engaged and experiential learning as well. Some work assumes that

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[7]While not discussed here, it is intriguing to note that discussions of the connection between knowledge and practice are linked to the scholarly literature in the European Union. See for instance the work of Helga Nowotny President of the European Research Council (ERC), which was launched in 2007 by the European Union, with the aim to stimulate scientific excellence in Europe by encouraging competition for funding between the very best, creative researchers of any nationality and age from anywhere in the world. Nowotny is a leading scholar on the relationship between knowledge and practice, including her 2001 publication with Scout and Gibbons.

fundamental knowledge is taught in lecture settings and that the experiences outside of the formal classroom help students learn to apply such knowledge in specific contexts, often ones that are messier than the settings where knowledge and skills are originally taught. Other approaches assume a tighter link between acquiring fundamental knowledge and application, where high impact practices are woven more explicitly into classroom experiences.

We have also noted a similar gap metaphor in discussions of research. Compared to the higher education literature on learning, there is a more explicit discussion related to the nature of the gap with authors such as Stokes (1997) specifically discussing whether and how research is inspired by fundamental inquiry and/or considerations of use. The underlying theme in much of this work is that consideration of use will be central to secure a renewed compact between science and government, especially funding. As Shove and Rip (2000) have argued, there is an important distinction in this body of work between those who argue for relevance through the invocation of potential value and an approach that integrates end users into the specific research framework. In the end, Shove and Rip note that more important than relevance of work is an explicit discussion of the process of use.

Are the conceptual frameworks regarding knowledge and practice in various domains of higher education cut from the same cloth?

The question can be raised whether the interest in practice (and in particular the need to close the gap between knowledge and practice) that is seen in discussions of teaching and learning, as well as in the area of research are driven by similar conceptual frameworks in higher education. Is there evidence that changes in conceptual frameworks pertaining to liberal education are in any way related to the changes in frameworks related to research? I will argue that both stem from a dominant conceptual framework, namely a belief that knowledge is decontextualized, abstract, and located within the head of individuals. While that metaphor seems to still guide thinking in higher education circles discussing student learning, I will show that the discussions of research have been slightly more nuanced and draw more centrally from alternative frameworks introduced in the learning and developmental sciences and the social sciences more broadly.

The conceptualization that learning travels from the classroom on out into the world makes sense within a larger framework that assumes the learner stores knowledge in the mind (or metaphorically in a backpack) and draws on that resource later on when out in the world. Similarly, many colleges and universities include in their educational mission something about preparing students to understand and contribute to a complex and interconnected world (see Newman et al. 2015; Felten et al. 2016). Nevertheless, research shows that students actually are not as successful as desired when it comes to integrating and transferring prior learning (Nowacek 2011, Wardle 2007). Transfer does not happen magically. A closer examination of ongoing work in this area shows a range of approaches for improving this outcome. Those more closely affiliated with the science of engaged learning (see for instance Eyler 2009) suggest the importance for reflection playing a central role in connecting knowledge and practice or other cognitive and social

processes. This contrasts with schools that refer generally to the process of trans-ferring knowledge from classroom learning to practice (see Felten et al. 2016 for discussion). Even in attempts by instructors and universities aiming to do a better job at helping students synthesize and apply the knowledge they are acquiring along their college journey, the framework is built off a conceptualization involving a gap between knowledge and skills that individuals "have" and the ability to put these skills to use in practice.

Gap metaphors also can be found in the discussion of research though the discussion is more nuanced. First, there has been ample discussion in the literature over the last few decades, and researchers have been encouraged and trained to consider the issue of relevance (albeit in different ways) both for obtaining funding (for instance, in discussing broader impacts) or in publication (in discussing rele-vance). At the same time, there has been a more nuanced discussion of what we mean by relevance—is it necessary or sufficient to mention potential users as a form of justification for research? Shove and Rip (2000) have spoken to the dangers of using mythic users and have highlighted the importance of digging deeper into what is meant by the process of use even if it detracts from the imaginary or "fairy-tale" like conceptualization of user. They also point out the dangers of limiting our discussions of use to instrumental conceptualizations alone. Unpacking the con-ceptualization of user communities typically involves a gap between researcher and user and raises again issues of abstract versus contextualized knowledge discussed above in the section on learning.

An alternative view of practice and its implications for organizational struc-tures of higher education

Situated knowledge and practice: Conceptualizations based on a gap metaphor tend to contrast abstract knowing with concrete conditions of use. But we know from the work of Dewey (1938) and Polanyi (1966) that this does not take into account what has been called tacit versus explicit knowledge. Furthermore, the gap metaphor provides a conceptual framework where knowledge and practice are entities. Alternatives that view knowledge and practice from a process viewpoint also exist. In particular, in recent decades within the fields of the developmental and learning sciences, there has been a shift away from viewing knowledge as decontextualized and individual-centered, and as something transferred from experts to novices, toward a view of knowledge and skills as being deeply embedded in human practices and thus relation-centered, rather than distinct and located in the mind. There are various versions of this perspective (see Lave and Wenger 1991; Rogoff and Lave 1984; Valsiner and van der Veer 2000; Vygotsky 1978; Wertsch 1997), but according to all of these sociocultural theories, knowledge and its development are always connected to human activity. Professionals build up knowledge in practice, acquiring the habits of mind and repertoires of practice that embody what it means to know in their profession. This view emphasizes the tight connection between knowing, experiencing, and reflecting.

If knowledge is conceived of as contextual, embodied, and built up in and through activities, does the gap go away? As noted by Wortham (2010) the answer

according to this growing body of work is not exactly; rather, this change in understanding simply changes the focus. The gap now becomes one of learning to navigate one 'knowledge-in-practice' activity to another, rather than learning to apply preformed knowledge to new contexts. A situated view of knowledge and practice revises our thinking about how to frame discussions of student learning, as well as the production and dissemination of research in new ways.

Implications for the organization of higher education: How does a situated view of knowledge and practice impact the organization of higher education? For both areas (student learning and research), from a sociocultural perspective, knowledge is viewed as part of a broader social activity where individuals gradually adopt the practices, beliefs, and values of specific expert communities. In addition to adopting ways of knowing, individuals acquire membership and construct an identity in such a knowledge community. This process takes time–novices (whether students or new researchers) begin by watching experts from a peripheral position in the community and gradually move to full participation in that community. Such a view would imply a profoundly different way of organizing higher education for learning and research. What students and researchers need are what has been referred to as rich "communities of practice" (Lave and Wenger 1991). For example, in apprentice-ships, an individual would join an established community of practice, initially spending time observing or performing very basic tasks studying how the group works and what the role of participation entails before taking on more complex work. What students then need from this perspective is not to unpack already formulated knowledge and apply it to new contexts, but in and through observation and participation in a community of practice students are provided an opportunity to build up knowledge of what it means to do/be that sort of knowledge producer. Similarly, this more dynamic or process view of the relation of knowledge and practice has consequences for the organization of research. The sociocultural per-spective can and does often study a team of disciplinary researchers who build up knowledge in and through distributed work that takes place in spaces such as laboratories. Nevertheless, it also allows for rich constellations of researchers across a set of disciplines with distinct areas of expertise and practices to come together, as well as researchers and professionals working side by side building up new knowledge.

All of this suggests a much more nuanced view of the connection of knowledge and practice. Our everyday folk theories highlight the idea that transfer from context to context is straightforward. But studies of knowledge building in authentic contexts suggest that experience alone does not contribute to knowledge building and the formation of expertise. Learners must draw upon a significant knowledge base and familiarity with the tools and discourse various disciplines use to engage in inquiry. Shift here focuses from learning about to learning to partic-ipate. Participation in a community of practice gives rise to a shared repertoire of resources such as routines, artifacts, and a common vocabulary that members develop (Wenger 1998). Such a view suggests the importance of considering the social nature of participation in engaged learning and knowledge building com-munities when organizing how students learn and how research is organized in university contexts.

Concluding Comments

In this chapter, we have explored the increasing role of practice in our conceptualization of knowledge and its development, both in our conceptions of student learning and university research within institutions of higher education. One central question raised here has been whether the trend within teaching and learning and that within research in the USA has been cut from the same cloth. The answer provided here is that it is likely that the growing turn toward practice is part of a more gradual transition away from viewing knowledge as decontextualized toward views that embrace more relational and situated conceptual frameworks. Nevertheless, the argument has been made that we have yet to fully realize the richness of what the learning and developmental sciences have to say about the relation between knowledge and practice. The shift to date has been modest and the path not straightforward. In particular, we have noted the need to deepen and align our conceptual frameworks about knowledge and practice with those connected with recent theory and research in the learning and developmental sciences. Second, we have highlighted that as our views of knowledge are revised toward more situated and relational views, organizational structures of higher education will need to be further thought.

This is not the first time such a conclusion was reached. In 1970, a group of scholars including scholars of knowledge and development came together in Paris to discuss problems of the university which resulted in a volume (Apostel et al. 1972). It is here that Jean Piaget coined the terms interdisciplinarity, transdisciplinarity, and multi-disciplinarity. In the preface to the volume that came out after the meeting, Gass (1972, p. 10), who at the time was the director of the Center for Educational Research and Innovation, sets up the problem like this:

The guiding principle is not the need to demolish the disciplines, but to teach them in the context of their dynamic relationships with other disciplines and with the problems of society. This is justified if only because of the increasing social costs of the over-specialization of knowledge. Indeed, it may be argued that one of the reasons for the tarnished image of science is public reaction to its power to produce specialized applications of knowledge, without a corresponding development of the synthesizing framework which can illuminate their side effects and long-term implications.

One idea at the 1970 conference was to better understand the epistemology of knowledge, noting this might lead to better structuring of the university. Nearly fifty years later, in the US context, a very similar problem continues to exist. Despite the fact that businesses and other organizations have changed to match more relational views of knowledge and practice (see Gergen 2009; Michel and Wortham 2009), higher education leaders have thought little about this. Our conceptual frameworks for leading and organizing universities still depend heavily on outdated conceptualizations of individual-centered institutions, rather than organization-centered structures. Rather than mitigating uncertainty, many organizations outside of higher education have adopted a framework that emphasizes the ability to learn from

contexts of ambiguity. Furthermore, rather than viewing leadership as associated with a set of top-down processes, very few institutions have considered new relationship-based styles of collaborative leadership within higher education circles (see for instance the notion of guided emergence in Budwig 2013). Our theories of knowledge and practice are not only tied to our understanding of student learning and research, but also simultaneously embedded within conceptual frameworks of leadership and how we structure universities. While we have identified changing notions of knowledge and practice in both student learning and research, work on leadership models and organizational structures have yet to be well aligned and will take fresh thinking. Tritelli (2007, 4), the outgoing editor of Liberal Education, had some thought-provoking comments on one reason why when he writes:

> Frustration over the functional disconnect between the vertical organization of colleges and universities and the horizontal forces driving successful educational innovation is expressed through what Richard Keeling, Ric Underhile, and Andrew Wall call "the frequent and increasingly predictable accusation that institutions of higher education operate in 'silos'."

Tritelli goes on to claim that as useful as silos are as a metaphor, they may make difficult the uncovering of new solutions which he claims needs not only to involve organizational models but "the roles and behaviors of those who inhabit them."

Three things are necessary to move forward on this complex issue. First, as was noted in the 1970 conference on problems of teaching and research, we need a deeper understanding of what we mean by knowledge to enhance student learning and research. Second, we need to assure that our universities and colleges are organized in optimal ways around what this understanding. As Tritelli (2007) points out, our framing of the problem, and in particular the language we use to represent that understanding, is key. It is not so much that we need new structures per se, but rather our new conceptual models of knowledge and practice highlight important changes to the relations between current structures. Such a review, well beyond the scope of this paper, will likely suggest that concerns that teaching and research are at odds with one another may actually not be so when viewed from a relation-centered viewpoint. Such a shift may also lead us to see new ways our higher education institutions can better connect to one another and the communities of which they are a part.

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