Michael B. Paulsen
Editor

Higher Education: Handbook of Theory and Research

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Chapter 1
Conceptualizing Innovation in Higher Education

William G. Tierney and Michael Lanford

1.1 Introduction

Despite its ubiquity in the coursework of business and management schools, in corporate boardrooms strategizing responses to fluctuating industrial and economic conditions, in media outlets detailing the newest technological developments, and in contemporary popular discourse, innovation remains a nebulous term that defies simple explanation. Within academe, an authoritative explanation of innovation has proven elusive, as individual disciplines conceptualize innovation in markedly dissimilar ways (Baregheh, Rowley, & Sambrook, 2009). Sociologists for example, might define innovation as "the process of introducing new elements into a culture through either discovery or imitation" (Schaefer, 2012, p. 57). Researchers from the field of business management may stress different aspects of innovation, asserting that it is the "invention and implementation of a management practice, process, structure, or technique that is new to the state of the art and is intended to further organizational goals" (Birkinshaw, Hamel, & Mol, 2008, p. 825). Scholars devoted to innovation studies, an emerging field whose academic literature has grown exponentially in recent years (Fagerberg & Verspagen, 2009), are currently content with a broad definition of innovation ("new combinations of existing knowledge and resources") that leaves room for customization (Fagerberg, Fosaas, & Sapprasert, 2012). Meanwhile, individuals representing a variety of disciplinary and cultural backgrounds either dismiss innovation as hollow jargon or warn that innovation is perilously close to being stripped of meaning and utility due to ambiguity and

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overuse (Ackermann, 2013; Berkun, 2007; Erwin & Kraksuer, 2004; Feldman, 2002; Page, 2014).

Several authors have lamented this lack of consensus concerning a single, unifying definition of innovation (Adams, Bessant, & Phelps, 2006; Cooper, 1998; Zairi, 1994). However, the current popularity of innovation may be attributable to its transferability and reconceptualization across different disciplinary areas, time periods, and cultures. Godin (2014) has persuasively argued that innovation, when viewed as a phenomenon of intellectual history, should, in fact, be deliberated as a "concept" rather than as a static word with a fixed meaning in time. According to the German historian and linguist Reinhart Koselleck (1972), concepts differ from words in that they are subject to a wide range of semantic meanings that are dependent upon context. Due to this enlarged theoretical space, concepts require a well-defined contextual field and a lexicon of interconnected terms for meaning.

In this chapter, higher education serves as the contextual field for our exploration of innovation. Although we are primarily focused on the contemporary landscape of American higher education, we shall suggest that the discussion is relevant to universities around the world, and, of consequence, we make reference to international contexts when appropriate. As we will argue at the outset of this chapter, higher education is currently confronted by global forces that necessitate innovative research, innovative pedagogies, and innovative organizational structures. While some may consider these changes to be a threat to traditional academic life, innovative research can provide immeasurable benefits to society in the form of medical and technological breakthroughs, inventions that improve global sustainability, and interdisciplinary ventures that raise the quality of life for millions, particularly in poverty-stricken regions (Khavul & Bruton, 2012). Innovative pedagogical methods and modes of delivery are likely required to match the dynamic interplay between workforce development and higher education, especially in developing countries (Goddard, 2012). Meanwhile, government demands for greater efficiency in national higher education sectors may compel a need for innovative institutional structures (Powell, Gilleland, & Pearson, 2012). For these reasons, we suggest that a theoretical understanding of innovation is imperative for higher education's continued development in the twenty-first century.

Grounded in the innovation literature from a variety of academic disciplines, this chapter outlines a conceptual framework in five sections. In the first section, we delineate four imminent trends in higher education that may compel innovative responses. First, knowledge-intensive trade has become vital to economic development in the twenty-first century. Second, the astonishing development of technological and computerized systems threatens to undercut job sectors relating to transportation, logistics, support, production, construction, and service (Frey & Osborne, 2013). Due to both of these factors, higher education will need to play a central role in developing creative and social intelligence skills in both younger and returning older students so that they might have viable talents for future labor markets. Third, many national higher education sectors across the globe, particularly in developing countries, may engage in deliberate massification strategies that reflect these changing workforce demands. At the very least, a period of dynamic change

concerning enrollment patterns is likely on the horizon. Fourth, government funding for higher education in many nations is being cut, especially in Europe and North America, even while educational quality remains a priority and change seems inevitable.

After making a case for innovation's importance to higher education, we address several interrelated terms – creativity, novelty, implementation, and entrepreneurship – that inform a working definition of innovation. In this second section, creativity is defined as inventiveness grounded in field-specific knowledge and expedited by motivation. Innovation is defined as the implementation of a creative product or process and its perceived novelty once it has been evaluated by a critical audience. Entrepreneurship is defined as an organizational activity and/or creative process that is reliant upon innovation, but primarily motivated by the potential for capital gain. Since these terms are frequently conflated by scholars, we interrogate their relationship with innovation to demonstrate how they are interconnected on individual and organizational levels, as well as to demarcate their differences.

In the third section, we contend that change and innovation has been a consistent fixture of higher education since its inception, even though artifacts and rituals that celebrate continuity and tradition pervade college and university campuses. To buttress this argument, we demonstrate how higher education has traditionally adopted what we shall define as "sustainable" innovations that induce incremental change to keep pace with developments in greater society. In contrast, what we call "disruptive" innovations have fundamentally transformed other industries through a combination of simplicity, affordability, convenience, and novelty but have hitherto left higher education unscathed. While many predict that disruptive innovations, such as online education, are destined to dramatically change the landscape of higher education, we caution that universities are different from businesses in that they rely upon the accrued prestige, often established over decades, of their faculty and their departments for legitimacy. Hence, the rhetoric surrounding disruption should be judged in a critical manner, even while the theory of disruptive innovation may prove useful for understanding the emergence of new educational paradigms.

In the fourth section, we consider three dimensions of innovation – diversity, intrinsic motivation, and autonomy – that positively impact the ability of individuals working within higher education to be innovative. Numerous studies indicate that organizations employing a diverse group of individuals are more innovative. Diversity is defined here by both "inherent" attributes, such as race and sexual orientation, and "acquired" attributes, such as an individual's areas of developed expertise and cultural knowledge (Hewlett, Marshall, & Sherbin, 2013). Incentives are a form of extrinsic motivation frequently employed in the invention and implementation stages to reward desired behavior and direct resources towards predetermined goals; however, research by psychologists demonstrates that tapping into an individual's intrinsic motivation is a more effective avenue to stimulate creative and innovative thinking (Deci, Ryan, & Koestner, 1999). Related to incentives is the issue of autonomy. One trend that threatens to inhibit innovation in higher education is the increasing prevalence of evaluative processes that are excessively focused on

externally-derived measures of assessment. To nurture an innovative climate in colleges and universities, we maintain that a certain degree of autonomy is necessary.

As the fifth and final section of this chapter elaborates, three additional concepts are important for a thorough consideration of innovation: time, efficiency, and trust. Time is intricately correlated with the implementation process, and it is subject to a complex array of considerations that are unique to each innovative project. The predominantly negative, and occasionally positive, effects of efficiency on innovation are also explored. Trust is also a complicated dimension, as it can have positive and negative effects on innovation. Most importantly, however, trust enables individuals within an institution to embrace diversity, facilitate intrinsic motivation, and allow talented innovators to enjoy the privilege of autonomy. This level of trust has to be engendered by an environment that allows for an open discussion of ideas, even when opinions diverge. As such, we argue that an innovative university needs to carefully consider how to manage the temporal aspects of an innovative process, balance the demands for efficiency with the need to adequately supply innovative institutions and researchers, and generate the conditions for trust so that resources are allocated appropriately and innovative inquiry can transpire.

1.2 Four Challenges Confronting Higher Education: A Case for Understanding Innovation

If the intensity with which global forces are compelling change is exceptional, innovative responses are needed. To maintain their relevance in contemporary society, many universities will need to carefully cultivate their respective identities while responding to turbulent external and internal pressures in which inherited philosophical beliefs and organizational structures are likely to be challenged. This section is not intended to be a comprehensive overview of challenges that higher education may face in the foreseeable future. Nonetheless, we do believe four explicit developments in the higher education landscape are worthy of consideration when thinking about innovation.

1.2.1 The Emergence of the Knowledge-Intensive Economy

Prior to 2008, two types of cross-border trade were vital to global economic development: (1) labor-intensive flows from nations with developing economies and (2) commodity-intensive flows from nations with developed economies (Manyika et al., 2014). The main drivers of globalization, however, have changed dramatically since the 2008 financial crisis. Today, knowledge-intensive services are indispensable to workforce development. In a knowledge-based economy, workers not only need to cultivate specialized skills, but they must be creative, work in teams, and

adapt to rapidly-evolving technologies and innovations. Richard Florida (2013) has written extensively on this topic, highlighting the contemporary importance of creativity and innovation while arguing that this shift "represents an epochal transition" for people around the world:

> Ever since the transition from feudalism to capitalism, the basic source of productivity, value, and economic growth has been physical labor and manual skill. In the knowledge-intensive organization, intelligence and intellectual labor replace physical labor as the fundamental source of value and profit (p. 232).

Technological advancements are rapidly changing the industries that are most successful in economic markets (Cortright, 2001; Florida, 2002), the expectations and procedures of conducting global business (Knight & Cavusgil, 2004), and the skills and competencies required from workers (Binkley et al., 2011; Sawyer, 2012). In particular, innovations in digital communication are lowering the costs of engaging in collaborative research (Oleksiyenko, 2015). As a result, the individuals and institutions best positioned to identify and utilize global innovations based on digital networks will have distinct advantages in the global marketplace (Castells, 2004). Moreover, the cities and countries that nurture innovative researchers and developers will serve as recognized educational hubs (Knight, 2011; Knight & Morshidi, 2011; Olds, 2007), stimulating the development of innovative clusters like Silicon Valley in California and Oxbridge in the United Kingdom (Feldman, 2002). These locations will be well-positioned to thrive in today's knowledge-intensive economy (Bereiter, 2002; Drucker, 1993; Manyika et al., 2014).

1.2.2 The Need to Train a Creative and Innovative Workforce

The effects of outsourcing jobs related to manufacturing and services have been well documented (Bhagwati, Panagariya & Srinvasan, 2004; Levine, 2011). Less appreciated, however, is how the escalating pace of technological innovation contributed significantly to wage polarization in the 1980s and 1990s (Autor, Katz, & Kearney, 2006) and may drastically change the nature of employment in the future (Brynjolfsson & McAfee, 2011).

Historically, computerization was confined to routine tasks involving explicit rule-based activities. According to a recent study by Frey and Osborne (2013), approximately 47 % of the jobs in the United States could be at risk due to exponential advances in computer-controlled equipment, sensory tools, algorithmic sophistication, and processing power. The resultant abilities of computers to perform "non-routine" cognitive tasks (Autor & Dorn, 2013) that were once considered unassailable – such as legal writing (McGinnis & Pearce, 2014), medical diagnosis (Bennett & Hauser, 2013), law enforcement (Manyika et al., 2013), and vehicle navigation (Denning, 2014; Spinrad, 2014) – consequently threaten to displace workers who are not able to otherwise secure employment.

Developing countries that currently rely on industrial production for the bulk of their economic output may seem immune from these changes. However, tasks that involve mobility and dexterity may also be accomplished by technological advances in the field of robotics. For this reason, occupations in the transportation and logistics sector, office and administrative support, construction, and service are designated as "high risk" by Frey and Osborne (2013). Industries may be unwilling to invest in expensive equipment if cheap labor is still available; yet, a mixture of political and social pressures may expedite a reliance on robotics similar to the changes in the automobile industry that were seen in the 1980s (Hunt, 1990).

Conversely, "low risk" occupations are likely to fit one of two models. They might be generalist occupations that require knowledge of human interaction (e.g., management, healthcare, business, or media). Or, they might be specialist occupations that involve the creation and implementation of novel ideas or artifacts (e.g. science, engineering, and the fine arts). To fit one of these two job-oriented models, workers will need to develop four types of proficiencies: (1) expert knowledge in a given field; (2) the ability to pursue research and development; (3) the ability to engage in interactive problem solving; and (4) the capacity to adapt to changes in communication technologies.

Some have argued that the pedagogical methods and the institutional structures found in contemporary primary and secondary schools are facing obsolescence due to their failure to foster an innovative climate and respond to these global trends (Bereiter, 2002; Hargreaves, 2003). In other words, if students are to be equipped to succeed in an economy that prizes knowledge, creativity, and innovation, they cannot be taught in institutions that were constructed to supply labor for an industrial age (Callahan, 1962; Sawyer, 2006). New models of primary and secondary education are therefore being promoted and implemented, and higher education is unlikely to be immune from such changes (Christensen & Eyring, 2011). Any truly disruptive innovation in the field of education, however, may need to emphasize social intelligence and interaction, as well as the cultivation of creativity and innovation.

1.2.3 Global Trends in Higher Education: Massification vs. World-Class Aspirations

As both creativity and innovation become more important to workforce development, many nations may also need to address an increased demand for higher education. Goddard (2012) has estimated that the total number of students enrolled in higher education globally will increase by 47.2 % from 2010 to 2025. Higher education systems in developing countries may be under the greatest pressure to develop massification strategies. Without innovative ideas, these nations may find it impossible to build capacity while simultaneously funding research and other important institutional activities. For example, Latin American countries will likely experience an influx of students "from households with reduced economic, social, and

cultural capital" in the immediate future (Brunner, 2013, p. 5). "Innovative concepts" will be necessary "to respond to social demands and ambitions, which aspire to leave poverty, authoritarianism, violence, and inequalities behind" (p. 7). East Asia is another region that will require innovative thinking to confront incipient challenges. As noted by Postiglione (2011), universities in China, Mongolia, and Vietnam may be unable to help indigent students complete a tertiary-level education without innovative reforms of their governance and administrative systems.

Even in affluent nations like the United States, more people may need to complete higher education credentials. University graduates in the U.S. earn nearly twice as much as secondary school graduates (Carnevale, Rose, & Cheah, 2011). Although the United States once led the world in the percentage of students who attended college and earned diplomas, it now lags behind other industrialized countries (Freeman, 2010). As of 2012, the U.S. ranked 14 among OECD countries in the percentage of 25–34 year olds who had tertiary education attainment (OECD, 2012). By 2025, the Lumina Foundation (2012) estimates that 60 % of U.S. citizens will need a postsecondary degree to be competitive in the job market. California alone needs to increase its college attainment rate from 31 to 41 %, while an additional 20 % will need to have some form of postsecondary education (Johnson & Sengupta, 2009).

The dearth of college-ready graduates is certainly one element behind this discrepancy between workforce supply and demand. The U.S. state of California could have over one million unfilled jobs in 2025 – particularly in the fields of science and technology – simply because the public postsecondary sector is constrained in terms of capacity and is focused on the wrong sorts of skills that are needed for the workforce (Johnson & Sengupta, 2009). Not everyone will need a bachelor's degree to be competitive in the workforce, but the United States, like many other developing and developed nations, will need a larger number of postsecondary graduates with a broad range of credentials, including associate's degrees and vocationally-oriented certificates.

To be sure, not every country will face the demands of massification. Taiwan has already stimulated the creation of over 160 new universities and increased enrollment by over 100 % since 1990 (Mok, Yu, & Ku, 2013). Other countries, such as Qatar, have invested in "Education Cities" that host international branch campuses from institutions representing a variety of foreign countries (Knight & Morshidi, 2011).

For these nations, the quality of higher education, rather than massification, may be emphasized in the near term. International and national ranking systems, along with other comparative indicators, have invigorated competition between individual universities and national higher education sectors. A number of stakeholders, including administrators, faculty, and students, now make important decisions about higher education based on tables and rankings produced by both governments and independent media outlets (Hazelkorn, 2008). Seemingly, every institution now aspires to world-class status, as observed by Salmi (2009):

> No longer are countries comfortable with developing their tertiary education systems to serve their local or national communities… These world-class universities are now more than just cultural and educational institutions – they are points of pride and comparison among nations that view their own status in relation to other nations. World-class standards may be a reasonable goal for some institutions in many countries, but they are likely not relevant, cost-effective, or efficient for many others (p. x–xi).

Thus, the pressures of massification will be circumscribed by the resources mandated by world-class aspirations. Across the globe, it remains to be seen how many countries will continue to allocate the majority of their resources to improve their standing in the superficial metrics that rankings and tables assess. How quality is defined, however, is still likely to be related to the competitive pressures presented by a knowledge-based economy that prizes innovation.

1.2.4 Decreased Funding and Resources for Higher Education

Although tertiary institutions are under pressure to expand opportunities for student enrollment while improving quality, national governments are allocating fewer resources for higher education. In Australia, for instance, recent budget cuts and a deregulation of university fees caused several universities to restructure programs, close campuses, eliminate a variety of positions, and consider mergers with other institutions (Marginson, 2013; Goedegebuure & Schoen, 2014; Taylor, 2014). In deference to market forces, many European countries have also reduced their provisions for tertiary education, even though European universities are mostly funded by the state (Muscio, Quaglione, & Vallanti, 2013; OECD, 2010). Funding for higher education in Ireland, Lithuania, and the United Kingdom decreased by approximately 35 % from the academic year 2008–2009 to 2013–2014 (European University Association, 2014). Since 2009, Italian universities have lost approximately 10,000 academic staff and researchers; meanwhile, state funding for scholarships was reduced by 90 % (to €26 million) from 2010 to 2011 and by another 50 % (to €13 million) in 2012 (Katsomitros, 2012).

American states apportioned, on average, 28 % less for higher education in 2013 than they did in 2008. During those 5 years, 11 states cut their funding for higher education by a third or more per student (Oliff, Palacios, Johnson, & Leachman, 2013). To cover this fiscal gap, student tuition has been on the rise. Between the academic years 2001–2002 and 2011–2012, the average cost of attendance (including tuition, room, and board) for public colleges and universities in the U.S. has risen by 40 % (U.S. Department of Education, 2013).

Performance-based funding, a method of channeling limited resources to researchers and institutions based on a competitive assessment of predetermined outputs, has become an increasingly popular tool (Hicks, 2012). Peer-reviewed, performance-based funding schemes, such as the Research Councils in the United Kingdom or the National Science Foundation in the United States (Jongbloed & Vossensteyn, 2001), have allocated research grants for years. In the near future,

though, other institutional offices and programs may be evaluated by performance-based funding methodologies.

One such proposal, known as the Postsecondary Institution Ratings System (PIRS), was recently developed by the administration of U.S. President Barack Obama. PIRS appraises colleges and universities on three primary criteria: access, affordability (tuition, scholarships, and loan debt), and outcomes (as defined by graduation rates, earnings of graduates, and the advanced degrees that graduates achieve). Originally, federal financial aid was going to be linked to the ratings that institutions received (U.S. White House, 2013). Concern was immediately expressed, however, that colleges and universities serving historically-disenfranchised populations might be unfairly penalized. Furthermore, some institutions might have been incentivized to sacrifice educational quality in the pursuit of favorable PIRS metrics. As a result, the U.S. Department of Education dropped the ratings system and refashioned the accumulated data into a consumer information tool (Blumenstyk, 2015). Regardless, several countries might tie future allocations to institutional performance on similarly-conceived rating schemes.

1.2.5 Summary

Higher education has faced issues of economic transformation, workforce development, massification, and reduced funding in previous years, but the urgency with which higher education is expected to respond to these changes by both government and the private sector is rather extraordinary. Innovative solutions will be necessary for universities to maintain their compact with government, align their programs with public objectives, and find solutions to societal problems. In the following section, we will provide a working definition for innovation in higher education, in addition to definitions of creativity and entrepreneurship. Afterwards, the differences between "sustainable" and "disruptive" technologies will be delineated, and their relative merits will be addressed. Lastly, three proven factors that enable an innovative climate will be discussed, and three dimensions that are necessary for a consideration of innovation within organizations will be examined.

1.3 Innovation: Defining Through Difference

As we described in the introduction, innovation is a concept subject to shifting meanings that depend on the contextual field, the time period in which it is discussed, and its relationship to similar, yet different, concepts. For this reason, one way to define a concept such as innovation is to first describe what it is not. A working definition of the concept of *innovation* must contend with a similar word that is often employed as a synonym, yet is actually quite different in practice: *creativity*. By utilizing examples from music and literature, we shall illustrate that *creativity*

and *innovation* have distinct meanings with wide applicability, even across disciplinary boundaries.

Two words that are related to innovation, *novelty* and *implementation*, depict aspects of an innovative process or product. This section grapples with the lexical challenges presented by both of these terms in an attempt to clarify what innovation signifies within the field of higher education. A consideration of implementation, in particular, extends the discussion of innovation from the individual sphere to the organizational level.

A final term that is often conflated with *innovation* is *entrepreneurship*. Scholars and other observers of higher education have long argued that universities must promote an entrepreneurial culture to survive the demands of a globalized marketplace (Clark, 1998) and to support research that can affect positively impact society (Thorp & Goldstein, 2010). Entrepreneurial goals are distinct from innovative production, though. As we will detail later in this chapter, a better understanding of the relationship between innovation and entrepreneurship can result in greater clarity about when marketization is appropriate for the research a university undertakes or the degree programs a university deploys. Moreover, during our discussion of the dimensions of innovation, we will demonstrate that a resolute focus on financial profit does not always foster an innovative climate.

1.3.1 Creativity

According to Amabile (1998), creativity results from three qualities – expertise, motivation, and imaginative thinking – that are possessed by a single individual. Without motivation, a creative thinker is unlikely to have the persistence required to solve a problem requiring knowledge and a willingness to challenge accepted wisdom. A lack of expertise incapacitates motivation and imaginative thinking. Likewise, many individuals have motivation and expertise, but are deficient when it comes to seeing how a product or a process can be refashioned.

Creativity is often associated with individual artistic endeavor, especially in dramatic portrayals of tortured artists working in solitude. To be fair, studies indicate that creative people are often independent-minded and willing to take risks (Simonton, 2003). Like many stereotypes, however, the image of the "starving artist" endowed with transcendent, perhaps even prophetic, creative powers that require distance from society is more mythology (based in nineteenth-century aesthetics) than fact. Researchers have discovered that positive affective states (Amabile, Barsade, Mueller, & Staw, 2005; Fong, 2006), a focus on potential gains (Friedman & Forster, 2001; Lam & Chiu, 2002), and a concentration on distant outcomes (Okhuysen, Galinsky, & Uptigrove, 2003; Forster, Friedman, & Liberman, 2004) each enhance creativity in individuals. As we will discuss in greater detail later in this chapter, intrinsic motivation also plays a key role in the creative abilities of an individual.

1.3.2 The Relationship Between Creativity and Innovation

What distinguishes creativity from innovation? Before considering the relationship between creativity and innovation in higher education, it might be helpful to first compare two well-known composers of Western classical music, Johann Sebastian Bach and Hector Berlioz, who had the motivation, expertise, and imaginative thinking to accomplish feats that evinced significant creative ability. Anyone who has studied *The Musical Offering* or *Goldberg Variations* would attest that Bach was an exceptionally creative composer, endowed with a tremendous capacity for reworking and enlivening musical material that could otherwise sound rather mundane. Despite Bach's prodigious creative gifts as a performer and composer, however, he has not been seen as an innovator by musical scholars. While his contemporaries in the early 1700s were experimenting with new musical styles, Bach busily perfected an older contrapuntal style rooted in musical theories and pedagogies from the previous century. Although subsequent composers such as Mozart and Chopin would later diligently study Bach's musical works because of his impeccable technique, they internalized and refashioned many of his contrapuntal and voice-leading practices to suit their own idiosyncratic styles.

By contrast, Hector Berlioz is primarily known today through the innovations he daringly incorporated in his 1830 orchestral masterpiece, the *Symphonie Fantastique*. Written for an unprecedented number of instrumentalists, the five movement orchestral work challenged numerous musical conventions relating to harmony, rhythm, orchestration, and form, helping to usher in a new age of overtly programmatic music that was emulated by composers throughout Europe for the remainder of the nineteenth century. No musical scholar would claim that Berlioz was necessarily a superior composer to Bach. In contrast to Bach, though, it is fair to say that Berlioz was both creative and innovative.

Similar arguments could be made about creative and innovative figures in other artistic fields, such as literature and art. With his two volume work, *Don Quixote*, Miguel Cervantes is often credited with writing the first modern European novel. Innovative ideas abound in *Don Quixote*, including a metafictional opening that asserts Don Quixote was a real human being whose chivalrous adventures were chronicled by a Moorish author named Cide Hamete Benengeli and translated from the Arabic language. Characters within the novel, such as Dorotea and Cardenio, tell stories that may or may not be reliable, depending on the reader's interpretation. Additionally, in the second volume of *Don Quixote*, Cervantes includes a major character from a rival author's unauthorized sequel (written under the apparent pseudonym Alonso Fernández de Avellaneda) and has him disavow the "illegitimate" Don Quixote. In short, Cervantes inspired generations of later authors who wished to create alternative histories, compel their readers to grapple with characters' trustworthiness, and blur the lines between reality and fiction (Hathaway, 1995).

In more recent times, James Joyce and William Faulkner have been acclaimed as innovative authors due to their successful implementations of two narrative

techniques – stream of consciousness and shifting first-person narration – in works such as *Ulysses* and *The Sound and the Fury*. A writer such as Agatha Christie, whose novels, short stories, and plays have achieved exceptional popularity, is certainly no less creative than Joyce or Faulkner. However, like the music of Bach, Christie's literary output represents a pinnacle achievement within a specific genre of expression (e.g., the detective novel), not its primary stimulus or its inception. Thus, novels like *Murder on the Orient Express* and *Death on the Nile* are also seen as more creative than innovative.

1.3.2.1 Novelty

Drawing upon the above examples, *novelty* is the first of two characteristics that differentiate innovation from creativity. Although anthropologists and sociologists developed theories and definitions for innovation in the early twentieth century (Godin, 2014), Joseph Schumpeter (2005) most famously addressed this defining characteristic of innovation in a 1932 article entitled "Development." Asserting that novelty imbues the element of indeterminacy to the process of innovation, Schumpeter noted that only time and the luxury of hindsight can distinguish between a novel product or process and a truly innovative one (Carlile & Lakhani, 2011). By 1942, Schumpeter (2003) extended this discussion of innovation, declaring that it could initiate a "process of creative destruction" (p. 83) by creating markets for new technologies (like oil and steel) that transfigure economic sectors and potentially cause social upheaval. These revolutions could then conceivably result in monopolies from which successful innovators could establish market dominance and benefit from extraordinary profit margins. As evidenced by the fiery rhetoric with which he occasionally conveyed his ideas, Schumpeter believed that institutions needed to focus on innovation for competitive survival (Dodgson & Gann, 2010).

Over the course of the twentieth century, Schumpeter's argument has been expanded to encompass the notion that modern societies are dependent upon the conception and implementation of innovative ideas and knowledge to preserve their relative prosperity (Robin & Schubert, 2013). In business and management literature, a hypercompetitive marketplace is therefore a replication of this globalized, inimical environment (D'Aveni, 1994), and it mandates that organizations engage in continuous innovation to maintain their competitiveness and generate new advantages (Dess & Picken, 2000; Tushman & O'Reilly, 1996).

1.3.2.2 Implementation

In addition to *novelty*, a second valuable concept that distinguishes innovation from creativity is *implementation*. Each of the above examples concerning musicians and literary figures represent individuals who implemented ideas within a specific artistic genre and were subsequently judged by a critical audience. That audience,

over time, assessed the work as creative and/or innovative based on the aesthetics of the prevailing culture combined with historical perspective.

If an artistic idea is not implemented in some way, it still might be recognized as creative. The history of both music and literature is full of intriguing works, such as Claude Debussy's operatic sketches to *Rodrigue et Chimène* and *The Fall of the House of Usher* or Jane Austen's novel *Sanditon*, that evince tremendous creativity. Those works could have also been innovative, but they were not influential due to their unfinished state and lack of circulation.

At times, innovations are associated with individuals who produce the most compelling implementation. For example, the musical technique of 12-tone composition was first employed in the twentieth century by Josef Hauer, a German composer who is relatively unknown to contemporary audiences. Later, a group of composers identified as the "Second Viennese School" (perhaps best exemplified by Arnold Schoenberg, Alban Berg, and Anton Webern) produced a series of aesthetically-persuasive compositions based on their idiosyncratic deployments of twelve-tone technique. Hence, they – instead of Hauer – have become associated with the development and subsequent impact of twelve-tone composition as an innovative musical practice.

Implementation is particularly applicable to an organizational understanding of innovation. Without an implementation stage, an organization cannot give a creative idea the opportunity to affect the industry in which it might operate or be subject to evaluation. Whereas *novelty* is subject to the assessment of external forces (Wang & Ahmed, 2004), the process of *implementation* requires internal evaluation by an organization (Crossan & Apaydin, 2010). Typically, an innovative organization is a creative one. However, an organization that lacks the capacity for creativity may be able to recognize an innovative product or process and implement another organization's invention. Later in this chapter, the implementation process of an organization will be considered in relationship to temporal dimensions.

Schumpeter (1939) also recognized the importance of implementation to a comprehensive theory of innovation, arguing that its impetus was traceable to economic impulses. McLean (2005), likely influenced by the work of Schumpeter, claims that a creative organization also needs to be an innovative one because "many brilliant ideas never see the light of day. To bring an idea from concept to market, it must be recognized for its potential" (p. 227). Both authors implicitly make a distinction between an *invention* – a creation that results from intellectual creativity (Godin, 2008; Schumpeter, 1939) – and an *innovation* – a creation that is subject to some type of implementation process initiated by an organization.

1.3.3 Creativity and Innovation – On the Organizational Level

Can organizations stimulate the creativity necessary to produce an innovation? Due to bureaucratic policies and procedures, organizations are often portrayed as negative forces that stifle the creative spirit of an individual (Sternberg & Lubart, 1999).

Since individuals are inevitably compelled to conform to the expectations of the organization, internal motivation is crippled, the imagination of the individual is stifled, and creativity dies. In fact, one of the cited benefits of universities is that they are loosely-coupled systems where a teacher or a researcher may work without oppressive regulations and constant supervision (Weick, 1976).

Others view the relationship between creativity and organizations differently, however. Woodman, Sawyer and Griffin (1993) define organizational creativity as "the creation of a valuable, useful new product, service, idea, procedure or process by individuals working together in a complex social system" (p. 293). This definition depicts creativity as the development of something novel by a group, rather than as the product of an individual working in isolation. Indeed, creativity may be enhanced through social interaction, and talent may be developed through socialization (Amabile, Conti, Coon, Lazenby, & Herron, 1996).

Due to the decentralized environment of most postsecondary institutions, the relationship between creativity and innovation is different for higher education than it is for a business. When a college creates an environment conducive to experimentation in the classroom or an office, creativity is focused on an event (teaching a class) or an act (composing an essay). Individuals working within higher education may have a multitude of opportunities to implement their creative research, art, or pedagogy. Researchers who work in scientific fields like biotechnology and neuroscience may elicit significant interest from private companies. An English professor may publish a collection of poems or even start a publishing company. A specialist in education technology may release online pedagogical tools that provide useful training to a broad audience. However, the creativity of this diverse group of individuals generally stays within the boundaries of a campus. While Florida et al. (2006) acknowledge that a university should have a creative role to play in economic development, they also argue that the creation of talent and the promotion of new ideas and diversity are central activities for a university:

> The role of the university goes far beyond the "engine of innovation" perspective. Universities contribute much more than simply pumping out commercial technology or generating startup companies… In short, the university comprises a potential – and in some places, actual – creative hub that sits at the center of regional development (p. 38).

To summarize, the welfare of most nations (certainly, at least, the United States) is, in part, dependent upon the ability of its higher education system to be creative. Furthermore, colleges and universities are innovative when (a) an individual's creativity is stimulated through interaction; (b) novel products and processes can be created; and (c) a creative product or process may be implemented.

1.3.4 Entrepreneurship

To retain their relevance in the twenty-first century, colleges and universities should be creative and innovative, but must they be entrepreneurial? As neo-liberal policies become more entrenched in politics, and institutions are forced to look to the private sector for financial support, entrepreneurship is becoming a more frequently-employed concept within higher education (Lightcap, 2014). Like innovation, entrepreneurship is a concept that resists easy definition (Low & MacMillan, 1988; Yang, 2012). In fact, substantial overlap exists between definitions of innovation and entrepreneurialism. Yang (2012), for example, argues that entrepreneurship's "defining trait is the creation of a novel enterprise that the market is willing to adopt. It thus entails the commercialization of an innovation… By fusing innovation and implementation, it is a unique process that allows individuals to bring new ideas into being for the benefit of themselves and others" (p. 388). Such a definition makes innovation and entrepreneurship seem like synonyms.

Differences do exist between innovation and entrepreneurship, however, even if they seem subtle. Entrepreneurship is more focused on the marketization of an innovation. Entrepreneurs do not have to be innovative, but they do have to focus on business goals, corporate management, and financial imperatives when considering the potential impact of an innovation. In a content analysis of entrepreneurship in five prestigious higher education journals, Mars and Rios-Aguilar (2010) found that "academic entrepreneurship is understood primarily through market-oriented lenses. Conversely, we found little evidence of entrepreneurial terminology being applied to socially-oriented activities" (p. 452).

Hence, one could argue that entrepreneurship is distinguished from innovation primarily through the aforementioned "market-oriented lenses." Innovation can encompass a variety of product- or process-oriented activities with the goal of social influence, cultural impact, or financial gain. Entrepreneurship has, as its primary end, the accumulation of wealth through new or existing ideas.

1.3.5 Higher Education: An Entrepreneurial or Innovative Enterprise?

This distinction between innovation and entrepreneurship has far-reaching implications for institutional decision-making in higher education. Since at least the nineteenth century, an entrepreneurial spirit, as well as a willingness to adapt to societal needs, has been necessary for many higher education institutions (Kimball & Johnson, 2012). With regards to higher education, however, the implications of a collective mindset oriented towards entrepreneurship versus a collective mindset focused on innovation are worth considering.

To cite but one example, the Bayh-Dole Act, since its inception in 1980, has allowed research universities in the United States to maintain their intellectual

property rights, even if federal funds were utilized during the discovery process of a patentable discovery (Perkins & Tierney, 2014; Shane, 2004). Advocates for the Bayh-Dole Act argue that it has increased the revenue streams at universities capable of producing patentable research (Slaughter & Leslie, 1997; Slaughter & Rhoades, 2004) and generated a net positive effect on the U.S. economy (Coupe, 2003). These perceived benefits have caused other nations to consider similar laws in hopes of encouraging impactful research and stimulating financial revenue streams (Marginson, 2004).

Critics, on the other hand, contend that the Bayh-Dole Act has instigated a fundamental shift in institutional values, as universities are progressively deemphasizing theoretical research in deference to applied research that can be more easily monetized through entrepreneurial ventures (Henderson, Jaffe, & Trajtenberg, 1998; National Science Board, 2008; Powers, 2003). Moreover, the "transactional costs" and exclusive licenses that have resulted from the Bayh-Dole Act prevent researchers from freely sharing discoveries with colleagues (who could similarly advance knowledge) and the general public (who, at least in part, provided financing for the research in the first place) (Kanarfogel, 2009). For this reason, the entrepreneurial motives that undergird the Bayh-Dole Act have received justifiable scrutiny from many scholars, but little attention from other stakeholders (Kenney & Patton, 2009; Kezar, 2004).

Entrepreneurial goals do not always conflict with a university's mission to serve the public. Insofar as the mission of a university offers meaning, direction, and purpose to institutional actors (Tierney, 2008), though, entrepreneurial motives need to be weighed against other salient goals of a university, such as public welfare and social justice. Through such critical examination, innovative research that can provide broad benefits to society does not become solely directed by financial concerns.

1.3.6 Summary

Both *creativity* and *entrepreneurship* overlap with *innovation* in specific ways. Creativity refers to inventiveness grounded in field-specific knowledge and expedited by motivation. Innovation pertains to the implementation of a creative product or process and its perceived novelty once it has been evaluated by a critical audience. While creativity is a necessary condition for innovative thinking, not all creative individuals or organizations have been innovative.

Meanwhile, innovations, as described by Mars and Rios-Aguilar (2010), can serve as "catalysts for entrepreneurial activities" (p. 454) that are focused on capital gain. Entrepreneurial strategies are reliant upon innovation, but innovative thinking is not always motivated, or even induced, by entrepreneurial objectives. For this reason, the focus of this chapter is on understanding innovation, rather than entrepreneurship, in the higher education environment.

1.4 The Impact of Sustainable and Disruptive Innovations: Incremental Change or "Process of Creative Destruction?"

Universities are among the world's oldest institutions. Part of their staying power is due to their well-defined mission statements and their shared ideology about how to achieve organizational goals (Taylor & Morphew, 2010). However, authors also acknowledge that universities are complex institutional actors with value systems that can be both in conflict with industry (Mowery & Sampat, 2005) and resistant to innovation (Brewer & Tierney, 2011). Both supporters and critics of academe have employed the metaphor of the "ivory tower" to emphasize the university's removal from society (Bok, 1984). Even this removal can be viewed from two sides. By being removed from society, individuals are able to study complex problems at a measured pace and with objectivity. And yet, researchers can be accused of being ignorant about the pressing problems that society faces, as well as the practical, real-world issues challenging the ideas and theories formulated by scholarly inquiry.

When stakeholders disagree about the appropriate pace of change in contemporary higher education, the arguments often center on whether or not a reorganization of institutional departments should be implemented or an innovation, such as online education, should be adopted (deVise & Kumar, 2012). In this section, we will explore these tensions between continuity and similarity on the one hand and change and difference on the other. We will then relate them to the innovation literature by describing the theories of sustainable and disruptive innovation. The repercussions of sustainable and disruptive innovations for higher education will also be discussed.

1.4.1 Continuity and Similarity

An institution's mission and prominence among peer institutions is often informed by its traditions and enhanced by its longevity (Kezar, 2001). Institutions such as Oxford and Cambridge have maintained their collegiate tutorial systems over centuries (Ashwin, 2005). In the United States, the oldest corporation in the Western hemisphere is represented by the Fellows and president of Harvard University (Williams, 2014). A tour of statues, inscriptions, and paintings strategically placed throughout a college or university campus can reveal the cherished legacies of an institution (Thelin, 2011). Many campuses purposefully emulate a Gothic or Colonial style to establish an air of permanence (Waite, 2014). With so much attention devoted to tradition and continuity, it is little wonder that colleges and universities can be reluctant to embrace change.

Nevertheless, colleges and universities have unique institutional cultures (Kezar & Eckel, 2002; Tierney, 1988). Burton Clark (1970) defined one type of culture as

"distinctive colleges" for institutions – like Antioch, Reed, and Swarthmore – that were particularly unique. To the extent that institutional culture respects egalitarian principles and sanctions dissent, the prospects for innovation can be either animated or inhibited (Jongbloed, Enders & Salerno, 2008). On the one hand, an organization's culture can enable change because a sense of trust pervades the institution. On the other hand, any change, however meager, might be fought in order to hold onto an institution's identity as if it is unchanging.

A discussion of continuity in higher education can extend beyond the institutional level. Networks are formed when the protégés of individuals who work at established universities attain positions at competitor institutions. Through these networks, benchmark universities like Harvard and Stanford not only buttress their prestige and certify their continued relevance, they generate webs of philosophically-congruous institutions. While the traditions unique to an college are usually confined to that institution, valuable hallmarks of Western higher education, such as academic freedom, shared governance, and professorial tenure, have been spread by academic networks and scholarly societies (Altbach, Gumport, & Johnstone, 2001; Tierney & Lanford, 2014). Some might argue that the preservation of these principles are vital to a university's mission; they oblige a tolerance for speculation and error that empowers researchers to think in innovative ways.

1.4.2 Change and Difference

As observed by Thelin (2011), though, "an element of continuity is that our colleges and universities are constantly changing, both by accident and design" (p. ix). Institutional prestige is one way to measure the unremitting evolution of higher education. At the beginning of the twentieth century, a handful of universities in the United States were aspiring to produce research on a level comparable with Oxford, Cambridge, or the best universities in Germany (Geiger, 2014). As of 2014, however, the Academic Ranking of World Universities produced by Shanghai Jiao Tong University counts 52 universities from the United States among the top 100 for productivity in scientific research.

Institutions have historically followed divergent paths to success, and they will likely continue to do so in the future. One line of thought, for instance, may hold that longevity, a track record of steady progress, venerable traditions, and a stable, largely homogenous, culture of conformity form the most valid set of criteria for benchmarking (Gornitzka, 1999). In the industries of technology and automobile manufacturing, respectively, this approach would possibly lead to an assessment that IBM and Toyota are ideal archetypes for emulation. Similarly, the very name of "Harvard" has become synonymous with excellence in the mindset of the general public, inspiring mental images of expansive, tree-lined campus courtyards, protective eighteenth-century gates, and impressive stone and brick buildings of symbolic permanence. It is perhaps not a stretch, then, to associate Harvard with other

enduring institutions of international stature that leverage their longevity and vast accumulated resources, such as IBM and Toyota.

On the other hand, the qualities of novelty, a willingness to gamble on untested solutions, a lack of stifling conventions and rituals, an ability to react to changing external forces, and a commitment to diverse opinions and backgrounds could be prized (Gornitzka, 1999). In such an instance, one might instead turn to nascent companies like Google and Tesla for inspiration. Likewise, Berkeley is a relatively recent addition to American higher education. In less than 150 years, Berkeley has ascended from relatively humble beginnings as a land grant university founded in 1868 under the auspices of the 1862 Morrill Act to a preeminent position in higher education, even though it is conceptually and organizationally quite different from Harvard (Altbach, 2007). To the American general public, Berkeley's image is conflated with its proximity to Silicon Valley and its recent history as a nucleus for student activism in the 1960s and 1970s. Hence, Berkeley has traditionally countered Harvard's reputation for tradition, withdrawn serenity, and cultured debate with a healthy embrace of novelty, public engagement, and notoriety through passionate, if not sporadically contentious, advocacy of liberal causes. Berkeley's ethos is consequently more in line with Google and Tesla than it is with many of its peer institutions in the Northeast United States.

1.4.3 Sustainable Innovation

Obviously, these institutions are nested within the national structure of the United States and have varying degrees of applicability to other national and cultural contexts. For the purposes of this discussion, though, the example of Harvard and Berkeley demonstrates an important point about innovation in higher education. Otherwise divergent universities like Harvard and Berkeley have traditionally responded to technological developments in a similar manner – by adopting what Christensen (1997) defines as "sustainable innovations." Individuals within an organization generally welcome sustainable innovations because the change is incremental. One example of a sustainable innovation is the electric typewriter. Compared with its manual predecessor, the electric typewriter improved performance without demanding extensive training from the user. The upgrade was, in fact, rather effortless.

Although public and private tertiary institutions are often caricatured for their perceived inability to adapt to changing times, universities, like many businesses, wisely utilized sustainable innovations throughout the twentieth century. Chalkboards were replaced by boards utilizing magic markers. Gymnasiums became student centers, accommodating numerous athletic activities and extracurricular classes. Xerox machines supplanted Mimeograph machines. Slide projectors became more advanced audiovisual projectors, and then Powerpoint became the software of choice for displaying information. Indeed, even though individuals like to criticize postsecondary institutions as reluctant and slow to change, a great deal

of reform has occurred over the past generation. Technological improvements in the production and dissemination of scholarship, for example, have radically changed the foci of many university libraries. Today, they might hold the majority of their bound collections offsite, instead devoting their limited physical space to computer labs and environments that promote group collaboration.

In the literature on innovation, one frequently encounters terms that depict similar concepts to that of sustainable innovation. For example, Breznitz and Cowhey (2012) use the phrases "incremental innovation" and "process innovation" interchangeably to describe "the improvements in how goods and services are designed, produced, distributed, and serviced" (p. 130). They also point out that the innovations that traditionally have had the greatest bearing on economic growth are regularly incremental in nature:

> Inventing the internal combustion engine did not change modern society. It was the wave of ensuing innovations – improving the original innovation and applying it throughout the economy in new products, processes, and technologies – that changed the world. Some industries are defined less by rapid product innovation and more by continuous process improvements that alter cost and performance capabilities (p. 130).

As pointed out by Hall (2011), though, "no two innovations are alike. Some innovations (e. g., the invention of the telephone or perhaps the telegraph) create a whole new market sector whereas others are useful but trivial, and there is a wide range in between. In general we can say that smaller innovations are more numerous than game-changing ones." Data collected on innovations in 1982 by Acs and Audretsch (1990) illustrate this very point. More than 85 % of the innovations in 1982 were modest improvements to existing products, and none created entirely new markets. Less than 2 % were the first of their type on the market in existing market categories. Although they are not always acclaimed by entrepreneurial texts or popular media, sustainable innovations have had a powerful, positive impact on society that is sometimes only evident through historical perspective.

1.4.4 Disruptive Innovation

One of the newer theories concerning innovation that is of direct import to higher education involves disruptive innovation. As defined by Weise and Christensen (2014) in its most recent incarnation, a disruptive innovation initially serves the bottom of a given market and has four distinguishing characteristics from its competitors: (1) simplicity, (2) affordability, (3) convenience, and (4) the ability to provide a product or service to non-consumers who lack an alternative.

The characteristic of quality is notably absent from this equation. Christensen fully admits that disruptive innovations, in their nascent form, are usually of inferior quality and require significant time to improve. As a disruptive technology improves, however, potential customers become increasingly interested, the costs of the invention drops, and, at some point, the mature disruptive innovation swamps companies

focused on sustainable innovations. Frequently, traditional companies fail to see new technologies and their organizations as competitors not simply because they are comparatively small, but because they are competing in different markets. After a number of years, though, the electric typewriters from our previous example were supplanted by computers, just as the telegraph was replaced by the telephone. Traditional companies belatedly try to adapt, but they cannot compete.

Some argue that the educational formats presented by online modules are examples of disruptive innovations (Christensen & Eyring, 2011; McCluskey & Winter, 2012) in that they may compel a reevaluation of pedagogical traditions and the value of university credentials (Christensen, 1997). Weise & Christensen contend that the process of disruption in higher education was initiated by the creation of the fully-online University of Phoenix in 1989. Although many of the university's course offerings have been seen as lacking in quality, the University of Phoenix has been successful in that it provides a simple, affordable, and convenient service to people who might not otherwise be able to participate in higher education.

By the second decade of the twenty-first century, online learning has started to follow the trajectory of other disruptive innovations. Just as computers became ubiquitous through improvements in quality and performance, online learning is underscoring how a technology can grow and quickly adapt. Working adults are being joined by more traditional postsecondary students in online classes. Allen and Seaman (2013) estimate that, in fall 2002, online enrollment constituted approximately 9.6 % of all enrollment in U.S. degree-granting postsecondary institutions; according to fall 2011 data, the percentage of online enrollment jumped to 32.0 %.

Compelled by decreasing state support for higher education, more colleges and universities are offering nighttime, weekend, and online classes in an entrepreneurial move to capture adult learners (Pusser, Gansneder, Gallaway, & Pope, 2005). Concurrent with this focus on the needs of the student, educational formats based on competencies and experiential learning are even being slowly adopted by influential research institutions like the University of Wisconsin (Shapiro, 2014). Online education, despite its current logistical issues and pedagogical limitations, has the potential for disruption if it is combined with competency-based education in an effective and efficient manner. Others maintain, however, that competency-based education is one way in which students are prevented from accessing valuable disciplinary knowledge that encourages interdisciplinary inquiry and promotes critical reasoning skills (Wheelahan, 2007).

The question of whether online education can continue to improve remains open to debate, as not all innovations that are considered to be "disruptive" upon their introduction are truly disruptive – or even reach a critical mass of acceptance. For example, the Segway, an ingenious electrical scooter, had the potential to radically transform transportation in urban environments. It was simple to use and fairly compact, making it convenient in terms of storage. However, the Segway never reached critical mass due to personal preferences (many people prefer the exercise that a bicycle provides) and its inability to displace other forms of transportation in dense, urban spaces. Thus, the Segway remained a niche product and has never achieved the economy of scale necessary for affordability.

It remains unclear whether the potentially disruptive technology of online, module-based education presents a challenge to the entire tertiary education sector, threatens to displace certain elements (such as community colleges and regional universities whose primary mission involves teaching and regional workforce development), or is fated to merely dissipate over time. Additionally, the effects that widespread adoption of this disruptive technology might have on faculty work, administration, and governance in higher education remain to be seen.

Lepore (2014), for example, argues that "arbitrary definitions of success" undercut the efficacy of disruptive innovation theory. Citing Christensen's argument that Seagate Technology, a company that produces disk drives for computers, was delinquent in producing a 3.5 in drive in the late-1980s and therefore was a casualty to disruptive innovation, Lepore rebuts with the following evidence:

> In fact, Seagate Technology was not felled by disruption. Between 1989 and 1990, its sales doubled, reaching $2.4 billion… In 1997, the year Christensen published *The Innovator's Dilemma*, Seagate was the largest company in the disk-drive industry, reporting revenues of nine billion dollars. Last year, Seagate shipped its two-billionth disk drive. Most of the entrant firms celebrated by Christensen as triumphant disrupters, on the other hand, no longer exist, their success having been in some cases brief and in others illusory (n.p.).

Hence, many, like Lepore, have contended that companies focused on sustainable, or incremental, technologies are frequently more resilient and prosperous than proponents of disruptive innovation are willing to concede. Certainly, an abiding focus on potentially-disruptive innovations can lead to organizational paralysis or, even worse, schizophrenic reactions to every technological advancement in the marketplace. The most troubling aspect of the theory concerns the consistent use of "disruption" as a justification by managerial entities who wish to promote questionable organizational policies, eliminate departments, or engage in damaging labor practices under the guise of impending disruption. In such instances, conflicts have arisen between Boards of Trustees who espouse a more entrepreneurial view of the university and chancellors who may have been enculturated through graduate training to respect the process of deliberation facilitated by shared governance (Rice, 2012). In reference to Lepore's criticisms, Christensen has acknowledged this problem:

> The word is used to justify whatever anybody – an entrepreneur or a college student – wants to do… I was delighted that somebody with her standing would join me in trying to bring discipline and understanding a very useful theory. I've been trying to do it for 20 years (Bennett, 2014, n.p.).

Disruptive innovation theory, therefore, is not intended to be employed as an all-encompassing predictive tool about the behavior of successful companies in the marketplace. As previously discussed, the literature is replete with accounts of successful sustainable innovations, as well as fleeting disruptive innovations. Rather, Christensen's theory of disruptive innovation is one prism through which administrators, researchers, and other stakeholders in higher education can potentially gain a deeper understanding of technological advances in today's rapidly changing, globalized environment. We should not assume that every widely-heralded innovative

development is destined to become a disruptive innovation. Rather, the potential for disruption must be balanced by thorough considerations of an institution's stakeholders, its history, its identity, and its perceived strengths. Since academic prestige, in particular, can take decades to nurture through perceived eminence and social networks (Burris, 2004), a premature decision to eliminate a widely-respected department out of concerns about eminent disruptions could be more damaging for a university than for a business. But we should also not rule out the possibility that a product focused on value, access, and ease-of-use can undercut current educational modes of learning – even if that product initially seems to be of inferior quality.

1.4.5 Summary

Through this discussion of sustainable and disruptive innovation, we do not want to suggest that universities need to fully abandon tradition to maintain their relevance. They do, however, need to make a greater commitment to supporting innovations that can attenuate the challenges currently confronting the higher education sector. The most meaningful of these future innovations may be disruptive in nature, rather than sustainable. In those situations, prudent institutions should keep an eye out for emerging simple, affordable, and convenient alternatives to current educational archetypes.

The rhetoric of disruptive innovation has nevertheless accrued a powerful ability to coerce change in situations where more deliberate strategies based on sustainable innovation might be preferable. Therefore, a proactive mentality must be balanced by a long-term outlook with sustained support for the expertise offered by researchers, administrators, and teachers. Their work, often requiring patience, deliberate effort, and a tolerance for error, is necessary to solve the complex problems confronting contemporary societies.

1.5 Three Positive Dimensions for Promoting Innovation

With innovation thus defined and its importance for higher education established, what is known about fostering an innovative climate? Literature from business, innovation studies, management, and psychology point to three factors that almost invariably impact innovation in a positive manner. These factors include diversity, intrinsic motivation, and autonomy.

1.5.1 Diversity

At the organizational level, a diverse range of backgrounds, proficiencies, and voices augments the creative impulses of individuals, as well as the innovative potential of a group. Feldman (2002), in fact, contends that "innovation, at a fundamental level, is a social process that bridges individuals from different disciplines with different competencies, distinct vocabularies, and unique motives" (p. 48).

Diversity is sometimes considered in terms of inherent characteristics, such as race or gender. Indeed, research on inherent diversity indicates substantial financial returns for companies that actively promote diverse hiring practices, especially in leadership positions. Hunt, Layton, and Prince (2014), for instance, discovered that the top quartile of companies in terms of gender diversity in corporate leadership are 15 % more likely to be above the national industry median for financial returns. The top quartile of companies for ethnic diversity in corporate leadership are 30 % more likely to rise above the national median.

Hewett et al. (2013) have conceptualized a two-tiered model of diversity that includes acquired characteristics, such as knowledge of a foreign culture, in addition to inherent characteristics. Leung, Maddux, Galinsky, and Chiu (2008) found that creative abilities like insight learning, remote association, and idea generation are each positively correlated with multicultural experiences. Similarly, Hewett et al. discovered that companies with a strong combination of inherent and acquired diversity among employees not only exhibited higher levels of innovation than other, less diverse companies, but they were also 45 % more likely to grow market share within a year and 70 % more likely to capture a new market. Additionally, Hewett, Marshall, and Sherbin found that a diverse leadership enables employees to propose novel concepts and understand the perspectives from a more diverse range of clients. Leaders also were more likely to expedite feedback channels, ensure that multiple voices were heard, and delegate authority. Each of these behaviors helped both leadership and employees fulfill their innovative potential to a greater degree than they would in a less diverse environment.

1.5.2 Intrinsic Motivation

In a university, researchers are frequently incentivized by the promise of enhanced disciplinary prestige, additional income, and/or institutional promotion. An additional worldwide trend in higher education is the expansion of performance-based funding through incentive arrangements, such as research grants. For many, including several economists (Bénabou & Tirole, 2003; Scotchmer, 2004), these types of extrinsic motivators are necessary tools for rewarding exemplary work and for encouraging desired behaviors.

However, most creative thinkers and innovators (like researchers) are not solely motivated by the prospects of recognition, a higher income, or an institutional title. In a summary of research conducted by her team at the Harvard Business School, Amabile (1998) maintains that extrinsic motivators do not "make employees passionate about their jobs. A cash reward can't magically prompt people to find their work interesting if in their hearts they feel it is dull." A meta-analysis on motivation conducted by Deci, Ryan, and Koestner (1999) supports Amabile's premise, asserting that "performance-contingent rewards significantly undermine free-choice intrinsic motivation" (Deci et al.).

As a result, higher education institutions need to stimulate the intrinsic motivations of researchers, administrators, instructors, and other employees for an innovative work environment. In particular, the individual agency associated with self-determination is vital for the cultivation of innovation. Three important individual needs – competence, relatedness, and autonomy – are associated with self-determination (Ryan & Deci, 2000). To unpack the potential of institutions in the higher education sector, a clearer understanding of how to meet these needs can foster greater creativity and innovation.

Innovation can be inhibited by inadvertent disincentives. Stable organizations, like universities, regularly have "deep cultural traits" that impede change or prevent the adoption of an innovation (Tellis, 2013). At times, these cultural traits can be valuable, particularly if they raise germane skepticism about the implementation of an untested educational fad. However, the institutional culture of a stable organization could also become too "risk-averse," precluding researchers from proposing and testing radical theories, administrators from piloting new management strategies, and teachers from attempting innovative pedagogical tools in their classes.

1.5.3 Autonomy

Psychological research has identified a particularly strong relationship between intrinsic motivation and autonomy. In fact, Fisher (1978) and Ryan (1982) each discovered that an individual who feels competent enough to perform a given task, yet lacks a sense of autonomy, will not experience the intrinsic motivation necessary to complete the undertaking. Thus, autonomy is required for innovation in higher education. Researchers working for a university are highly-skilled disciplinary experts who can draw upon their knowledge to construct the best plan of action for achieving a desired outcome. In management literature, the degree of autonomy an actor receives is sometimes portrayed as a "coordination-autonomy dilemma" (Puranam, Singh, & Zollo, 2006). However, a production line mentality that requires workers to meet particular standards throughout their workday would not stimulate an innovative climate in higher education.

To preserve autonomy, academic freedom is essential. Researchers need the liberty to debate concepts and investigate theories without fear of censorship or rebuke for an "incorrect" or an "unproductive" outcome. As Albert Einstein wryly noted

about his own work, "that fellow Einstein makes things convenient for himself. Each year he retracts what he wrote the year before" (Ohanian, 2008, p. 253). Karl Popper, a distinguished philosopher of science who specialized in the scientific method at the London School of Economics, eloquently described this milieu, stating that "science is one of the very few human activities—perhaps the only one—in which errors are systematically criticized and fairly often, in time, corrected. This is why we can say that, in science, we often learn from our mistakes, and why we can speak clearly and sensibly about making progress there" (1963, p. 78). To challenge conventional wisdom, scientists regularly advance unpopular theories that may be initially flawed, yet undergo refinement over time. Through this process, research can lead to important technological advances, such as the mapping of the human genome, thereby positively impacting the overall quality of life for millions of people.

To be sure, a transparent, fair process of evaluation is an essential part of any organization. Autonomy, however, can be negatively impacted by excessive evaluation and micromanagement (Amabile et al., 1996); for this reason, colleges and universities need to strike a delicate balance between evaluative measures and the conditions which incentivize innovation. Burdensome evaluations can prevent administrators from implementing innovative programs and discourage scholars who wish to pursue innovative research agendas. Punitive evaluations may frighten individuals from even testing novel ideas.

1.5.4 Summary

Inherent and acquired diversity, intrinsic motivation, and autonomy each have been shown to have positive effects on the innovative climate of an institution. Establishing an innovative institution is not as easy as simply focusing on these three factors, however. Research has demonstrated that three additional dimensions of innovation require thoughtful consideration of the culture, motivations, and goals of an institution.

1.6 Three Emerging Dimensions That Complicate the Innovative Process

The dimensions of time, efficiency, and trust each have a complex relationship with innovation. As discussed below, each dimension poses challenges for the development of innovations, the conditions that allow for novel or creative thinking, and the sharing of information that inspires an innovative product or process. Unlike the previous three dimensions, these three are more emergent and the literature continues to evolve about them.

1.6.1 Time

Since innovation is a time critical concept, a consideration of temporal dimensions involving innovation is imperative (Sartorius & Zundel, 2005). The linear process model, developed through a confluence of natural scientists, researchers from business schools, and economists, has been particularly influential on theoretical conceptions of innovation. According to the linear process, basic research initiates the innovation process; this process is followed by a middle stage of applied research and development and ends with a final stage of production and diffusion (Godin, 2006). Critiques of the linear process have been levied throughout the twentieth century (Rosenberg, 1994), and numerous alternative models that include multiple feedback loops (Kline & Rosenberg, 1986) and rather complex integrated networks that include external ideas (Galanakis, 2006; Trott, 2005) have been proposed. Nonetheless, the linear process model has proven resilient, partly due to its lasting popularity among policymakers attempting to understand how research and development impacts the economy (Crescenzi & Rodríguez-Pose, 2011).

Therefore, the connection between time and innovation can be considered in one of three ways: (1) the rate of development; (2) the moment in which an innovation is unveiled to the public; and (3) the rate of adoption or acceptance by a given participant base (Dodgson & Gann, 2010). These three stages provide a useful framework for considering the viability of an innovative idea, the resources necessary to realize the development of an innovation, and the likelihood of an innovation's adoption or acceptance by targeted audiences.

Individual disciplines may have different expectations concerning the rate of development for an innovation. For instance, a discipline that deals with continuous technological advancements, such as the digital humanities, may expect new innovative discoveries on a yearly, if not monthly, basis. Conversely, universities may take several years to develop a new drug in partnership with a pharmaceutical company. They may also need to anticipate an extended period of time to ensure safety through multiple drug trials.

Since compressed time can allow innovators to beat competitors to the marketplace, speed during the development stage is typically viewed in a positive light (Vaitheeswaran, 2012). Furthermore, creativity can be stimulated by milestones and deadlines that motivate individuals to complete tasks (Eisenhardt & Tabrizi, 1995), share their work (Takeuchi & Nonaka, 1986), and remain within the confines of a prearranged budget (Drucker, 2014). Nevertheless, people avoid the complex cognitive processing obligatory for innovation if they are constantly working under deadlines (Amabile, Hadley, & Kramer, 2002). This complex cognitive processing often requires patience. As described by Ness (2015), Bell Laboratories was "perhaps the most celebrated dynamo for industrial discovery" because "its parent company, AT&T, did not require fast wins":

> Indeed, they were known for introducing new products and services after a slow and costly process of discovery and development. The mega-corporation could afford to finance basic discovery in physics, mathematics, materials science, and engineering because the Bell

> system had become colossal… AT&T's progressive leadership invested their proceeds in basic research that built the future of communications and the betterment of humankind (p. 36).

Both the introduction and the adoption of innovations are subject to a complex array of considerations. When an innovation is swiftly brought to market, companies and individuals alike may be rewarded handsomely for their impetuosity. Likewise, rapid adoption of a promising innovation can lead to competitive institutional advantages within a given field or market. However, employees may be reluctant to undertake the training necessary to effectively utilize an innovation and benefit from its advantages. Some groups may also be disinclined to adapt to innovative products or fully understand their benefits (Rogers, 2003).

1.6.2 Efficiency

In certain situations, a focus on efficiency can stimulate creative solutions to demanding problems, especially if resources are limited. Generally, though, efficiency is a disincentive that precludes innovative inquiry. Some even contend that efficiency is the "enemy of innovation" (Janeway, 2012), as it negatively impacts the trial and error process necessary for innovation. A reluctance to fund promising research and adequately regulate the tradeoff between efficiency and innovation has triggered significant losses for companies like Motorola, Ericsson, and Samsung (Christensen & Raynor, 2003).

As a result, Christensen and van Bever (2014) argue that many companies, fixated on short-term financial returns from their invested capital, exclusively develop "efficiency innovations." These innovations are attractive because they reduce the costs associated with a product or service, and they often provide a return on their investment within 12–18 months. "Efficiency innovations" may be held in great esteem by shareholders, but they are not as beneficial to society as "empowering innovations" that make expensive products affordable and create the conditions for economic growth.

A company that specialized in "empowering innovations" from the 1970s through the 1990s was the Palo-Alto research hub of Xerox, otherwise known as Xerox PARC. The list of personal computing-related innovations developed by Xerox PARC is astounding, encompassing laser printers, Ethernet, the mouse, bitmaps, and even the graphical interface that makes modern operating systems such as Windows, the Apple iOS, and Linux accessible to millions of users. According to Ness (2015), "what allowed these staggering accomplishments were dedicated funding, concentrated brainpower – it is said that by the 1970s PARC had attracted half of the world's most famed computer scientists – and pure audaciousness" (p. 37).

Alas, "empowering innovations" require a much longer period of time (5–10 years) for profitable returns. For this reason, institutions need to carefully interrogate

the length of their commitment to funding potentially-innovative programs and research. In many cases, long-term funding that gives individuals the time to diagnose problems and correct errors is necessary for substantive innovations that can propel national and regional growth in today's knowledge economy.

1.6.3 Trust

Research concerning the intersection of innovation and higher education usually focuses on institutional structures. Weick (1976), for instance, postulated that educational organizations might be "most usefully viewed as loosely coupled systems" (p. 16). Among many characteristics, these systems are distinguished by their lack of coordination, relative absence of regulations, infrequent inspection of activities, and overall decentralization.

If an educational institution is indeed loosely coupled, then what enables the independence and decentralization necessary for our conceptual framework of innovation? As stated by Molina-Morales, Martínez-Fernández, and Torló (2011), the literature on trust indicates the following:

> Trust helps facilitate cooperation, lowers agency and transaction costs, promotes smooth and efficient market exchanges, and improves firms' ability to adapt to complexity and change. This stream of research holds that firms can find a wealth of benefits from trust, including cost savings and enhanced organizational capacities (pp. 118–119).

Thus, trust can be a crucial animating force that allows talented innovators to enjoy the privilege of autonomy, thereby also enabling intrinsic motivation. In diverse settings, trust can also foster collaboration, allowing for the sharing of information and expertise, rather than siloed knowledge and resources that would occur in a less trusting environment (Ahuja, 2000; Daft & Becker, 1978; Tsai & Ghoshal, 1998). According to Powell, Koput, and Smith-Doerr (1996), innovation may even depend on the relationships that can be forged by individuals from discrete backgrounds.

1.6.4 Conceptualizing Trust

Although trust exists between two parties writ large, it is, at its most rudimentary level, an interaction between two individuals. This interaction unfolds in a dynamic process and is developed through recurrent interactions between individuals. Over time, greater trust is formed as individuals behave in a manner that is consistent with predetermined expectations (Seligman, 1997) and greater familiarity is established (Strasser & Voswinkel, 1997). However, greater trust entails greater risk and vulnerability as the potential for digressions from expected behavior exist (Six & Sorge, 2008). Although trust may take considerable time to develop on a meaningful level,

it can be invalidated by a single deviation from established norms and/or values (Sitkin & Roth, 1993). This precarious nature of trust, particularly since it involves a combination of emotional and rational behaviors (Bigley & Pearce, 1998), means that individuals differ in their proclivity to trust others (Elangovan & Shapiro, 1998).

On an organizational level, trust can also have an impersonal dimension (Brennan, 1998). Universities, for instance, are inanimate, and an employee's trust (or lack thereof) in the ability of a university to pay his or her salary can therefore be interpreted as such an impersonal relationship. If an organization fosters extensive trust, a feeling of relative independence and autonomy may be prevalent among the members of that organization. If trust is weak on the organizational level, however, the members of an organization may feel stifled by extensive control mechanisms (Das & Teng, 2001; Gillespie & Dietz, 2009).

We define trust as "a dynamic process in which two or more parties are involved in a series of interactions that may require a degree of risk or faith on the part of one or both parties" (Tierney, 2006, p. 57). Consistent with the notion that trust is a dynamic process, we also contend that trust is a cultural construction, subject to meaning only within specific contexts and situations. A certain degree of uncertainty is vital for both trust and innovation, but the tolerance for that uncertainty is contingent on both cultural and temporal factors.

1.6.5 A Good with Mitigating Factors

Trust should not be equated, however, with a lack of supervision or monitoring. Research has also shown that organizations with too much trust may be inefficient, misallocate resources, or lack coordination between different departments (Langfred, 2004; Orton & Weick, 1990). Perhaps even worse, an organization with an abundance of trust will take unnecessary risks based on incomplete data (Molina-Morales et al., 2011).

As mentioned previously, the entrepreneurial desires of the modern university may not always match the intrinsic motivations of researchers and/or administrators to tackle issues involving public welfare or social justice. If the intrinsic motivation of students and faculty is betrayed by the monetization of their work, trust can also erode. Along the same lines, established codes may be necessary to detail and clarify the intellectual property rights of researchers, as well as their ability to participate in open source development that can befit the public good (Välimaa & Hoffman, 2008). Although codes should not tell individuals in a college or university precisely what to study, how to conduct innovative research, or how establish an innovative policy, they can set the basis for trust and autonomy by outlining broad expectations and letting people with expertise discover new solutions.

If trust is to be engendered by a college or university, the environment should, above all, allow for an open discussion of ideas, even when opinions diverge. Transparency among stakeholders is also crucial. Most effective are intangible

constructs that preserve open lines for communication, as well as respect for the roles of researchers and administrators. The confluence of the above factors is vital for an innovative environment (Tierney, 2006).

1.6.6 Summary

Each of the three dimensions – time, efficiency, and trust – discussed in this section require deliberation about an institution's goals, priorities, and culture. While efficiency is generally seen as an "innovation killer," it can also stimulate creative thinking. In general, however, "empowering innovations" that can have the greatest impact on society require considerable time to develop and implement. Since grants typically run for less than 5 years, governments and institutions may want to make lengthier financial commitments, depending on the intended scope and impact of a given project. For such long-term projects, there is a tendency to micromanage the activities of researchers. Hence, trust is of major importance, since it diminishes the need for bureaucratic impediments that can increase expenses and stifle creativity.

1.7 Concluding Remarks

As we have argued in this chapter, a greater understanding of and appreciation for innovation is necessary for the future of higher education. If different career competencies are indeed necessary for success in a twenty-first century knowledge-based society, universities will need to be innovative to equip workers with valuable skills, especially in the face of reduced state funding. Institutional ambition will also require innovative thinking grounded in the realities of regional needs. Not every institution needs to become world-class, but every institution should support innovative research, organizational structures, and pedagogical approaches that can provide assistance to individuals outside of academe.

Professors are enculturated through graduate training to be critical thinkers and challenge accepted views. As a result, universities are uniquely positioned to grant autonomy and tap the intrinsic motivation of researchers. Without this skepticism and interrogation, disciplinary progress and innovation cannot, in fact, take place. Novelty is only one aspect of innovation, however. The process of implementation, at times, may require a greater willingness to engage in interdisciplinary research, a capacity to embrace diverse backgrounds and viewpoints, and a thorough consideration of how to effectively nurture trust between different institutional levels and individuals. The demands for efficiency voiced by many actors outside of education may also compel a more entrepreneurial attitude, balanced by a recognition that the most effective innovations necessitate time and the privilege of deep reflection.

Whether the majority of innovations in the future are largely sustainable or increasingly disruptive, change for higher education is likely on the horizon. This

chapter provides a conceptual framework that can be refined as future studies examine innovation in a variety of higher education environments. Through this continued investigation, institutions will be better equipped to create and implement novel research that can positively impact society and advance human knowledge.

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Chapter 2
English Learners and Their Transition to Postsecondary Education

Higher Education: Handbook of Theory and Research

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2.1 Introduction

Students with limited English proficiency, English Learners (ELs), currently represent 10 % of total K-12 enrollment in the US (National Center for Education Statistics [NCES], 2013), and these students comprise one of the fastest growing populations in K-12 schools (Kanno & Harklau, 2012a, 2012b). The majority (three-quarters) of ELs speak Spanish as their first language (Rios-Aguilar & Gándara, 2012a), but, collectively, ELs speak at least 460 different languages (Batalova, Fix, & Murray, 2007; Kindler, 2002) in K-12 classrooms. ELs are often portrayed as a relatively new and homogenous student population, but ELs bring quite diverse skills, educational needs, backgrounds, languages, and educational goals to U.S. classrooms (Gil & Bardack, 2010; Valdés, 2001; Wright, 2010).

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Much research has addressed EL students' experiences and outcomes in K-12 education (e.g., Callahan, Wilkinson, & Muller, 2010; Cheung & Slavin, 2012; Gutíerrez & Rogoff, 2003; Hakuta, 1983; Moll, Amanti, Neff, & González, 1992; Rueda & Goldenberg, 2007). Meanwhile, state policies have emerged that restrict EL students' access to core academic content in K-12 settings (Gándara & Orfield, 2012). Despite this attention to EL students in the research and policy arenas, far less research has examined EL students' transitions to college and their postsecondary outcomes (Callahan, 2005; Callahan & Gándara, 2004; Kanno & Cromley, 2013; Kanno & Harklau, 2012a, 2012b; Kanno & Varghese, 2010).

What we do know is that ELs complete high school, enroll in college, and graduate from college at far lower rates than their non-EL peers. For example, in their analysis of the national data source NELS: 88, Kanno and Cromley (2013) found that within 2 years of high school graduation, almost half of ELs (47 %) had not enrolled in college, and only 18 % had advanced to 4-year colleges, compared with more than twice the proportion of monolingual English-speaking students (43 %) and English-proficient LM students (38 %). Similarly, within 8 years of high school graduation, just one in eight of ELs in the sample (12 %) had attained a bachelor's degree, compared with one-third of monolingual English speakers (32 %) and one-fourth of English-proficient LM students (25 %).

As the proportion of ELs rises, increasing these students' college completion rates can advance the popular policy goal of raising overall college attainment in the U.S. Furthermore, although multilingualism is not always framed as an asset in the U.S., it is seen as an asset in many areas of the world. The ability to communicate in multiple languages is taught and even required in some nations (Krzyżanowski & Wodak, 2011). In the U.S., ELs make significant contributions in the workplace and have equivalent or even better labor market outcomes than monolinguals, particularly in a world that is increasingly global-oriented and interconnected (Rumbaut, 2014). Multilingually proficient ELs have been found to think in more cognitively complex and sophisticated ways than monolingual individuals (Bamford & Mizokawa, 1991; Hakuta, 1983). Collectively, this evidence suggests that realizing the potential of EL students can increase the quantity and quality of human capital in the U.S. and prepare these students to become more active participants and contributors to a healthy democracy and government.

In this review, we synthesize existing literature to examine the status of research on ELs in higher education. In addition, we aim to bridge the disconnect between the rich body of scholarship on ELs in K-12 with the comparatively limited research in current higher education literature to explore how ELs transition from K-12 to postsecondary education. First, we discuss reasons for the limited scholarship on ELs in higher education by examining the ways these students have been framed in broader educational and legal policy developments, which, importantly, have heretofore only formally defined ELs as a category of students in the K-12 sector. In this section, we also review the limitations of existing data to study ELs, focusing on the challenges of identifying and tracking these students over time, particularly between K-12 and post high school graduation. Here, we demonstrate that in order to understand how being EL affects college experiences and outcomes, it is essential to

understand how EL students have been framed at the K-12 level with respect to classifications, labels, and political interventions. Second, we address what is known about ELs' postsecondary enrollment outcomes, illustrating that EL status has an independent effect on these outcomes, and is therefore worth examining more closely as a variable that affects college attainment.

Third, we discuss two theoretical lenses that constitute our methodological approach to understand the classification, labeling, policies, and practices oriented at EL students in the K-12 system that influence these students' transitions to higher education. Specifically, we employ two theoretical lenses – intersectionality (Núñez, 2014a, 2014b) and the funds of knowledge and funds of capital approach (Rios-Aguilar, Kiyama, Gravitt, & Moll, 2011) to foreground our emphasis on the multiple social identities of EL students and on the resources that they bring with them to education that typically go unrecognized by the dominant culture.

Fourth, we outline our methods for conducting our review of the literature in higher education on EL students' transitions to college. Fifth, we review key themes from this literature to identify factors shaping these students' transitions to higher education. Sixth, based on these themes, we advance the most promising theoretical frameworks to guide future research on ELs. These theoretical frameworks are distinctive from the theoretical lenses in our methodology discussed earlier because they are more explanatory in nature than the other lenses to address the factors affecting ELs' postsecondary outcomes. Furthermore, these frameworks align with the themes we identify in current empirical research about EL students' transitions to higher education and also align with the potential to identify supportive factors for these students.

Finally, we conclude with implications for future research, policy, and practice about EL students in higher education. In sum, we aim to: (1) advance terminology for describing these students in higher education, (2) provide an understanding of political and legal developments shaping their academic preparation in the K-12 system that have consequences for their success in higher education, (3) identify key themes in the literature on these students once they arrive in higher education, (4) highlight promising theoretical perspectives to guide future research, and (5) advance higher education research implications. Our intention is that researchers interested in EL students' postsecondary transitions can use the conceptual approaches and analyses presented to inform research design about EL students in areas such as labeling these students, collecting data, and choosing or constructing variables for analyses.

2.2 Reasons for the Limited Scholarship on ELs in Higher Education

Before reviewing findings on EL students in the transition to higher education, it is important to understand how diverse factors have contributed to limit research on this group of students. Notably, research on EL students in higher education has

emerged primarily from the field of applied linguistics (e.g., Leki, 2007; Harklau, 2000, 2013; Kanno, 2015; Kanno & Grosik, 2012; Kanno & Varghese, 2010), rather than from the field of higher education itself. There are at least four reasons for the lack of scholarship on these students in higher education. The first and fundamental reason is that the classification of EL students is, at least in name, associated with particular legal rights and the reception of academic support services in the elementary and secondary education levels, but not at the higher education levels. ELs' emergence as a distinctive category of students in the K-12 system is rooted in federal history, including the Civil Rights Act of 1964 that shaped the opportunity to pass the 1968 Bilingual Education Act (BEA) to articulate the right to a sufficient K-12 education for EL students. These acts set the stage for key subsequent legal rulings in bilingual education to accord protection from discrimination by national origin and to provide access to education as a right for participation in the American citizenry, following the precedent of the Fourteenth Amendment of the U.S. Constitution (*Lau v. Nichols*, 1974; *Plyler v. Doe*, 1982; San Miguel, 2004).

Importantly, these policy developments never specified that the right to an education for ELs extended beyond K-12 education to the higher education level. In fact, there may have been an assumption underlying these policy movements that providing an adequate K-12 education would automatically prepare EL students to pursue higher education. In any case, this position is consistent with the notion that postsecondary education is not a guaranteed right for the entire U.S. population, let alone ELs. Furthermore, in addition to federal policy, state policy also significantly shapes ELs' educational trajectories, since states have considerable autonomy to decide about utilizing or prohibiting various instructional methods to serve ELs. Therefore, though mandated by the federal government, services for ELs to facilitate K-12 academic skill development (which would in turn affect preparation for college) can vary significantly at the state level. Regardless, upon leaving secondary education, all ELs lose their classification as a separate category of students. Concurrently, once they graduate from high school, they also lose access to specialized academic support services that are required by law at the K-12 level (*Lau v. Nichols*, 1974; *Plyler v. Doe*, 1982; San Miguel, 2004). One critical consequence is that, if they do pursue postsecondary education, EL students are no longer identified on the basis of their language proficiency status and therefore might not receive the support they need to succeed in postsecondary education.

Second, EL status can change over time as language skill development increases or decreases, so it is a relatively fluid category. For example, in K-12 education, once ELs meet certain academic and English-proficiency thresholds, they are reclassified as English-fluent and exit the English as a Second Language (ESL) program (Linquanti & Cook, 2013; Regan & Lesaux, 2006). Similar developments could, of course, take place among EL college students.

Third, multiple terms have been used to describe EL students in higher education. While different labels have also been used to describe these students in K-12, there has also been more K-12 research to contextualize the use of these labels. In higher education, terms used to describe these students have included Language/Linguistic Minority (Kanno & Harklau, 2012a, 2012b), Limited English Proficient

(LEP) (Tichenor, 1994); English as a Second Language (ESL) (Ignash, 1995), English Language Learners (ELL) (Curry, 2004), and English Learner (EL) (e.g., Callahan, 2005; Gándara & Rumberger, 2007; Kanno & Harklau, 2012a). The use of the various labels over time can make it difficult to define and distinguish EL students from other students, especially for those who are new to studying this topic. Therefore, it is important to clarify terminology and reasons for using particular labels to describe these students. In this review, we will address this issue in more depth and explain why we have chosen to employ the term English Learner (EL) among all of the options. Until then, we will employ labels that reflect the referenced studies, historical time periods, or topics they are representing.

Fourth, data limitations have also made it difficult to conduct research on EL students. The level of detail necessary to adequately assess language skills over time can be limited in longitudinal federal data sets like the National Educational Longitudinal Study (NELS), Educational Longitudinal Study (ELS), and Beginning Postsecondary Students Study (BPS). Other federal data sets that may have more detail on linguistic skills, such as National Assessment of Educational Progress (NAEP), are limited in that they are cross-sectional. Certain state level data sets include more detail on linguistic skills and track students for a length of time such that they provide opportunities for longitudinal analysis from a K-20 perspective, but their generalizability may be more localized (Flores & Drake, 2014).

In some cases, richer data may be available at the district and school, rather than, state level. Thus, the capacity to analyze ELs' experiences and outcomes along the K-20 continuum varies by the type of data set used (e.g., federal or state, cross-sectional or longitudinal), state, and institution. Needless to say, EL status is often measured in different ways according to these various levels, depending on the type of placement test used. Typically, entering students at higher education institutions must choose or are advised to take an English or ESL placement exam. This is a high stakes decision that will determine the type of services and instruction that the student will receive (Hodara, 2015). While this process may seem efficient, allowing colleges to assign students to specific courses (depending on their "needs"), the reality is that misplacement prevails (Hodara, 2015). Some students who need ESL services will not receive them, and some students who do not need them will remain in "remedial" coursework for a long period of time. Unfortunately, we do not know the extent of misplacement decisions because it has not been carefully and systematically studied (Hodara, 2015). In addition, there is little research that examines the validity of placement tests (see Belfield and Crosta (2012) for examples of studies that examine the use of placement tests in college outcomes). Collectively, the data available to conduct research on EL students are still evolving in significant ways. At the end of this review, we will make recommendations on developing better data systems for researchers in higher education interested in studying EL students.

This brief review of reasons for limitations of current research on ELs in higher education makes it clear that understanding the classification, labeling and history of policy legislation and legal developments concerning ELs in the K-12 system is essential to understanding who ELs in higher education are. It is also critical for understanding not only the reasons why these students face distinctive and signifi-

cant challenges in higher education, but also for understanding the potential assets they bring to higher education settings. Now, we turn to examining what we do know about ELs' postsecondary enrollment and completion outcomes using the most current and nationally representative data available.

2.3 Postsecondary Outcomes: Enrollment and Degree Attainment

Recent national studies indicate that ELs enroll in and complete college at lower rates than non-ELs, and that they tend to enroll in less selective colleges. Analyzing the National Education Longitudinal Study of 1988 (NELS:88), Kanno & Cromley (2013) found that, after 2 years of expected high school graduation, almost half of ELs (47 %) had not enrolled in college, and only 18 % in total had advanced to 4-year colleges, compared with more than twice the proportion of monolingual English-speaking students (43 %) and English-proficient LM students (38 %). Similarly, within 8 years of high school graduation, just one in eight of ELs in the sample (12 %) had attained a bachelor's degree, compared with one-third of monolingual English speakers (32 %) and one-fourth of English-proficient LM students (25 %). Fifty-one percent of ELs never earned postsecondary education credits of any kind, meaning that half of EL high school graduates either did not enroll in postsecondary institutions at all, or, never stayed long enough to earn credits.

Kanno and Cromley's (2015) analysis based on the recent Education Longitudinal Study of 2002 (ELS: 2002) found similar trends in initial college enrollment: Only 19 % of ELs advanced to 4-year colleges within 2 years of high school graduation, compared with 45 % of English-native speakers and 35 % of English-proficient EL students, suggesting that even after a whole generation of student turnover, gaps between ELs and non-ELs in college access remain. In short, the disparity between ELs' and their English-proficient peers' access to 4-year postsecondary institutions remained the same when comparing the NELS: 88 and ELS: 2002 student cohorts, which were 14 years apart.

Núñez and Sparks (2012) conducted a related study using the Beginning Postsecondary Students Longitudinal Study 2004 (BPS: 2004), but, in contrast to Kanno and Cromley's studies (2013, 2015), the only available measure on EL status in this data set (whether a student had spoken English as a first language) did not distinguish between lower proficiency EL students and English-proficient EL students. In examining EL students' college enrollments, they found that a slightly higher proportion of EL beginning college students (61 %) than non-EL students (56 %) were enrolled in community colleges. Notably, about equal proportions of LM and non-LM students (12 % and 10 %, respectively) were enrolled in selective 4-year institutions. Meanwhile, LM students (27 %) were less likely than non-LM students (34 %) to be enrolled in non-selective 4-year institutions. These results suggest a possible bifurcation among EL college students according to language

proficiency in the selectivity of their colleges, in which those who are less English-proficient attend community colleges and those who are more English-proficient attend the more selective 4-year institutions.

ELs tend to enroll in community colleges, due in part to these institutions' open admissions policies, their local accessibility, and relative affordability. Emerging research suggests that, as in K-12, ELs' access to mainstream academic coursework in community colleges is limited (Bunch & Endris, 2012; Razfar & Simon, 2011) and that their associate's degree completion rates and transfer rates are even lower than for community college students in general (Almon, 2010; Razfar & Simon, 2011). One recent study (Razfar & Simon) employed longitudinal data to analyze the course-taking patterns and outcomes of Latino ELs in one large California community college district. The majority (65 %) reported attending community colleges for career related reasons or to develop basic academic skills, and just 8 % of the EL students in the study intended to transfer to a 4-year institution. Despite some reported intentions to gain basic academic skills, over half (58 %) of the students in the study were not mainstreamed into regular community college classes when they began postsecondary education, and most (63 %) did not advance to a higher level than the one in which they began. After just two semesters, the majority (62 %) had dropped out of the community college, a proportion that, after five semesters, rose to 85 %, indicating just a 15 % persistence rate within this time period.

In a mixed-methods study of one large community college on the East Coast, Almon (2010, 2014) found that even though ELs on average earned a GPA of 2.72, which was higher than the mean GPA of 2.32 from a matched sample of non-ELs, only 43 % of ELs successfully exited the community college's ESL program and only 13 % graduated, a rate lower than that of the overall graduation rate of this community college (23 %). In the qualitative part of the analysis, Almon identified lack of finances, full-time employment, and family obligations as three major barriers to ELs' persistence in community colleges. Given the limited number of studies, far more research is needed to understand EL students' course-taking patterns, developmental education experiences, and community college outcomes.

Although ELs tend to face structural challenges in K-12 schooling that affect the transition to college, some ELs, especially those with more economic and academic resources, do reach selective 4-year institutions (Kanno & Varghese, 2010; Kanno & Grosik, 2012). For those ELs who are fluent in multiple languages, bilingualism is positively associated with increased cognitive functioning for people of all ages (e.g., Bialystock, Craik, & Luk, 2012) and increased capacity to function in and contribute to a global economy (Callahan & Gándara, 2014). Furthermore, first-generation immigrant status, a characteristic of many ELs, is associated with increased K-12 academic performance, which some have attributed to "immigrant optimism" (Kao & Tienda, 1995) about the power of education to become socioeconomically mobile, or to relatively limited exposure to a racially discriminatory environment in the U.S. (Portes & Rumbaut, 2001). These phenomena potentially account for why some postsecondary studies find that, among beginning college students in 4-year institutions, EL status is independently and *positively* associated with postsecondary persistence and completion (Arellano, 2011; DeAngelo, Franke,

Hurtado, Pryor, & Tran, 2011; Suárez Orozco & Suárez-Orozco, 1995). This indicates that EL students who make it out of the K-12 system and enroll in 4-year colleges are more likely to complete college than others with similar characteristics. More study is needed, however, to understand what makes them exceptionally resilient.

This overview of ELs' college enrollment and degree attainment patterns indicates that ELs' postsecondary outcomes are markedly lower than those of their English-proficient counterparts. EL college students more often enter higher education through community colleges, a pattern that is associated with lowering the chances of attaining a bachelor's degree for the general population (Bowen et al., 2009; Cabrera, Burkum & La Nasa, 2005). Given the importance of academic preparation in college persistence and graduation for all students (Adelman, 2006), focusing on ELs' precollege educational experiences is critical to understanding these disparities in postsecondary enrollment and outcomes. An emphasis on these precollege educational experiences requires an understanding of the broader historical policy developments influencing how EL students' rights have been addressed by legal rulings and legislation. It also requires an understanding of how these students have been labeled and classified to receive services in K-12 or higher education, and in turn, the quality of these students' preparation for college-level work. Before proceeding to discuss these themes, we will next describe the theoretical lenses shaping our interpretation of these contextual factors.

2.4 Methodological Perspectives to Understand EL Students' Transitions from K-12 to College

An overarching paradigm and two theoretical lenses have shaped the methodology guiding our review. Many higher education researchers do not explicitly distinguish between paradigm and method in their research (Hurtado, 2015; Jones, Torres, & Arminio, 2013). However, we feel that this is an important distinction, in the sense that the method, or our data collection process (outlined later in this piece), was distinct from the lenses that guided the approach to this inquiry and subsequent interpretation of the findings. Specifically, we applied a methodological approach rooted in a "transformative paradigm" (Hurtado, 2015) that offers the following guidelines when studying marginalized groups:

> Decisions on method involve an awareness of contextual and historical actors, considering forms of oppression. Multiple methods, techniques, and theories may be necessary. Relies on crystallization (multifaceted perspectives and data sources) rather than triangulation, assumptions of heterogeneity rather than homogeneity, and attention to structures of opportunity and inequality, conditional effects (specific groups are affected differently by the same practices), and cultural norms in their influence on individuals and groups. Avoids an acontextual focus on individuals. (Hurtado, 2015, p. 291; see also Mertens, 2009)

We followed these guidelines to conduct the review through bringing together scholars who had conducted different types of research on EL students, using differ-

ent disciplinary and methodological approaches. Based on our own empirical research and that of others, we shared an orientation toward emphasizing the importance of precollege experiences in EL students' college access, transition, and outcomes. But together, because of our varied disciplinary backgrounds and expertise, we also had the capacity to address a broader array of social contexts influencing educational opportunities for these students across the K-20 continuum (e.g., policy, history, legal and legislative developments, precollege, college, multiple demographic identities) than any one of us could individually. Thus, we drew on multiple disciplines, data sources, methods, and theoretical perspectives to portray the current status of research on ELs and advance guidelines for future inquiry on this population.

In terms of our methodological assumptions, we framed our inquiry according to two theoretical perspectives: *multi-level intersectionality* (Núñez, 2014a, 2014b) and *forms of knowledge and forms of capital approach* (Rios-Aguilar et al. 2011). Multi-level intersectionality posits that historical conditions, different social contexts or "domains of power" (Núñez, 2014a), and multiple and intersecting social identities simultaneously work together to affect educational opportunities of marginalized groups. Accordingly, the following factors must be considered in examining ELs' transitions to higher education: (a) the historical construction of the EL category—how ELs came to be recognized as having educational rights, (b) associated policy developments shaping the organization of their K-12 education (and indirectly of their postsecondary education), (c) past and current ways of representing ELs through classification and labeling, and (d) the role of potentially related social identities (e.g., immigrant, citizenship status, race/ethnicity, nation of origin, socioeconomic status).

The funds of knowledge and forms of capital approach (Rios-Aguilar et al., 2011) highlights the need to simultaneously examine the varied wealth of resources (including the language practices) embedded in underrepresented students' (and their families') daily experiences with the forms of capitals (i.e., social and cultural capital), as well as these students' needs to access, convert, and/or to activate these resources in order to advance academically. Notably, it also posits that how these resources are evaluated (e.g., in deficit or asset terms) will also shape their opportunities to succeed in school. It integrates a sociological perspective (i.e., the forms of capital) with an anthropology-based funds of knowledge perspective (i.e., varied resources already existing in underrepresented students' family and school daily experiences) to provide a more complete picture of the full range of resources and capabilities that students from marginalized groups have to succeed in postsecondary education. Together, these two theoretical lenses informed our methodological approach to this analysis, by guiding us to:

1. illustrate the necessity of considering other social identities in relation to EL status (e.g., immigration, citizenship, socioeconomic status, race, ethnicity, nation of origin),
2. recognize that a fundamental tension exists between framing ELs' resources, skills, and knowledge as deficits or assets, and

3. indicate our own perspective on that tension – that we fundamentally take an assets-based view that recognizes the potential of ELs, even though some research labels these students in static and dichotomous ways (e.g., not recognizing that skill development can change over time and be measured across a continuum) and frames their linguistic practices (i.e., speaking another language at home and/or being bilingual) as detrimental to their academic success.

One of the reasons that an assets-based perspective is critical is evidence that framing EL students in deficit ways and in terms of limitations rather than resources could have negative long-term consequences. One empirical example involves the case of students classified as Long Term English Language Learners (LTELLs) (Flores, Kleyn, & Menken, 2015). This label connotes limited potential to learn English, and it happens to be correlated with lower school performance outcomes. Most recent research has found that LTELLs are the EL students most likely to drop out of school, and that, compared with other EL students, they tend to be retained in EL programs longer (Hopkins, Thompson, Linquanti, Hakuta, & August, 2013; Olsen, 2010). Consequently, they have less exposure to the academic content that is needed to succeed academically, both in high school and in college (Hopkins et al., 2013; Menken & Kleyn, 2010), which can limit their abilities to enroll in or complete college. Thus, the connotation of the LTELL label that students have limited potential and will not learn English quickly may be related to assignments that separate them from opportunities to take more advanced coursework that would prepare them more to graduate from high school and enroll in college.

Later on, we will examine and compare in depth the labels that have been more commonly applied to EL students and advance an argument for using the term EL. But first, we examine the policy developments that first identified these students as having distinctive rights and correspondingly have shaped services for these students at the federal, state, and local levels.

2.5 English Learner Policy Development and the K-20 Landscape

Understanding the progression of language minority children through the U.S. educational pipeline into college requires a deeper look at the policy development on the politics of language instruction for this diverse group of students at both the federal and state level. This policy development has exclusively occurred at the K-12 system level, and the enforcement of policies at higher levels (e.g., federal, state) has been extremely decentralized; that is, states and districts have had considerable autonomy in deciding how to address the needs of EL students. If EL students are not defined separately and classified consistently at the federal, state, and local levels in higher education, the status of EL policy in K-12 education provides a critical component of the context for understanding how and why systematic policies at the federal and state levels have not explicitly addressed the needs of EL students in higher education.

While EL student policy has not been developed to facilitate higher education enrollment as a direct outcome, legal and historical analyses of the intent of language policy for ELL students suggest that longer term outcomes such as the opportunity to attend a postsecondary institution or the ability to gain meaningful employment may have been part of the indirect goals of this legislation created to ensure greater educational opportunity. Although the No Child Left Behind Act of 2001 stipulated important requirements regarding the recording of progress by English Language Learners (ELs), much latitude in regard to the type of language instruction provided by a district is still largely a matter of state discretion, although the level of discretion from the federal to the state level has varied over time (Moran, 1988). Nonetheless, policy development regarding the education of EL students can be traced back at least to the Civil Rights Act of 1964, which is credited for creating the environment for the first major federal legislation addressing the educational opportunity of ELL students, via the Bilingual Education Act (BEA) of 1968.

The evolving definition of educational rights for these students is instead intertwined with the rights accorded from protection from discrimination by national origin and access to education as a right for participation in the American citizenry via the Fourteenth Amendment of the U.S. Constitution (*Lau v. Nichols*, 1974; *Plyler v. Doe*, 1982; San Miguel, 2004). However, not unlike the rights to a free K-12 public education accorded to undocumented students via another U.S Supreme Court decision, *Plyler v. Doe* (1982), the educational rights of EL students have not extended to higher education and, at the K-12 level, instead have mostly remained mired in debates regarding the type of language instruction to be provided if at all.

Protests to the teaching of languages other than English, separate from campaigns of the violation of language rights of Native Americans, emerged well before the 1960s (Wiley, Lee & Rumberger, 2009). But the Bilingual Education Act (BEA) of 1968, also known as Title VII of the Elementary and Secondary School Act of 1968, was the first acknowledgment of federal responsibility for the educational well-being of language minority students (Petrzela, 2011). Moran (1988) notes that this legislation may have influenced other states to adopt similar legislation, in that between 1968 and 1973, six states adopted similar BEA legislation at the state level and a number of other states repealed statutes mandating English as the only language of instruction. Moreover, evidence of the promise of the long-term benefits of language instruction as a form of opportunity had become part of the policy development of BEA. Hearings leading to the passage of the BEA document involved Hispanic parents and community leaders advocating for the BEA as a necessary step in promoting full participation of linguistic minorities in the social, political, and economic stages of American life and society (Moran, 1988). These leaders argued that educational failure of linguistic minorities resulting from inadequate schooling instruction required interventions. Improved educational opportunity was heralded as a key method for improving the long-term outcomes of Hispanics.

This act was innovative, represented a major political victory for Spanish-speaking groups, and later benefited other non-English speaking students and their families. However, the Act came with limitations. First, according to Petrzela (2011), the Act articulated arguments based on the deficiencies, rather than efforts

to maintain bicultural schooling and practices. Second, the Act came with limited funds (approximately 85 million dollars) that would be insufficient to truly implement and adequately enforce language instruction programs across the country, especially since it was enacted on a voluntary basis (Petrzela, 2011). Despite its remarkable place in educational policy regarding the equal education of children, the Act placed such responsibility on state and local organizations within an environment with little guidance and even weaker enforcement. Such gaps in enforcement would eventually lead to additional court rulings and federal guidance measures through subsequent reauthorizations of the BEA that validated the use of transitional bilingual education programs incorporating native languages, another Supreme Court case in *Lau v. Nichols* (1974), the Equal Education Opportunity Act of 1974, clarifications to *Lau* via the *Lau Remedies (1975)* and federal guidelines regarding language instruction pedagogical requirements in *Castaneda v. Pickard (1981)*.

By the twenty-first century, however, two key policy movements in the education of EL students appeared to dominate policy discussions and decisions. The first was that of a change in the emphasis from transitional bilingual education programs utilizing native language instruction as the preferred method of instruction to that of an emphasis on English language acquisition as noted in the No Child Left Behind Act via the renaming of the BEA to the Title III of NCLB entitled Language Instruction for Limited English Proficient Students. (Mavrogordato, 2012). A clear emphasis on English language acquisition was made prominent in this new federal policy, even if the NCLB Act did not state a preference for the type of language instruction, maintaining the practice of state autonomy on this instructional matter.

The second critical policy development was the introduction of a new era of state policy mandating the restriction of forms of bilingual and/or ESL instruction or mandated English immersion in schools beyond a certain number of years through state voter referenda about whether EL instruction should be provided in public schools, as seen in California, Massachusetts, and Arizona. This policy reality has been recognized in several recent state-based studies on EL student outcomes. Kim and Herman (2009), for example, provided an analysis of three states with various reclassification criteria to avoid substantial differences that might be overlooked in a nationwide analysis. Acknowledging problems associated with the use of cross-sectional data when longitudinal data are not available, the authors' findings suggest that differences in the stringency of state reclassification criteria might influence the reported size of the achievement gap between ELL and non-ELL students across state context (Kim & Herman, 2009). In a multi-state study examining the effects of English language immersion policy in California, Massachusetts, and Arizona, as compared to Texas, using Early Childhood Longitudinal Study, Kindergarten Class of 1998–1999 (ECLS-K) and the National Assessment of Educational Progress (NAEP), separately, Garrett found highly mixed results incorporating a difference-in-difference design. Specifically, her analyses utilizing ECLS-K data revealed no consistent policy impacts on achievement, while results using the NAEP data indicated a modest positive effect of policy implementation on fourth grade math

achievement for all students and a similar modest positive effect on reading achievement for EL students. State level differences were prominent, with EL students from Arizona experiencing a negative effect on math NAEP scores as a result of policy implementation.

Notably, Garrett's study was one of the first econometric analyses of the impacts of statewide English immersion policy. However, the analyses utilized cross-sectional data (the NAEP) that did not account for when a student entered school as an EL student, nor how long the student had participated in language instruction. Meanwhile, ECLS-K data, while longitudinal, could only capture relatively short periods of implementation exposure by the state, given the timing of the cohort and the state policy changes. In both cases, state policy changes were documented only up to middle school grades, with large gaps in achievement assessment at the high school level. In sum, this research suggests that the effects of state policy on the academic achievement trajectory of EL students are becoming of greater importance when taking into account long-term outcomes such as high school graduation and college enrollment, as it is well established that that academic achievement at the elementary and secondary school levels significantly affect the odds of college enrollment.

2.6 Background on EL Students and Their Academic Preparation in K-12

In this section, we review literature on EL students in K-12 education that is most salient to their experiences in higher education. We begin by discussing how EL students are labeled and defined in K-12 research and explain our rationale for calling these students, *EL*, rather than several of the other terms that have been used in the literature. We continue by discussing how these students are identified through practices such as academic testing, as well as how their support services are determined at the K-12 level. Finally, to provide a foundation for our discussion later about demographic characteristics of EL students in higher education, we provide some demographic characteristics of EL students in K-12 here, because research on the K-12 population of ELs is more developed than in higher education literature and because it is important to understand qualities that might shape EL students' K-12 academic preparation system for college.

2.6.1 Defining Terms for English Learner Students in K-12 and Higher Education

Describing, categorizing, and labeling learners of English is a difficult but imperative task in sorting information in the existing scholarship on these students. The difficulty arises initially from the non-specific vocabulary and acronyms used in the