2023 JAMES C. SNYDER MEMORIAL LECTURE WORKING PAPER

Shaping the Future of Higher Education? –
Becoming A Land-Grant University for Our Times[1]

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Professor James C. Snyder

This paper is dedicated to the memory and legacy of Dr. James C. Snyder, a Purdue Agricultural Economics graduate (MS, 1956; Ph.D. 1962) and member of the faculty until his passing in 1974 at the age of 44 – much, much too soon. While brief, his brilliant career defined the very best of a land-grant faculty member.

Professor Snyder's talent as a researcher was recognized early on when he became the first Purdue student to receive the Ph.D. thesis award from the American Farm Economic Association (now Agricultural and Applied Economics Association).[1] He is primarily known for his work bringing sophisticated tools of quantitative analysis, especially operations research techniques, to the managerial problems of food and agribusiness firms. This work was wide-ranging and included applications from feed manufacturing (least cost formulation and inventory management) to ice cream and sausage production (cost and quality production control).

In a 1958 review paper published in *Operations Research*, Snyder and his co-authors were prescient in their discussion of the growing size and complexity of management problems in rapidly expanding food and agribusiness firms and the equally dramatic expansion of data available to help solve such problems – perhaps even foreshadowing uses of artificial intelligence.[2] These many contributions in the application of computing to address management problems led Purdue to name one of its high-performance computing clusters 'Snyder' in 2015 (the cluster was retired in 2021).

His work was not limited to research applications of quantitative tools and he had a robust Extension program. Professor Snyder's applied research and Extension publications encompassed such topics as cost analysis for small commercial banks, surveys on seed corn marketing practices, and in one extension publication, an important problem of food retailers at the time: what to do with empty bottles.[3] Another dimension of his industry engagement was the consulting firm, Snyder Associates, that he owned and operated. While deep relationships with industry were a hallmark of his research and Extension activities, Professor Snyder also made disciplinary and methodological contributions to the field with multiple *Journal of Farm*

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Economics/American Journal of Agricultural Economics articles and a contribution to *Econometrica* in 1970: "A Decomposition Algorithm for Solving the Multi-Facility Production Transportation Problem with Non-Linear Production Costs".[4]

Professor Snyder was widely recognized for his exceptional teaching at both the graduate and undergraduate levels. At the graduate level, under his personalized and rigorous mentorship, students revered him, excelled, and took leading positions in business, education, and government.[1] He was recognized as 'teacher of the year' for his outstanding undergraduate instruction in business management[1] and was deeply involved in developing the undergraduate curriculum in agribusiness management. In a 1969 proceedings paper published in the *American Journal of Agricultural Economics,* "Trials, Errors, and Successes in Agribusiness Education at Purdue", he defined the Department's overall goals for an undergraduate curriculum in agribusiness:[5]

- A broad and liberal education in the social and natural sciences.
- Adequate professional emphasis to enhance student placement and performance with business firms upon graduation.
- Adequate academic emphasis to provide the foundation for graduate work in business management and/or economics.
- Adequate agribusiness emphasis to provide the student with special insights into the unique problems of agribusiness without becoming involved in specific trade practices and problems of any one activity.

One can easily argue these four goals should be the foundation for a curriculum in food and agribusiness management today.

Professor Snyder was an accomplished researcher, deeply involved with industry, a master teacher, and someone who fully leveraged his engagement in all three land-grant mission areas. Given the focus of this paper on future directions for land-grant universities and especially the land-grant learning mission, it is difficult to imagine a more appropriate faculty member to honor with this work than Professor James C. Snyder.

Introduction

The 'value of higher education' has increasingly been called into question and scrutinized by students and parents, employers, the press, legislators/government officials, and the general public with unprecedented intensity over the past decade.[6-9] Headlines ask 'is college worth it?' and questions are raised about the cost and relevance of a college degree.[10-12] Stories of students who have accumulated huge amounts of debt paying for their education – with no job prospects forthcoming – abound.[13] Others have questioned the relevance of a college degree for current and future workforce needs.[14-17] Surveys document declining public support for higher education – both in spirit and in kind.[18-20] What was once held up as the ticket to a better life – a college degree – is portrayed by many critics as a waste of time, money, and taxpayer dollars.

At the same time, studies of lifetime earnings of college degree holders continue to show a substantial financial return to a degree.[21] Other studies have shown higher rates of employment/lower rates of unemployment for college degree holders – a finding even more

robust during recessions/economic slowdowns. Other supporters state the benefits of a liberal education in enhancing quality of life, supporting civic engagement and participation in democratic society, thriving in a multicultural world, and injecting humanity into our increasingly technology-laden future.[22-23] At the national and global level, investments in human capital promote economic growth.

While many higher education institutions are struggling to address the issues raised in this generally negative narrative, other colleges and universities are thriving at present. But, even for those institutions experiencing heady times, the future operating environment presents challenges and questions – challenges and questions that demand careful consideration and, in all likelihood, will require changes in the operating model for continued success – or to return to previous levels of success. Calls for change are nothing new to higher education. However, from the coming decline in the number of traditional college-age students and other demographic shifts, to rising concerns about cost and associated student debt, to rapid developments in learning technologies and new education providers, to employer questions about relevance, to intense political debates about diversity initiatives and free speech protections, to public uncertainty about value, and to funding challenges driven by all of the above, it is not an overstatement to describe the anticipated operating environment as an existential challenge for higher education.

What underlies the decline in public confidence in higher education and can higher education regain relevance and the public's trust in the coming years? How can colleges and universities re-position to create value given the radically different operating environment that is emerging? One specific type of higher education institution may be best positioned to define the way forward. The land-grant university was created in response to a set of national needs in learning, discovery, and engagement – relevance was woven into the original design. These universities, built around the ideas of broad access to a quality education preparing one for life and career, research addressing the most pressing needs of society, and deep engagement with the communities they serve, have been a foundation for economic development and civil society in our nation for the past 150+ years.

But, the times have changed and the future is more uncertain. What does the land-grant ideal mean today and what role can – should – land-grant universities play in shaping the future of higher education? This paper will briefly review the history of the land-grant university with a focus on the three essential elements of the model. Then, factors impacting the future operating environment for higher education will be discussed, with the intent of getting below the 'headlines'. The primary focus will be residential undergraduate educational programs. The final section will present ideas on how a land-grant university can position for relevance and societal impact in the anticipated operating environment – and be a model for all of higher education in the process.

Our Land-Grant Foundation[2]

On July 2, 1862, President Abraham Lincoln signed into law what is now known as the Morrill Act. This legislation, passed during one of the most challenging periods of U.S. history, effectively framed the educational mission of the land-grant university ('college' at the time) and provided resources in the form of grants of federal land for the establishment of these path-breaking institutions.[24-25] Senator Justin Smith Morrill of Vermont had worked for years to make his dream of a 'peoples' college' a reality – actually getting the bill through Congress in 1859, only to have President James Buchanan veto it. Much is made (and rightly so) of the bill's signing during the middle of the U.S. Civil War, though the Morrill Act may have actually been passed *because* of the war – many of the opponents of the original bill were Southern legislators, and provisions were added to the bill to teach 'military tactics' as the Union faced a shortage of officers, creating even more support for the bill among the now Union Congress.

While Senator Morrill is deservedly given credit for the creation of the land-grant university concept, Jonathan Baldwin Turner, an Illinois native and a Yale educated farmer, newspaper editor, and professor at Illinois College was an early champion of the idea of a college for the 'laboring class'.[24-26] His 1850 "Plan for a State University for the Industrial Classes" described many of the elements seen today in the land-grant model. Turner's influence (if any) on Morrill's vision is the subject of debate, but having this strong champion from Illinois for the idea likely had some influence on securing President Lincoln's support.

While much of the language in the First Morrill Act focuses on how these colleges would be funded, the purpose of the land-grant college was stated as follows:

> "...the leading object shall be, without excluding other scientific and classical studies and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life." (Act of July 1, 1862, First Morrill Act)

This language is visionary and was radical for a time when higher education generally followed the British, religious model and was primarily limited to wealthy males on the east coast. The language describes an educational institution with a much broader and ambitious agenda. Morrill, in an 1887 speech at the Massachusetts Agricultural College, provided an eloquent perspective on the land-grant idea:

> "It would be a mistake to suppose it was intended that every student should become either a farmer or a mechanic when the design comprehended not only for instruction for

[2] This section provides a brief overview of key moments in the history of land-grant 'colleges'. Many comprehensive histories are available including the two-volume set of essays edited by Alan I. Marcus: *Science as Service: Establishing and Reformulating American Land-Grant Universities 1865-1930* and *Service as Mandate: How American Land-Grant Universities Shaped the Modern World*.[27-28] Crow and Dabars review the evolution of higher education in Chapter 4 of their book *The Fifth Wave: The Evolution of American Higher Education.*[29] Fred Whitford has chronicled the land-grant history of Purdue's College of Agriculture in his several books including *For the Good of the Farmer: A Biography of John Harrison Skinner, Dean of Purdue Agricultur*e and *Scattering the Seeds of Knowledge: The Words and Works of Indiana's Pioneer County Extension Agents*.[30-31] David Ching has authored recent articles that address the history and contemporary interpretation of the land-grant idea at Purdue (Ching).[32]

> those who may hold the plow or follow a trade, but such instruction as any person might need – with 'all the world before them to choose' - and without the exclusion of those who might prefer to adhere to the classics."

In 1890, the Second Morrill Act was passed, and a group of (now) 19 land-grant colleges serving African American students were created in segregated states. Then, in 1994 land-grant status was conferred on the nation's 29 Native American serving institutions (Tribal Colleges). Today, there are 111 land-grant universities and colleges enrolling more than 2 million students annually.[26]

The research role of the land-grant university was formalized in 1887 with the passage of the Hatch Act which established an 'agricultural experiment station' to be associated with each land-grant college. The act charged these experiment stations as follows:

> "to conduct original and other researches, investigations, and experiments on and contributing to the establishment and maintenance of a permanent and effective agricultural industry in the United States, including researches basic to the problems of agriculture in its broadest aspects, and investigations as have for their purpose the development and improvement of the rural home and rural life and the maximum contribution by agriculture to the welfare of the consumer..." (Hatch Act of 1887)

While focused appropriately on agriculture at the time, this idea of research to improve an industry, and in the process enhance the lives and livelihoods of broader society, has shaped the research agenda of land-grant universities since. Use-inspired research, purpose-driven research, research on grand challenges – whatever the name, the notion that land-grant universities will conduct research that enhances the well-being of those they serve by addressing important issues faced by their 'stakeholders' is the second mission of the land-grant university. (It should be noted that other non-land-grant public and private research universities have embraced these ideas of research for the good of their stakeholders and broader society.)

The third element of the tripartite land-grant mission was established with the Smith-Lever Act of 1914. This act launched the Cooperative Extension System, effectively bringing the land-grant colleges' education and research activities to the broader public – those 'communities' not served directly by campus-based efforts. The Smith-Lever Act expresses this idea as follows:

> "Cooperative agricultural extension work shall consist of the development of and practical applications of research knowledge and giving of instruction and practical demonstration of existing or improved practices or technologies ...to persons not attending or resident in said colleges in the several communities and imparting information on said subjects through demonstrations, publications, and otherwise..." (Smith-Lever Act of 1914)

The general idea was 'extending' the college to the people and ensuring that educational and research benefits would flow to broader society – arguably the most distinctive feature of the land-grant idea.

Over time, the 'extension' concept has been refined and expanded – most importantly with the work of the Kellogg Commission on the Future of State and Land-Grant Universities in 1994. Born out of rising public concern with the responsiveness and relevance of universities, this Commission of 23 land-grant and public university presidents and chancellors defined the engaged university as:

> "an institution that has redesigned their teaching, research, and extension and service functions to become even more sympathetically and productively involved with their communities, however community may be defined" (*The Engaged Institution*, page 9).[33]

The report asserts the engaged university must accomplish at least three things (*The Engaged Institution*, page 10):[33]

- "It must be organized to respond to the needs of today's students and tomorrow's, not yesterday's.
- It must enrich students' experiences by bringing research and engagement into the curriculum and offering practical opportunities for students to prepare for the world they will enter.
- It must put its critical resources (knowledge and expertise) to work on the problems the communities it serves face."

As described in the section below, higher education today finds itself in a radically different operating environment relative to the formative years of the 'land-grant colleges'. Former Purdue President Martin Jischke, in the 2004 Justin Smith Morrill lecture, outlined the key changes land-grant universities were facing at that time and proposed a set of areas of focus for "a contemporary land-grant mission for a new century".[34] First among these areas was expanding the land-grant mission beyond agriculture to all sectors of society. Jischke also called on land-grant universities to build on their historical missions of learning, discovery, and engagement, to embrace change, and to reposition their historical mission areas to serve a fast-changing world. In Jischke's words:

> "The land-grant agenda of access, practical and liberal education, basic and applied research, along with outreach, extension, and engagement, is now clearly shared with many, many other institutions....land-grant universities must be distinctive because of their excellence in learning, discovery, and engagement, their commitment to access and opportunity, and their commitment to civic-minded engagement with the most important issues facing society..."

The idea of an engaged institution underlies the central theme of Gavarri and Gee in the more recent (2018) *Land-Grant Universities for the Future* where they issue a call for 'servant universities' – defined as "institutions of higher learning that directly and unequivocally give primary emphasis to the stewardship responsibilities they have been given by society to provide for the development and well-being of its communities" (page 34).[22] Fischer provides a number of specific examples of land-grant community engagement initiatives aligned with the idea of a 'servant university'.[35] Like Jischke, Gavarri and Gee call for land-grant universities to build on their heritage, respond to societal challenges and criticisms, and define a distinctive position in higher education:

> "...universities will regain the high ground only when it is certain that the public at large is experiencing a more harmonious relationship with its land-grant institution...land-grant institutions must position themselves as standing for distinctly different values than all other universities public and private" (pages 2-3).[22]

What actions should the contemporary land-grant university take to find or reclaim its distinctive place among institutions of higher education? Can that distinctive position – or elements of it – serve as a model for other colleges and universities? Before answering these questions, some of the key challenges, concerns, opportunities, and issues facing higher education today and going forward will be reviewed. The primary focus will be the learning/teaching mission, though many of the issues below have implications for the research/discovery and engagement/Extension mission areas.

The Current and Projected Operating Environment

Overview

To say the public narrative about 'higher education' over the past decade has been negative is an understatement. (While critics/authors don't often specify what they mean by 'higher education', in most cases the focus appears to be the traditional, 4-year residential college experience – and that will be the primary focus here.) The criticisms include the cost of a college education, the debt that students take on, the relevance of curricula, the structure of and constraints on the experience, and questions about learning: does any occur? Higher education also has been criticized for not being accessible to underrepresented groups and for the lower levels of success of these students when they are admitted. Views of higher education are divided by political affiliation, with among other concerns, the left focused heavily on cost, equity, and access and the right concerned with relevance, free speech, and lack of diversity of thought. These criticisms and others have led to overall questions about the value of a college degree – is it worth the money and time required?

The concerns and questions play a role in the decline in college-going rates by high school graduates. And, this decline is on top of a general decline in the number of high school graduates – a decline that will accelerate markedly after 2025 due to reduced birthrates post-Great Recession. Higher education institutions are also facing the rapid emergence of alternatives to the traditional 4-year degree, many made possible by advances in digital technology – and motivated by frustration with the traditional model. The end result is an undermining of trust in higher education as an institution and faith in the value of a college degree. What was once viewed as necessary for a better life is now viewed by many students, families, and employers as optional at best, and irrelevant at worst.

All of that said, and as with any complex issue, there is much more underneath each of these points – including the benefits of a college education. A more nuanced understanding is essential if higher education is to respond appropriately, earning back the public's trust. These key criticisms and concerns and the value provided by a college education will be explored in more detail below.

Cost

One of the most frequent criticisms of higher education is rising tuition – tuition that has increased faster than the rate of inflation for decades. Published in-state tuition for 4-year public universities (inflation adjusted – 2022 dollars) was $4,870 in 92-93, increased to $11,060 in 12-13, and had declined slightly to $10,940 in 22-23 (Table 1). Using 92-93 as a base, adjusted for inflation, published tuition was 2.25 times higher in 22-23 relative to 92-93, down from a peak of nearly 2.5 times higher than 92-93 during the 17-18 to 20-21 period. Much of this run-up happened from 92-93 to 12-13 – increases in published tuition by 4-year public universities have been much more modest over the past decade. Indiana ranks 20th (low to high) in published in-state tuition for 4-year public universities at $10,040 in 22-23, slightly below the U.S. average.

Table 1. In-State Tuition, Grant Aid, Net Tuition, and Net Cost of Attendance for 4-Year Public Universities

Year	Published In-State Tuition	Grant Aid Per Student (Not Loans)	Net Tuition and Fees Paid by Students	Net Cost of Attendance*
92-93	$4,870			
06-07	$8,440	$4,760	$3,680	$19,100
12-13	$11,060	$7,000	$4,060	$21,400
22-23	$10,940	$8,690	$2,250	$19,250

*Includes room, board, books, supplies, transportation and other personal expenses.
Source: Ma and Pender, College Board, CP-2, CP-3, CP-9.[36] Inflation-adjusted, 2022 dollars.

However, given the complexities of higher education pricing, published tuition and fees are not helpful in understanding the investment a student and their family actually makes in a college education. The story looks different when net tuition and fees are the focus. Net tuition and fees represent published tuition and fees less grant aid provided to students (not loans) (CP-9).[36] Published tuition and fees were $8,440 for in-state students at 4-year public universities in 06-07, grant aid was $4,760, making the net tuition and fees paid by the student $3,680 (43% of total) (Table 1). In 22-23 the net tuition and fees paid by the student were $2,250 (21% of total) (Table 1). Net cost of attendance is basically unchanged on an inflation-adjusted basis since 2006-07 as grant aid primarily impacts tuition and fees (Table 1). The patterns are similar for private nonprofit 4-year institutions (CP-10)[36], but the absolute amounts are far higher. Grant aid per student has climbed dramatically for these institutions as they have increased institutional grant (discount) programs, but net tuition at private non-profits at $14,630 was about 6.5 times the $2,250 net tuition for in-state students at public 4-year universities in 22-23.

State appropriations in support of higher education operating costs (not capital, medical school, etc.) per student FTE increased for the 9th straight year in 2022, though these state investments have yet to return to the pre-recession levels of 2001 and 2008.[37] Some of the recent increases in per FTE support can be attributed to federal COVID-19 funding that states chose to allocate to higher education, as well as an overall decline in the number of students enrolled in higher education. The U.S. average was $9,327 per student in state and local funding in 20-21, the highest since $9,963 in 2000-01 (inflation-adjusted – 2021 dollars) (Figure 2.1).[37] In 20-21, Indiana invested $6,060 per student FTE in higher education – 5 states invested less (CP-12).[36]

Total education revenue is the sum of education appropriations and net tuition and fee revenue, excluding net tuition revenue used for capital debt service.[37] The student share is the proportion of total education revenue that comes from net tuition and fee revenue, reflecting how dependent the institution is on tuition and the investment required of students and their families.[37] The student share tends to increase with recessions as state support for higher education pulls back and declines as state revenues and commensurate investments in higher education recover. In 1980, the student share was 21% of total education revenue, increasing to 42% in 2021. The 2021 figure was down some from the all-time high of 48% in 2013.

Getting at the specific 'why' costs of higher education are increasing faster than inflation is not straightforward. And, this concern is not new, going back to at least 1910 and Morris Cooke's report on "Academic and Industrial Efficiency". In the report Cooke states, "the cost of university education has risen throughout the world, but nowhere more rapidly as in the United States...not only is this true, but the whole demand of the American University today is for more money".[38] Cooke viewed such growth "unsustainable".

The Economist magazine states that "higher education suffers from Baumol's disease – the tendency of costs to soar in labour-intensive sectors with stagnant productivity".[37] They go on to assert increasing higher education costs are the result of "pricey investments in technology, teacher's salaries, and administrative costs".[37] Some argue reduced teaching loads for tenure/tenure track faculty are part of the issue.[39] One higher education consulting practice focused on efficiency and productivity blames higher education inefficiency on decentralization and lack of scale economies, failing to use data in decision making/change management processes, and unwillingness to "reverse commitment to resources" or unwind initiatives once they have served their purpose.[38] Still others blame increasing costs on programs of study that are longer than they need to be (too many credit hours) and a proliferation of course offerings, many of which are too under enrolled to be 'efficient'.[39] This list is far from complete.

Even defining what efficiency and productivity mean in higher education is not straightforward. Goal: Lower the cost per student? Response: The quality of the student experience is being compromised. Goal: Lower the cost of instruction specifically? Response: Full-time faculty are being replaced by adjunct faculty who are not fairly compensated. One (perhaps overly simple) metric of productivity is cost per degree – taking an institution's total annual educational costs and dividing by the number of degrees awarded. Using this metric, McKinsey found the most efficient 25% of U.S. universities to be 34% more productive than the mean level of productivity.[40] While helpful in characterizing the extreme variation in one metric which reflects productivity, this analysis ignores factors such as quality – are all degrees created equal? Regardless of how defined, how measured, or what the root causes are, the push for more productivity and efficiency – and lower cost – in higher education is neither new, nor likely to abate.

Debt

Another frequent criticism of higher education is the 'massive' debt that students accumulate when acquiring their degree.[13] Indeed, the Federal Reserve reports that student debt totaled $1.76 trillion dollars in December 2022.[42] This is up from $243 billion in 2003 and is

regularly called out as a national crisis, a major drag on the economy, and an unconscionable factor constraining the future success of student debt holders.

While the overall amount and trend in student debt should be a source of concern, it is also important to unpack the $1.76 trillion figure both over time and across borrowers. First, on an inflation-adjusted basis (2021 dollars), annual student borrowing climbed rapidly from $66.8 billion in 2001-02 to $141.6 billion in 2010-11.[35] However, since 2010-11, annual student borrowing has dropped for 11 consecutive years to $94.7 billion in 2021-22 – about the same level it was in 2004-05.[36] About 90% of this debt is held by the federal government, the rest in private loans. Graduate and professional (medicine, law, etc.) students have made up an increasingly greater proportion of total federal student loan borrowers over time – in 2006-07 graduate/professional students were responsible for about 38% of total annual federal borrowing and by 2021-22 that figure had increased to 48%.[36]

Some 54% of bachelor's degree recipients (public and private) graduated with debt in 2020-21 and the average debt load was $29,100 (SA-14A).[36] For public four-year institutions, the figure was $27,400, up from $25,000 in 2005-06, but down from $30,400 in 2015-16 (all figures in 2021 dollars). A real concern here is the debt held by students who failed to graduate. These students have taken on the obligation of repaying loans, but do not have the degree-credential and the potential earning power it represents. A widely reported statistic suggests that 40% of students holding debt failed to graduate, but this figure is based on a limited survey of students in 2012-2017 – no readily available data are available on this important point.[41]

The distribution of federal debt is also an important and underreported part of this story. Of the $1.6 trillion dollars in federal student debt held in the second quarter of 2022 by 45.3 million borrowers, 32% owed less than $10,000 and another 21% owed between $10,000 and $19,999 – 53% of all federal student loan borrowers owed less than $20,000 (SA-11).[36] At the other extreme, 1 million borrowers (2.2%) owed $200,000 or more and another 2.4 million (5.3%) owed between $100,000 and $199,999. 7.8% of federal student debt borrowers, each owing $100,000 or more, held 38% percent of all federal student loans in the second quarter of 2022.

Completion

Completion rates are another area of concern – put simply, too many students that start college don't finish. The National Student Clearinghouse Research Center publishes comprehensive completion data for higher education – reporting completion rates for all who start college, no matter where they finish.[44] Nationally, there has been some improvement in completion rates since 2006. The six-year completion rate was 54.1% for the 2006 entering cohort and climbed to 62.3% for the 2016 cohort. The six-year completion rate in Indiana was 66.4% for the Fall 2016 cohort, slightly above the national average. Looking only at public 4-year universities, the figures are 54.1% for the 2006 cohort and 68% for the 2016 cohort. However, most of this increase was achieved prior to 2012, and the completion rate across all types of institutions has been relatively flat since 2013.

Two other persistent and concerning trends are found in this data. There are important gaps in completion across racial and ethnic groups. For the 2016 entering cohort, the six-year completion rate for 4-year public universities was 80.5% for Asian American students, 73.5% for

White students, 57.1% for Hispanic students, and 50.2% for Black students.[44] There is also a substantial difference in the completion rates for men and women – women complete their degree at a substantially higher rate than men. Since 2008, the gap between the completion rate for women and men has hovered in the 6-7% range, reaching 7.1% for the 2016 cohort (page 6).[45] These completion gaps represent a major issue that to date higher education has been unable to address.

Emerging Alternatives and Competitors

Alternatives to a traditional 4-year residential college education are not new. Short courses, certificate programs, technical education, apprenticeships, firm-specific/industry training and professional development, correspondence courses, and now online programs have been available to high school graduates for decades in many cases. However, beginning in the early 1980s, the proportion of job openings requiring postsecondary education and training began a sharp climb, from 28% in 1973 to 64% in 2020, and with it demand for the college diploma and correspondingly, college enrollments.[47,21]

The situation is beginning to change.[6,47-49] With a tight job market brought on by slow growth in the U.S. workforce, the Great Resignation (COVID-19), changes in immigration policy, and an increase in demand for those with high school skills, employers are re-thinking the need for a college degree for many jobs.[46,50-51] Burning Glass has reported that the proportion of job openings requiring a four-year college degree has declined from 51% in 2017 to 44% in 2021.[52] Dropping the degree requirement has fired interest in alternatives to a 4-year residential college education, leading some authors to state 'non-degreed training is a growth industry' (page 56).[50]

A study by Burning Glass described this phenomenon as 'The Emerging Degree Reset'.[48] This study reviewed 51 million job postings over the 2017-2019 period. The focus was on 'high skill' jobs (jobs where a college degree is required more than 50% of the time – 25% of the total) and 'middle skill jobs' (jobs where degrees are required from 25% to 50% of the time – 36% of the total). Results showed that 46% of the middle skill occupations and 31% of the high skill occupations experienced 'material' degree resets over the period, with college degree requirements replaced with more specific skill requirements.

The report also explored the potential duration of these resets: degree resets were classified as 'structural' when the degree requirement was dropped for an extended period of time (basically starting before the pandemic and continuing through the pandemic) and 'cyclical' when the degree requirement was dropped during the pandemic. Cyclical resets, where degree requirements may return when unemployment increases, represented 27% of the total. Structural resets were 63% of the total meaning the college degree requirement is not as likely to return for 2/3 of these jobs.[48] Structural resets were more common in occupations with significant technical or analytical requirements as well as managerial positions and cyclical resets were more common in the health professions, with the 'reset' driven by the surge in demand for these professions due to the pandemic.

This 'reset' has led some to speculate that while the college degree was once a proxy for a set of difficult to assess employee skills such as persistence, ability to learn, etc., employers are now finding more targeted ways of identifying and preparing students with the specific skills they seek.[51,48] (An alternative perspective here would be that a college degree better prepares

an individual to learn and adapt as their career unfolds in a dynamic, rapidly changing work world.)

Comprehensive data on short-courses, certificates, and other credentials is not readily available. Available data on one form of non-degree training, apprenticeships, shows participation in these programs is growing.[53] And, an ECMC study reported that 1/3 of teens would attend a Career and Technical Education School if it were considered as valuable to employers as a four-year degree.[54] Attitudes about online education have turned more positive since COVID-19. The Varying Degrees report shows 34% of those surveyed thought the quality of online instruction was 'the same' as in-person instruction in 2021. This figure had increased to 47% in 2022, with another 8% believing the quality of on-line instruction was *better* than in-person instruction.[19] Artificial intelligence (AI) offers immense potential for advancing on-line professional development/technical training. Of course, these online/digital tools are also being used to enhance the traditional residential college model and K-12 education.[55-56] The implications of AI for the residential college experience could easily merit a separate and extensive treatment as another factor shaping the higher education operating environment.

Value

The concerns explored above raise fundamental questions about the 'value' of higher education – plainly, do the benefits exceed the cost of a college degree? The costs of college were discussed above – what kinds of potential benefits are provided by a traditional, residential college education? The 'value' of a residential college degree is comprised of a complex set of attributes/benefits. One is the educational benefit a student enrolled in such a program receives which can include specific content mastered, development of capabilities such as critical thinking, writing, and speaking, and expansion of the student's world view through exposure to new ideas, cultures, history, etc. Another benefit is professional as students develop specific skills of interest in the work world – the ability to lead, to solve problems, work in teams, to address conflict, to engage with individuals of different backgrounds, and so on. There is also the potential for social benefit creation where students mature as individuals, become more independent, and develop life skills that will support their full engagement in a democratic society. This benefit also includes the network of individuals a student develops while in college – a network that will likely support their career and personal success after graduation.

Many of the above benefits are personal and accrue to the student. Beyond such personal benefits, the development of human capital can benefit the public and the economy more broadly, providing an educated citizenry and workforce to help support a democratic society and economic growth. Individual firms and organizations may benefit from access to talent that is now better prepared to enter the workforce as productive employees. In a more cynical view, some have argued the benefit of higher education is as a sorting mechanism, with the screening that occurs during the admissions process identifying individuals with intellectual talent, and individuals completing college as having the persistence to see a major endeavor through to completion – regardless of any educational benefit the student might possibly receive on campus.[12]

These benefits may manifest in a variety of ways, likely the most discussed being higher lifetime career earnings for those with a college degree. Another signal of value is that unemployment levels decline with education level, and especially so in recessions.[46] Over time,

the number of jobs requiring postsecondary education has escalated, from 28% in 1983 to 68% in 2021, making additional education essential to compete for a position.[48] However, as mentioned above, more firms and government entities are relaxing the requirement of postsecondary credentials/a college degree. Other benefits of college include greater levels of civic engagement, better health, and paying more taxes (on higher levels of lifetime earnings).[23] The full set of benefits from a residential college learning experience is obviously complex, and here the primary focus will be lifetime earnings.

Career earnings data have shown a 'college premium' for years – those with college degrees earn substantially more over the course of their careers than those without. One recent analysis reports the median lifetime earnings of a Bachelor's degree holder at $2.8m, 40% higher than the $2m reported for an individual holding an Associate's degree, 47% higher than the $1.9m for an individual completing some college, and 75% more than the $1.6m reported for a person with a high school education.[21] Over time, the premium (Bachelor's degree relative to a high school diploma) grew rapidly from around 35% in the early 1980s, to 60% in the early 2000s, before stabilizing in the 60-75% range.[46] This premium is relatively stable over the course of a career for those with a Bachelor's degree at about 1.9 times those with a high school diploma, but widens dramatically with age for those holding professional degrees.[21]

However, median career earnings are only part of the story – the distribution of earnings matters and there is substantial overlap across levels of educational attainment. For example, 28% of those with Associate's degrees and 16% of those with a high school education report lifetime earnings greater than 50% of those with Bachelor's degrees.[21] Undergraduate major matters as well with median lifetime income for engineering and computer/data science majors at $3.6-$3.8m compared to $2-$2.2m for psychology, social work, and education majors. That said, even here the distribution matters and there is a substantial lifetime earnings overlap between different majors with the high end of most majors exceeding the low end of others. It is also important to note these differences vary substantially across the U.S. Indiana has some of the highest lifetime earnings for high school and Associate degree holders, and is in the second tier of states for lifetime earnings of those with a Bachelor's degree – compressing the 'college premium' in this state.

How do these myriad factors of cost, debt, completion, lifetime earnings, employment, among others, impact the publics' attitudes toward higher education? A number of studies and surveys track such perceptions and the results are decidedly mixed. One of the most extensive studies involved interviews with 340,000 individuals over the 2016-2019 period.[57] Asked if their education was worth the cost, only 40% of Bachelor's degree holders strongly agreed it was. The figure was 57% for those with vocational/technical credentials and 50% for graduate degree holders. Not surprisingly, field of study mattered and these figures were higher for majors more closely aligned with career fields such as health care and engineering.

Exploring the same idea from a different angle, a 2022 survey found 51% of the respondents believed an Associate's degree, technical certificate, or high school education was 'the minimum needed to ensure financial security'.[19] The same survey found 76% agreed/strongly agreed that 'education beyond high school offers a good return on investment for the student' and 67% agreed/somewhat agreed that 'public four-year colleges and

universities are worth the cost' with the other one-third strongly/somewhat disagreeing with the statement.

Another 2022 study asked respondents if they agreed more with the statement 'a college education is still the best investment for people who want to get ahead and succeed' or the statement 'a college education is a questionable investment because of high student loans and limited job opportunities'.[58] The results overall were literally dead even – 49% agreed with the first statement, and 51% agreed with the second. There were significant differences by political party with 41% of those identifying as Republicans agreeing with the first statement while 60% of those identifying as Democrats did. Perhaps most alarming, those in the 18-34 age group agreed with the second statement at substantially higher rates than those older than 34. Key concerns expressed by respondents were student debt, inadequacy of financial aid to cover cost for low-income students, and employers who demand college degrees for jobs that don't really require them.[56] Some of these concerns likely underlie another study of teen attitudes toward higher education which found that the percentage of high school students considering a four-year degree had fallen from 65-71% in 2020 to 51% in January 2022.[54] An important point here is how the respondents define 'college'. Differences in quality, experience, models, outcomes, etc. across institutions are not picked up in such questions.

For more than 40 years, the most important reason given by students and families for attending college is to get a better job, rating higher than to secure a general education/appreciation of ideas.[59] Given this primary objective, are students prepared for today's work world? Again, views are decidedly mixed. One 2014 survey by Gallup reported that while 96% of university and college chief academic officers thought their institutions were doing a good job preparing students for the workforce, just 14% of the general public and only 11% of business leaders strongly agreed that graduates had the necessary skills and competencies to succeed in the workplace (page 15).[53] Beyond this gap between academic and business perspectives, surveys have shown that students believe that they are better prepared for the workplace than employers do. For example, a 2018 survey by the National Association of Colleges and Employers reported that while 89% of graduates rated themselves proficient with respect to 'professionalism and work ethic' and 79% rated themselves proficient at 'oral and written communications', comparable figures for employers were 43% and 42%.[60]

The recent *Chronicle of Higher Education* report (2022) entitled "Building Tomorrow's Work Force: What Employers Want You to Know" pulled together a number of studies and personal interviews exploring this question of preparation for the work world.[53] The tension between developing professional (soft) skills and technical skills, the (slow) pace of curricular change, and the lack of effective communications and productive relationships with employers (especially small and mid-size firms) were all raised as concerns. On the other hand, the report also questioned if employers were asking for more out of graduates than is possible to deliver in a traditional 4-year degree program. In addition, the point was made that a residential learning experience affords personal and professional growth opportunities that short courses and boot camps cannot deliver. Many ideas for moving forward were advanced and communications was a central theme, with points from Carnevale's essay perhaps the most insightful:

> "It might seem too crass to think about higher education as a commodity instead of a place where learning happens for learning's sake. But colleges must grasp that they can

> talk simultaneously about lofty purposes and converting knowledge into dollars. Students desire both, and to deny that is self-defeating." (page 56)[50]

How should higher education respond to such questions from employers? The Strada/Gallup study explored factors that impacted what they term 'career value' – the student's education made them attractive job candidates. Most of the actionable items related to support in preparing for a career – career relevant curricula, skills useful in daily life, applied learning, career advising, and academic advising.[57] The Public Agenda study referenced earlier also asked about the highest priority areas of focus for public universities.[58] Affordability and access to all students topped the list, followed by teaching students the skills they need to succeed in their careers. Providing students with a broad base of knowledge and strong critical thinking skills and effective guidance and advising to help them complete their degree were a lower priority to the respondents.[57] A challenge here is helping students/parents understand the importance of so-called lifelong learning skills: in a work world where the half-life of job specific training is likely to be exceedingly short, capabilities such as critical thinking, ability to learn, data literacy, etc. become even more important to career success.

Digging a bit deeper into concerns about the value provided by higher education, when asked if money is spent wisely in public 4-year colleges and universities, 38% believed it is and 39% did not.[19] Similarly, 43% believed that public four-year colleges and universities are run efficiently, while 34% do not. More broadly, 42% of the respondents believe colleges and universities are having a negative effect on the way things are going in this country today.[19] The Public Agenda survey found that 66% of the respondents agreed/strongly agreed that colleges were stuck in the past instead of meeting the needs of today's students.[58] Perhaps summarizing the general conclusions about value, Carnevale stated:

> "Without a close focus on outcomes, higher education risks being marginalized, its proponents written off as out-of-touch elitists....Colleges are facing a Judgement Day they have long avoided by riding the waves of increased economic value since the 1980s. In this favorable environment, colleges got complacent. They copied the elites rather than innovated. They became bloated and unmanageable, resembling department stores of yesteryear (page 56).[50]

While harsh, the implied challenge to build an appropriate operating model which will deliver outcomes for the students of focus looks to be good advice.

Demographics and Enrollment

College enrollment levels are influenced by a number of factors, but fertility rates and their impact on high school completers is fundamental. Carey (2022) provides an overview of fertility rate cycles going back to the 1950s and the resulting impacts on enrollment. 4.3 million children were born in 1957 – a figure not matched for the next 50 years.[61] The resulting decline in the number of births after 1957 led directly to bleak college enrollment forecasts in the 1970s as the number of high school completers declined from 3.1 million in 1976 to 2.5 million in 1994. However, the dire forecasts did not materialize. Over this period the labor market changed dramatically as the number of high-paying blue-collar jobs collapsed and more women entered the labor force – a college credential became much more important for the proverbial 'well-

paying job'.[61] The result was an increase in the immediate college enrollment rate from 51% in 1975 to 67% in 1997, offsetting the decline in the sheer number of high school graduates.

As in the late 1980s and early 1990s, the effect of the post Great Recession decline in birthrates is now beginning to impact college enrollments. In 2007, 4.3 million babies were born and that number had declined to 3.4 million in 2021.[61] Undergraduate enrollment peaked at 18.1 million in 2010 and has fallen to 15.1 million in the Fall of 2022 – a 17% decline. As recently as 2017, undergraduate enrollment was 17 million, so enrollment has declined 11% in the last 5 years.[62] Beyond the impacts of birthrates, COVID-19 is widely believed to have had a negative impact on college-going behavior.

While all regions of the U.S. lost undergraduate students from 2017-2022, undergraduate enrollments were down 15% in the Midwest and only 8.5% in the South.[62] The enrollment decline did slow substantially in the Fall of 2022, and enrollments actually increased in the South and the West. Indiana undergraduate enrollment has declined 12% from 312,151 in Fall 2017 to 273,217 in Fall 2022 – about 12%.[62]

These general trends vary dramatically by type of institution: of the 1.9 million student decline in enrollment from 2017-2022, public 2-year institutions lost 1.5 million undergraduate students and public 4-year institutions lost 300,000 undergraduate students.[62] Among 4-year public institutions, students have been migrating from regional public universities and colleges to the flagship institution in the state. Between 2010 and 2021, 28 states reported growth in flagship enrollment while regional public enrollment declined.[63]

The number of students beginning college immediately after high school is another major determinant of college enrollments. In 2010, 68% of high school graduates immediately enrolled in college.[64] In 2020, that figure was 63%. Again, there is a major difference across types of institutions with the immediate college enrollment rate moving from 41% in 2010 to 43% in 2020 for 4-year institutions – this figure peaked in 2016 at 46%. Over the same period, the immediate college-going rate for 2-year colleges declined from 27% to 20%. In Indiana, the immediate college-going rate has been on a steep decline over the past five years, falling from 65% in 2015 to 53% in 2020.[65] There is some recent evidence that while still a tiny proportion, more 18-24 year-old students are enrolling in fully on-line programs with the 0.28% of high school students planning to attend college fully online in 2020 (pre-pandemic) and .72% planning to do so in 2022.[66]

Women continue to enroll in college at far higher rates than men and for the 20-21 academic year 59.5% of college students were women compared to 40.5% for men.[67] The race/ethnicity profile continues to change with the proportion of students identifying as Hispanic or Asian increasing, and the proportion identifying as White declining (Table 2).

Table 2. Proportion of Total Enrollment in Higher Education by Race/Ethnicity

Year	White	Hispanic	Black	Asian	Other
2011	60	14	14	5	7
2021	51	21	14	7	7

Source: National Student Clearinghouse Research Center.[62]

International student enrollments are under pressure due to a variety of factors: cost, political tensions (especially with China), more domestic opportunities in students' home countries, immigration and visa issues, cost, etc.[68]

Grawe provides detailed projections to the year 2034 of college enrollment by type of institution, by region, and by race/ethnicity.[69] These projections consider fertility rates, immigration, and migration across states, as well as college-going rates. As a result of the 10% decline in fertility rate in the aftermath of the Great Recession, the pool of prospective college students will drop abruptly beginning in 2026. An uptick in total births in 2014 and 2015 moves the projected pool of college students back up slightly in the early 2030s, before declining fertility rates again become the primary driver and the pool of prospective college students begins to decline.

Regionally, interstate migration patterns show population moving away from the Northeast and the West coast and toward the Southern and Southwestern parts of the country. Three other general trends are highlighted: 1) an increase in the Asian American population and rising education level of parents suggest general growth among selective institutions; 2) greater diversity across all prospective student pools; and 3) a plateau among first-generation students as increases in college-going rates have produced increasingly educated parents.[67]

Summarizing the Grawe projections, with 2018 as 100, the college-going population is projected to peak in 2025 at 104%, before falling to 93% in 2030 (page 28).[69] After the 2030-2032 rebound, the 2034 projection is 95% of 2018. This general pattern is projected for two-year, regional four-year, and national four-year universities, though it is not as pronounced for national four-year universities. Elite institutions climb to 114% of 2018 in 2025, recede slightly to 109% in 2029, before growing again to 116% of 2018 in 2034. (Regional universities fall outside the top 100 on the *U.S. News and World Report* rankings. National four-year universities are universities and colleges ranked 51-100 in the *U.S. News and World Report* rankings. Elite institutions are in the top 50 colleges and universities on the *U.S. News and World Report* list) (page 29).[69]

The impact of the declining pool of 18-year-olds is far more negative in the Northeast and Midwest relative to the South and West. For national four-year universities, enrollment at Midwest institutions in 2034 is projected at 85% of 2018, while enrollment in the West at these schools is projected at 120%. Focusing on public versus private institutions, the regional trends are similar with the exception of the South – projections for Southern public universities follow the enrollment pattern for Midwest and Northeast institutions (declining enrollment) while Southern private universities follow the West (growing enrollment) (page 52).[69]

The racial/ethnic composition of the prospective college student pool is projected to change dramatically over the next decade. Again, using 2018 as a base, and focusing on national and elite four-year institutions, college-going Asian-American students will increase to 132%, the Hispanic population will grow to 128%, the non-Hispanic Black population holds steady, and the non-Hispanic White populations will decline to 92%. These trends generally follow the projections for all 18 year-olds over the period, with the exception of non-Hispanic Black students which are expected to hold enrollment at national and elite institutions, while declining in number at other types of institutions (page 68).[69]

Other Important Issues Shaping the Future

There are many other important issues shaping the current and future operating environment for higher education that must be highlighted here. Some of these are the direct result of the forces discussed above, others independent developments that create opportunities and concerns for colleges and universities, and some that raise challenges about the philosophical foundations of higher education and fundamental questions about Constitutional rights.

Among these issues and developments, Gen Z students are now on campuses, bringing their own values and perspectives about a residential college education – including the much more pronounced (and deserved) focus on mental health.[70-72] Financial concerns are and will remain front and center for many colleges and universities, and the current inflationary environment is accentuating these concerns (pages 24-25).[73]

The politics of diversity, equity, and inclusion efforts have become a central issue in many states and on many campuses, resulting in intense debate, protests, and legislative actions.[74-75] Issues of diversity, inclusion, and equity have also become intertwined with equally intense debates about academic freedom, free speech, and freedom of inquiry.[76-77] The political divisiveness reflected in the intensity of the arguments over this set of issues likely impacts public perception of higher education's value. Access concerns, and an increasingly diverse population (broadly defined, including family income), have put questions of equity front and center: does higher education provide the opportunity to improve one's station in life, or does higher education deepen existing equity divides?[78] Each of these issues and developments is important, merits deeper consideration, and will impact the higher education operating environment for the foreseeable future.

Looking Forward

Many trends, attitudes, and concerns have been shared that will shape the future of higher education. To summarize briefly:

- Published tuition at 4-year public universities in 22-23 is 2.25 times 92-93 tuition after adjusting for inflation.
- The actual cost of attendance for undergraduate students has remained relatively flat at 4-year public universities in real terms over the past 20 years given increases in grant aid.
- State support per student FTE has increased for nine consecutive years, but has not returned to the pre-recession levels of 2001 and 2008.
- Of the $1.6 trillion in student debt held by 45.3 million borrowers in the second quarter of 2022, 53% owed less than $20,000 and 38% of the total amount was held by 7.8% of the borrowers who owed more than $100,000.
- Six-year completion rates at 4-year public universities have hovered at 66-68% since 2013 and vary dramatically by race/ethnicity and gender.
- Employers have begun to pull back on degree requirements in job postings, focusing on better defining the skills they are looking for and considering a broader array of ways for job candidates to accumulate/demonstrate those skills.

- College officials and students in general feel students are better prepared for the work world than employers do.
- All of the above have led to a decidedly mixed perception of the value of a college degree and higher education in general, despite the continued existence of a strong lifetime earnings premium for college degree holders.
- Declining birth rates post Great Recession mean fewer college students post 2026 – on the heels of a 17% decline in college enrollments since 2010. The impact will be felt most strongly in the Northeast and Midwest and among less selective institutions.
- The projected student population will be far more diverse, with substantial growth among Asian American and Hispanic students (and a decline in White students).
- Many other important issues will have an impact on the future of higher education including the matriculation of Gen Z, financial pressures, and political divisiveness over, among others, issues of diversity, equity and inclusion and academic freedom.

Students and families will remain concerned with the amount they pay for college, as will elected officials making budget decisions. The sheer amount of student debt, an issue much more nuanced than the headlines, will hang over individual and public attitudes about the value of college. Colleges and universities must get more focused on completion rates and especially the gaps across race, ethnicity, and income groups. While a college education is about much more than the first job, more attention must be given to better alignment between student preparation and expectations and employer needs. The questions about the value of a college degree are real and cannot be ignored. The demographic trends are equally clear, and there will be fewer high school graduates over the coming 15 years. All of these challenges occur in the context of a divisive political climate, with any action taken by a college or university interpreted through the political lens of the observer.

Purdue President James H. Smart, in a speech to the Lehigh University Club of Chicago on January 4, 1896, stated “If you ask me the characteristics of the new education, I reply that they are the characteristics of the ages in which we live.” The remainder of the paper will focus on how land-grant universities can respond to these “characteristics of the ages in which we live”.

A Proposed Blueprint for the Future: Ideas for Consideration

Given prevailing public attitudes and questions, shifts in student perceptions, and demographic changes, how should higher education respond? More specifically, what are the implications for residential undergraduate programs at public universities and how will these programs remain relevant in the future? Beyond the general issues these challenges raise, of specific concern is the impact of the negative narrative and apparent disconnects on underrepresented and low-income students. If such students opt out of a residential college education as a direct result of the negative narrative, a lack of resources, and/or lack of preparation when such an education could be their best option, equity and wealth gaps will likely further widen going forward. Note the point is not that every student should pursue a traditional, residential undergraduate degree. The point is that any student for whom such a degree is the right choice should be prepared for and encouraged to pursue that degree, should have access and the resources to do so, and should be successful in obtaining it.

Central to addressing the issues outlined above is relevance. The land-grant university model was built on the idea of being relevant to the various communities it serves. What actions should land-grant universities take to ensure their continued relevance in the future and in the process provide a blueprint for all of higher education as the sector navigates the many headwinds it faces? This last section will outline a set of ideas for consideration. First, a set of institutional-level ideas will be offered which build on the land-grant mission of engagement, followed by a set of specific ideas for residential undergraduate education.

Institutional Ideas for Consideration

Engagement as the Foundation

Of the three land-grant mission areas, it is the engagement mission that demands relevance and provides a platform to meet the operating environment outlined above. Building on the original Extension idea, full embrace and effective implementation of the engagement mission offers a potential point of difference relative to other higher education models as well as a possible exemplar for how other colleges and universities can best position for success looking forward. The idea of engagement is not unique to land-grant universities today and many higher education institutions engage with their stakeholders. But land-grants have a specific charge to focus on the difference they can make for those stakeholders and how they can learn from them in a mutually reinforcing, symbiotic relationship. Such a philosophy of engagement can lead to a richer, more employer-ready educational experience, research and outreach that is better aligned with the needs of the community/state/nation/world offering more potential for impact, and enhanced visibility with and changed perceptions of stakeholders, including elected officials.

More than a century has passed since the Smith-Lever Act was enshrined into law, which means the relevant land-grant must think deeply about the unique contributions it can make to improving the lives and livelihoods of stakeholders today and in the future. Partnerships and collaborations are central – there are few societal issues a land-grant will solve on its own. And, perhaps most importantly, the relevant land-grant must create mechanisms to internalize lessons learned/insights provided from stakeholders, and take full advantage of synergies across its learning, discovery, and engagement missions. Note this foundation in engagement does not imply every initiative and activity involves stakeholders, but it does suggest that the relevant land-grant stays focused on the specific role it can play in creating a better state, nation, and world – with 'focus' and 'specific role' being the most important ideas here.

Adopt an Outside-In Perspective[3]

The relevant land-grant has an outside-in perspective, rethinking how curricula, research, programs, processes, policies, structures, etc. align with the current and anticipated needs of stakeholders – and not vice versa. This is not a new idea – snide comments have been made for years about stakeholders having problems and universities having departments. But, in an environment where relevance is in question, the importance of this operating philosophy is central. Operationalizing such a philosophy means bringing the stakeholder perspective into decisions by whatever means is appropriate: informal conversations, focus

[3] The outside-in concept is described further in Kotter's *A Sense of Urgency*. [79]

groups, advisory boards, surveys, pilot projects, etc. It also means asking questions during the decision-making process about the impact and consequences of decisions for impacted stakeholders. And, it means listening with intent to the answers received.

Given access and affordability issues, streamlining how recruiting and admissions processes can be made more straightforward, more transparent, more accessible to students and their families might be one example. Looking for ways to improve existing engagement efforts is important. The siloed nature of campus organizational structures leads to multiple initiatives aimed at supporting certain stakeholders – initiatives that have every good intention. But, it also creates an environment where a manufacturing firm or a school system or a local government (or even a granting agency) can be overrun by university faculty, staff, and students who want to help, and where these organizations have no idea where to start to build a relationship with the university. Note the argument here is not to take away from ideas like faculty governance, nor to treat students as 'customers', or any of the other criticisms of this idea. Rather, the point is the relevant land-grant with an outside-in philosophy, bringing stakeholder perspectives into decisions, will be far more effective at creating opportunities for faculty and staff, attracting and educating students, and generating support for funding than one that remains overly internally focused.

Innovation Everywhere, All the Time

The relevant land-grant will aggressively support an environment of innovation everywhere, all the time. Universities are places of discovery, where faculty, staff, and students work to push the boundaries of what we know and understand to new places. However, that same spirit of discovery and creativity can be lacking in the classroom, in policies and processes, in budget models, and so on. Innovation must be incentivized and, when and where appropriate, scaled – instructional methods, including course design and curricula is one important area. Pilot projects can play an important role here. Models from other areas of the university (commercialization processes) and industry (lean process management) may be instructive. Indeed, an important part of the solution here is continued support for faculty and staff entrepreneurial activity – a culture, an environment which encourages, rewards and supports new ideas and new ways of thinking. And a culture that does not let bureaucratic processes impede change and does not punish failure or initial low returns on investment.

An intense focus on innovating, streamlining activities to permit faculty, staff, and students to put more of their time into learning, discovery, and engagement activities can pay major dividends. The role of staff is central here – the relevant land-grant will recognize and lift up the staff role and incentivize their work in doing everything possible to keep the focus on outcomes. Policies, procedures, processes must be aligned with the goals and target outcomes of the relevant land-grant, focused on supporting in full the land-grant mission areas and releasing the creative potential of faculty, staff, and students. Trade-offs include which services are self-provided and which are contracted out – approaching such decisions with overall goals and target outcomes front and center and recognizing fully the internal and external consequences of such decisions. Again, universities can learn from their private and public sector partners here, and putting some of the lessons they have learned to work can both enhance relationships with partners and improve outcomes for the university.

Scale Matters

An area that does not receive enough attention if a university is truly going to have impact is the importance of – and the challenges of – organizing to create economies of scale. The role of faculty as intellectual entrepreneurs is central to the discovery mission of a relevant land-grant. At the same time, individual faculty members working on their specific areas of interest does not generate scale on its own. That said, universities have long built scalable teams to secure competitive funding. But how can such team-building be improved and expanded to mission-specific domains other than discovery? Relevant land-grant universities will have robust commercialization support to help faculty, staff, and students take promising ideas to society. More broadly, relevant land-grants will support rapid adoption, diffusion and scaling of ideas with broad potential in the learning and engagement missions. And, perhaps most importantly, they will create organizational entities that bring the campus together around issues of importance to their state, our nation, and the world – issues such as workforce development, public health (and mental health specifically), improving K-12 education, and rural community development simply cannot be effectively addressed through a fragmented, uncoordinated approach.

Generating scale may mean bringing in partners – other universities, the private sector, local, state, and federal governments. Collaboration between public universities in a given state can generate scale and improve the potential for impact. Scale likely means more specialization and collaboration: campuses in a state system defining different roles based on state needs, then focusing specifically on those needs – with robust transfer pathways and collaborative structures between members of the system. Working with other land-grants across state lines to capitalize on specialized facilities and programs in addressing shared challenges would be an example. There are also some good national models here, the University Innovation Alliance is one – 15 universities coming together to address student access and success issues. However, specialization also means focus, difficult choices, and trade-offs: what will be given up to focus on and invest in areas where scale is needed? Most universities are good at creating new programs. But many struggle to sunset those that are less effective or obsolete. The relevant land-grant will be comprised of entrepreneurial faculty, staff, and administrators that embrace a "fail fast" mentality.

Aligned Goals and Incentive Structures

The relevant land-grant will seek excellence and stay focused on goals that are aligned with its engaged mission – outcomes that matter to the stakeholders it serves, including the state's goals for the institution. The number of students a university denies, admits, the quality of the incoming class are traditional brag points for institutions, but what matters is how many graduated, in what amount of time, with what debt, placed with what organizations/graduate/ professional schools, at what salary level – and what happened to those admitted, who did not graduate? To put an even finer point on such outcomes, how do they vary with student profile, race/ethnicity, income, etc. – is the university successful at adding value for the full spectrum of students it serves? Similar questions can be asked for the discovery and engagement mission areas. How is the discovery mission advancing disciplines, addressing pressing societal issues, etc.? What is the evidence? How is the engagement mission contributing to workforce and community development, contributing to a healthier, more prosperous state, etc.? Again, what is the evidence?

While rankings are much maligned (especially recently), the underlying components and associated peer comparisons can still affect decision-making on campus. The relevant land-grant is bold enough to pay attention to the rankings and/or the components of rankings that reflect the excellence it seeks and that matter to its stakeholders (including peers). It uses peer comparisons to support excellence in chosen target areas. The relevant land-grant does not let the pursuit of rankings or peer comparisons take it in directions which are not aligned with its chosen goals and those of the communities it serves.

Quantitative data matter here, but impact can be difficult to distill down to a few quantitative metrics. The relevant land-grant utilizes qualitive evidence of impact to complement those areas that can be measured quantitatively. Perhaps most importantly, there is a shared sense of responsibility for achieving goals across campus – an internal accountability and understanding of how individuals contribute to the broader goals of the institution. Accomplishing this means rewards and recognitions for administrators, faculty, and staff must be aligned with the goals and aspirations of the institution.

Be an Authentic Storyteller

The relevant land-grant will tell its story aggressively and in a way that connects with the various stakeholders it serves. If the university is fully engaged with stakeholders, such communications should flow naturally. That said, the relevant land-grant stays focused on what matters to its stakeholders – an outside-in approach. What does the activity, the finding, the accomplishment mean for the stakeholder? Why does it matter? What difference did it make for them? The idea here is not image building and posturing through clever messaging, but authentic conversations with stakeholders that clearly communicate the (unique?) value the relevant land-grant is generating and why it should matter to that specific stakeholder.

Beyond the message, the mode matters and aligning the vast array of communications vehicles with the institution's target audiences demands a deep understanding and appreciation of both – and especially so for prospective students and families. To the extent possible, such storytelling has a feedback mechanism that allows the voice of stakeholders to be captured, helping inform future actions and initiatives – supporting the outside-in perspective. Too often, public universities, including land-grants, want to tell stories but not listen to or incorporate meaningful stakeholder feedback (or don't have good mechanisms for doing so). The importance of effective storytelling is difficult to overstate – in a noisy world, a relevant land-grant simply must demonstrate to its varied publics what it is doing for them and why it matters, helping create informed opinions of the work being done and the value created.

Undergraduate Education Ideas for Consideration

Rethinking Access and Completion

Fulfilling the land-grant mission in the future will mean being much more proactive in ensuring students have access to the educational opportunities that land-grants provide and even more focused on supporting degree completion. As the quality and rigor of land-grant institutions (especially the flagship campus) have advanced, increasing numbers of high school graduates are not prepared for success and/or competitive for available slots. Strong applicant pools – including large numbers of non-resident applicants – have enabled some land-grants to avoid addressing this issue directly, while at the same time, other land-grants have struggled

maintaining enrollment. The goal here would be that any in-state student who wants to do the work required to attend a flagship land-grant university campus have that opportunity – which may mean alternative paths and/or programs to ensure adequate academic preparation to meet the institution's standards.

Achieving this goal means being more deliberate about understanding where and why preparation levels are inadequate, and then developing tailored solutions to expand the pool of qualified applicants – to address enrollment issues and/or provide access to more in-state students. More robust partnerships with K-12 schools are required to frame how the land-grant can better support K-12 college-prep strategies and programs – especially in rural and urban schools. Land-grants will expand their own college-prep activities. An example is the Purdue Polytechnic High School model, created specifically to graduate students who are 'college ready' whether or not that is the path they choose. Other options to expand the pool of qualified applicants could make use of online college-prep and college courses for K-12 schools, dual credit courses, using current college students as tutors, summer programs/short courses, and much more robust transfer programs with community colleges/regional 4-year universities.

Another element of access is rethinking how the true cost of college is communicated, clarifying and simplifying wherever possible, as well as making outcome data much more readily accessible. Adopting an outside-in perspective, how can the application process be streamlined? How can information on cost/financial aid/degree options/outcomes be made much more student-family friendly – especially for first generation, low income, and other underrepresented/underserved students. Expanding the number of in-state students would need to become one of the overall goals of the university – and additional state support would likely be required. Regional campuses play an important role here – but likely need to rethink their models with an intense focus on local/regional needs and how they can work with the flagship campus as part of an overall system strategy[4].

Completion will be another area of increased focus. Despite efforts to date, completion rates have stalled – and significant gaps for Hispanic and Black students and males, among other groups, underrepresented and otherwise, continue to exist. Even deeper looks are needed at why students are not completing, what academic, mental, financial, social support is needed, how existing curricula impact completion, where students go after leaving a university, etc. Data, data analytics, and student information systems offer the potential for both insights and interventions to improve completion rates. Improvements here are wins all around – increasing the number of graduates, ensuring that students leave with their credential, and boosting enrollment and tuition revenue for the university (helping pay for the investments that may be needed here).

Flexibility

While seemingly the antithesis of scale (mentioned earlier), the relevant land-grant will also adopt a mantra of flexibility. Some of the flexibility will be manifest in on-ramps: how

[4] The focus of this paper is the residential learning experience for the traditional 18-21 year-old student. However, land-grant universities should also play an important role in supporting the education of adults, and especially those who started but did not complete a college education. This role is aligned with promoting and supporting lifelong learning of traditional graduates. Purdue Global provides an excellent example.

students enter the university. Possibilities include on-line college courses in high school, transfers and dual enrollment programs with community colleges, transfer programs with regional partners (Purdue Agriculture's Pathway to Purdue program provides a successful example), academic boot camps, online courses for students who choose to work immediately after high school, a willingness to grant credit for non-traditional academic experience when justified – thinking deeply about how to attract students who don't enter through the traditional route as residential first-year students.

Flexibility will become increasingly important to a relevant undergraduate curriculum. Flexibility here will include the opportunity for more cross-disciplinary majors, minors, and certificates – where students have more latitude in courses they take to earn credentials. Some of these credentials will likely be non-credit and/or recognized by industry, helping students lay the foundation for the lifelong learning capability so important to career success. It will include more opportunities for students to demonstrate proficiency in mastering course material outside of a standard semester-long course. Flexibility will include using online courses and personalized digital learning tools (putting AI and machine learning to work) where complementary to residential, experiential courses – and in some cases to replace such courses with better options that enhance student learning. Flexibility also means appropriate support/options for students who stumble to ensure they have every opportunity for timely completion.

Finally, flexibility will consider those students who leave the university – with a proactive strategy to find the right spot for such students in the land-grant system, another institution in the state, on-line degree/credential options, and/or a reentry plan. Relevant land-grants will deepen their engagement and support for those students they admitted but stop out for whatever reason.

Residential Must be Experiential

The only way a residential learning experience can be justified given the cost and given the quality of digital educational tools is if that experience is truly experiential – it takes full advantage of the physical proximity between students and instructors. As part of the Purdue Next Moves Transformational Education 2.0 initiative, the university has adopted the following definition for experiential education: "a planned pedagogy centering on an authentic experience to strengthen students' knowledge, skills, and abilities, paired with student reflection". There are many ways to embed experiential pedagogy into academic programs: laboratory-based courses, case studies, service learning, research, simulation, role play, projects with industry, study abroad, study away, etc. While online courses can fit this definition and be 'experiential', the focus here is bringing the idea into the physical classroom and laboratory.

To make residential learning truly experiential, institutions must review course structure across the curriculum. They must reconsider those course experiences that may be efficient because of scale but do not create effective learning environments (very large lecture courses for example) and are not engaging nor taking advantage of learning technology that can provide scale in a different manner. Perhaps the relevant question here is: does the current course-experience require the student to be in the physical classroom or not? If the answer is no, then 1) what can be done with the design of the course that makes (more) in-person engagement required or 2) can the course be made available in a hybrid or online format given in-person

instruction is not required? Rapid advances in machine learning, AR (augmented reality), VR (virtual reality), AI (artificial intelligence), digital pedagogy, and other learning technologies mean this won't be an 'either/or' question as these advances will impact/reshape how residential, hybrid, and online classes are delivered.

Instructors need support and incentives to bring such approaches into the classroom if experiential practices are to be adopted. There is a cost to such approaches and land-grant universities will need to be deliberate as to where learning technology can bring scale and effective learning, and where highly personalized, face-to-face experiential learning is the proper approach. The point here is not that virtual experiences/digital learning is ineffective, or that every learning opportunity must be in-person, it is ensuring that the overall curriculum delivers on the supposed value proposition of a residential education. Otherwise, why will parents and students continue to invest the money and the time to participate in a residential undergraduate program?

Delivering a Comprehensive Student Experience

The relevant land-grant university will have a rich understanding of what students need for professional success and how they can contribute to the students' personal wellness and happiness. And, it will focus on providing a set of co-curricular experiences for students that address those needs – and perhaps more importantly, ensuring that students take advantage of those experiences. A residential campus offers a myriad of professional and personal growth experiences, from hands-on leadership opportunities, to career exploration, to building professional and social networks, to learning to live and work in a multicultural world, to embracing independence and the importance of physical, mental, financial, etc., well-being. Importantly, being part of a community of residential learners provides an opportunity to reflect on personal beliefs and engage in civil dialogue with those who share and those who don't share those beliefs. Modelling approaches to help students build skills in civil discourse and conflict resolution is another opportunity for land-grants to contribute to an issue faced by all of higher education.

A relevant question is what proportion of students graduating today take full advantage of the incredibly rich set of academic, professional, and personal development opportunities offered at a land-grant university? Ultimately, answering this question is about integrating the curricula and co-curricular in deliberate ways. It means understanding which experiences contribute in what ways to outcomes and capabilities that are important to the student going forward. It means program requirements, comprehensive advising, and attention to access so that students leave with the full experience they need – and invested in. Progress here requires carefully thinking this through from the student's perspective, helping them navigate the literal blizzard of unconnected experiences across the campus of a major land-grant university – and having access to the financial resources needed to take advantage of the opportunities. Some universities are currently embracing this idea with 'student experience' offices and officers. Others are using a credentialing process to help ensure students leave the campus with a set of co-curricular experiences that support professional competencies and personal development. Whatever the organizing or incentive mechanisms, this area is far too important to student success to be left to chance/happenstance.

Employer Engagement: A Must

As mentioned above, the relevance of an undergraduate education has been called into question by employers. And students and their families are asking to be more workforce ready at completion. Note this is not about turning land-grant universities into career and technical schools (though that is not to minimize the importance of these programs, because they have an important role), but it is about deeply understanding the background of our students today, what employers expect from them when they graduate, and ensuring the experience delivered positions the student for career success in every appropriate way – a design-thinking approach.[5]

It is also important to note that this is not about preparing the student for their first job – many of the alternatives to a residential undergraduate education can better prepare students and at a lower cost for a first job than a traditional, residential university. It is about preparing a student for a *career* in a work world that has never been more dynamic, a work world made up of more diverse individuals and a broader array of cultures, where graduates will change jobs multiple times, new career paths will open with increasing frequency, student careers will pause and resume in new ways, people will work to a later age, among so many other changes not yet anticipated. In such an environment, capabilities such as critical thinking, digital literacy, numeracy, communications, self-learning, and an appreciation for and respect of diverse cultures becomes more important for career success than the specific subject being mastered. More broadly, an appreciation for history, philosophy, ethics, political science, the arts and literature, becomes even more important in bringing humanity to the opportunities and challenges new technologies, including AI, will bring. Explicit preparation for life and career, not a job, may well be the true point of difference for a residential learning experience relative to alternatives.

Currently, insights about employer needs are fragmented and siloed in placement offices, those engaged in industry research or educational activities, university development, etc. Individual faculty and staff do not have the time nor connections for taking the pulse of employers on any kind of regular basis. Anecdotal feedback on graduates and curricula is not enough. Relevant land-grant universities will spend much more time studying the future of work, asking employers and alumni for insight and feedback, and exposing faculty, staff, and curriculum committees to the findings. They will survey employers on the quality of their graduates and how the employer's human talent needs are evolving, alumni on their preparation, collecting insight on where they are succeeding and where they are falling short, making appropriate adjustments in curricula and the broader student experience based on the findings. Finding ways to help instructors engage with employers formally and informally can help instructors refine courses and curricula and/or build confidence in the relevance of their approaches to the classroom. Projects that engage industry provide a window into both industry needs and student capabilities to be industry-ready.

This is not simply an employer issue: an important aspect of 'career readiness' is the background students bring to us. Fifty years ago, many/most students likely had some work experience before arriving on campus. That is no longer true, making the step from the campus

[5] Design thinking is defined as "a mindset and approach to problem-solving and innovation anchored around human-centered design", putting people at the center of the development process, enabling creation of solutions that resonate and are tailored to the audience's needs. [80, 81]

to the work world an even bigger one for most. Addressing this gap means mapping the full residential experience against employer needs so that students have the opportunity to develop the full range of professional skills that employers desire – and that will help prepare students for future career success.

Blending Work and School

The idea of cooperative education is not new, but relevant land-grants will embrace the idea fully and draw on digital technology to expand opportunities for students and employers. The general notion is one of students taking some of their courses on campus – perhaps their first and final year – and working for a firm/organization (with pay) in the intervening years, all the while continuing their education using digital technology. Perhaps this idea could go further with curricula and experiences aligned with employer needs – with students working for the firm while earning their degree. This blending of work and school has many positive aspects: dramatically enhancing the work experience of students, providing context for their education they did not have, reducing the cost of their education/giving them a source of income, and filling the work experience gap of current students. Employers get access to talent earlier, and also get a deep look at students before making a full-time offer. A twist on this idea is virtual internships that students complete on campus as part-time employees. This is already happening and again, expanding the idea would seem to offer many benefits.

Another potential benefit of this blending of work and school could be the expansion of capacity at relevant land-grant universities – imagine a university with capacity for 20,000 undergraduate students on campus doubling enrollment to 40,000 students given that ½ of the students were placed with employers and taking courses digitally. Note that it will be essential to retain the philosophy of preparing students for a career (not a job) in such programs. Effective partnerships with cooperating employers will be required to shape a productive student – and employer – experience. The goal remains to send students off with a set of capabilities that will serve them personally and professionally over their lifetime.

Data-driven Assessment and Intervention

The relevant land-grant will invest heavily in data and data analytics, and digital support systems, especially as these tools apply to the student experience. This is not to diminish the art of teaching, nor the individual and personalized relationships one wants to build in a thriving university community. But, the relevant land-grant university will put what it knows and can know about student success and the student experience to work in enhancing both. Given technologies available today (and technologies on the way), universities have few excuses for courses that are poorly taught and barriers to student progress, advising processes that are not highly individualized and disconnected from other parts of the student experience, and missing important signals that a student is struggling and failing to intervene.

Note that these tools and systems will be an important part of achieving scale and flexibility – automating what can be effectively automated and supporting functions that are most appropriately delivered personally to maximize the time available for personal interactions. Of course, these ideas are already being pursued in various ways, but AI tools will dramatically expand the possibilities here. Student data protections must be respected, and privacy will be paramount, but failing to put what is known and can be known about how to help students succeed will be a major failure on the part of the University.

Engaged, Relevant Leadership

Delivering on the elements of an engaged, relevant land-grant university will take engaged, relevant leadership. It will take leaders who stay laser focused on who their institution is and what it is working to achieve. Individuals who can ignore fads and conventional wisdom, respecting external assessments and rankings, but never letting such drive decisions counter to the university's goals and ambitions. They will be willing to support ideas that generate scale, impact, and efficiency without diminishing the underlying individual innovation. They will set the bar high for teaching excellence and find ways of resourcing programs to support faculty in their role as instructors. They will understand the central importance of staff in delivering high impact experiential learning/co-curricular experiences, and innovations in internal policies, processes, and procedures aligned with the university's goals.

These leaders will set the standard for engagement by the institution with the communities it serves and be masters of the intentional listening it takes to ferret out issues where the university can make a difference. They will be collaborators, confident in their position and that of their institution, fully aware of the strengths of their university and where and how it can collaborate with others to address the most important issues their stakeholders face. These leaders will be master story tellers and have superb ability to communicate the difference their institution is making in an authentic, passionate way.

Closing Thoughts

Land-grant 'colleges' were pathbreaking institutions when conceived more than 150 years ago. Today's higher education operating environment demands a similar pathbreaking mindset: bold vision, creative thinking, new approaches, discipline, resolve, a commitment to the communities served. With a focus on relevance, this paper has outlined ideas for reframing and refining the land-grant philosophy for the coming decades, a philosophy that can be a model for all of higher education. The key elements include:

- A philosophy of engagement, bringing the outside in, connecting with students, families, employers, and stakeholders in developing and delivering an innovative, impactful student educational experience that takes full advantage of the residential campus.
- Developing, articulating, and supporting a clear purpose and vision that aligns the campus around student access and success, around innovation, and strives for solutions to the real-world problems facing their communities while eschewing fads or comparisons that detract from this vision.
- Pursuing scale whenever appropriate to maximize impact, creating alignment and innovative partnerships that drop the barriers of silos/tradition to form new ways of working across the campus, across educational institutions, and with employers and other partners.
- Digging deeply into access barriers and developing creative pathways and approaches to ensure the land-grant idea of higher education available to all can be realized. Similarly, understanding and addressing barriers to completion, including support for those that stop out, to ensure those admitted are successful.
- Building more flexibility into the curricula and learning experience drawing on developments in learning technology, including AI and machine learning; maximizing in a deliberate way the potential of the 'residential' on residential campuses; connecting with employers with creative work-learn programs; and ultimately creating and delivering experiences that are relevant and translatable to students' individual goals and dreams.

- Aggressively use data, data analytics, and learning technology to support student access and success, and the faculty and staff delivering the learning experience.
- Telling the university's story in an authentic way, recognizing that a true conversation with the communities served is essential for continued relevance.
- Leadership that fully supports and champions the residential learning experience, a philosophy of engagement, and the changes that must be made and the resources required to "become even more sympathetically and productively involved with their communities."[33]

Building on their tradition as engaged institutions, land-grant universities have the opportunity to do the work needed to fully embrace the higher education operating environment and take the actions necessary to help students prepare for an increasingly dynamic world of work and to be engaged citizens in an equally dynamic society. Land-grants can deepen their legacy as places of discovery where the world's most difficult problems are solved. And, they can redefine what it means to be engaged with stakeholders, modelling this distinctive element of the land-grant university for all of higher education. The challenges and headwinds are real, the opportunity is there, the question is how will land-grant universities choose to respond? More than a rhetorical question, how we respond will have lasting implications for the quality of life for the citizens of our communities, our state, our nation, and the world. No less is at stake.

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