

REVIEW ARTICLE

# Strategies for Land-Grant Universities to Foster Public Trust

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## Abstract

This review article explores the role of land-grant Extension amidst an escalating epistemic crisis, where misinformation and the contestation of knowledge severely impact public trust and policymaking. We delve into the historical mission of land-grant institutions to democratize education and extend knowledge through Cooperative Extension Services, highlighting their unique position to address contemporary challenges of information disorder and declining public confidence in higher education. Land-grant universities can reaffirm their relevance and leadership in disseminating reliable information by reasserting their foundational principles of unbiased, objective scholarship and deep engagement with diverse stakeholders. This reaffirmation comes at a critical time when societal trust in science and academia is waning, necessitating a recommitment to community engagement and producing knowledge for the public good. The article underscores the necessity for these institutions to adapt to the changing information landscape by fostering stakeholder-engaged scholarship and enhancing accessibility, thus reinforcing their vital role in upholding the integrity of public discourse and policy.

**Keywords:** Misinformation; land-grant universities; public trust; cooperative extension services; engagement; information disorder

**JEL classifications:** D83; I23; Q16

## Introduction

A decade ago, Francis Fukuyama wrote an article for *Foreign Affairs* (2014) entitled “America in Decay: The Sources of Political Dysfunction.” The article was Fukuyama’s attempt to explain the nature and causes of contemporary American political dysfunction. One of the striking features of the article is that he made no real effort to defend his foundational premise of a dysfunctional system, yet readers accepted the notion as self-evident. The situation has not improved in the intervening decade, partially due to the increased velocity with which false information can spread in the modern media environment (Vosoughi et al., 2018). The conflict over information in the public sphere has received numerous labels, including “information disorder” or “information pollution,” which implies the indiscriminate mingling of accurate and false information, intentionally or unintentionally (Wardle and Derakhshan, 2017).

Somewhat more dramatically, this ongoing conflict has been labeled an “epistemic crisis” (Benkler et al., 2018). An “epistemic crisis” arises when the established systems of knowledge creation, validation, and dissemination are challenged, leading to widespread uncertainty, mistrust, or conflict about what information is credible or true. This article will explore strategies for land-grant university colleges of agriculture to engage directly within public discourse in the

current epistemic crisis, especially in areas that impact public trust and policymaking. This crisis of distrust is acutely relevant to higher education because it affects how society perceives and values knowledge, undermining trust in institutions traditionally seen as reliable sources of information, such as land-grant universities and their Cooperative Extension Services.

Though the most comprehensive treatment of the notion of the modern epistemic crisis has remained isolated to the fields of communications and political science, the agricultural economics literature would benefit from a comprehensive overview of the field's role in alleviating this crisis (Bagg, 2018; Brennan, 2018; Kreiss, 2019). This article develops strategies for U.S. land-grant universities to respond to this crisis by leveraging their foundational missions of unbiased, objective scholarship and community engagement to restore public confidence in the information they disseminate. We pay special attention to the opportunities and challenges confronted by Cooperative Extension Services in the wake of the modern epistemic crisis related to the agri-food sector. However, our conceptual framework and principles extend past the food system and can be applied to Extension's many other focus areas, such as rural health and community development.

While the epistemic crisis has largely been treated as a political phenomenon, the increased potential for false or misleading information to gain traction, with adverse consequences, in a decentralized media environment is ubiquitous (Fong et al., 2024). Moreover, the tendency of ostensibly nonpartisan issues to become politically charged in our current polarized culture broadens the range of potential targets for politically motivated information (or misinformation) campaigns (Biedny et al., 2020; Malone and Norwood, 2020). Artificial intelligence is taking the potential for misinformation to a new level of concern and, ironically, offering new approaches to fighting misinformation (Demartini et al., 2020; Kreps, 2020). These modern headwinds may pave the way for burgeoning opportunity, as land-grant universities are well-positioned to address the current epistemic crisis as producers and disseminators of science-based knowledge and objective information.

The remainder of this review article is organized as follows. First, we provide a brief background history of the public land-grant university model, describing other key inflection points in the history of these universities. We then develop a conceptual framework for understanding the implicit relationship between modern land-grant university research and the taxpayers who support it. From this conceptual framework, we outline crisis factors that threaten the enterprise of integrated research, teaching, and Extension programming. Those crisis factors also create opportunities for land-grant universities to engage with taxpayers more meaningfully, addressing the crisis factors by fully exploiting the potential of the land-grant model. The final section concludes by offering strategies to expand and enhance the role of land-grant Extension in addressing the epistemic crisis.

### **The public land-grant university model**

The land-grant university system has a unique provenance among the world's institutions of higher learning. As Eddy (1957) notes, the land-grant system has played an instrumental role in shaping Americans' view of higher education:

Partially through their efforts, higher education came to be regarded as not so much a luxury as a national necessity. Before long, America had taken for granted the assumption that each individual, regardless of his economic or social status, should be given the opportunity to develop his innate abilities to the ultimate benefit not only to himself but to the nation. Each man was worth educating as a person and as a citizen (p. 285).

The land-grant mandate to offer practical education to all quickly expanded well beyond the already ambitious aims of the original Morrill Act of 1862. Subsequent legislation added

agricultural research capacity to the system (Hatch Act of 1887), expanded the system to include institutions serving African-American students (Morrill Act of 1890), added the Cooperative Extension Service to extend the knowledge generated at the university to stakeholders throughout every state (Smith-Lever Act of 1914), and provided land-grant status for certain Native American serving colleges and universities (Land-Grant Act of 1994). Since then, Extension programming has created value in settings ranging from private decisions by stakeholders for their farms to public decisions in managing common pool resources (Mandal and Lawrence, 2017; Roe et al., 2004; Swallow and Mazzotta, 2004). The land-grant model of dramatically expanded educational opportunities and integrated, applied scholarship can proudly claim to have contributed to the explosive economic growth of the 20<sup>th</sup> century due in large part to drastic improvements in agricultural productivity and rural development (Andersen et al., 2018; Irwin et al., 2010).

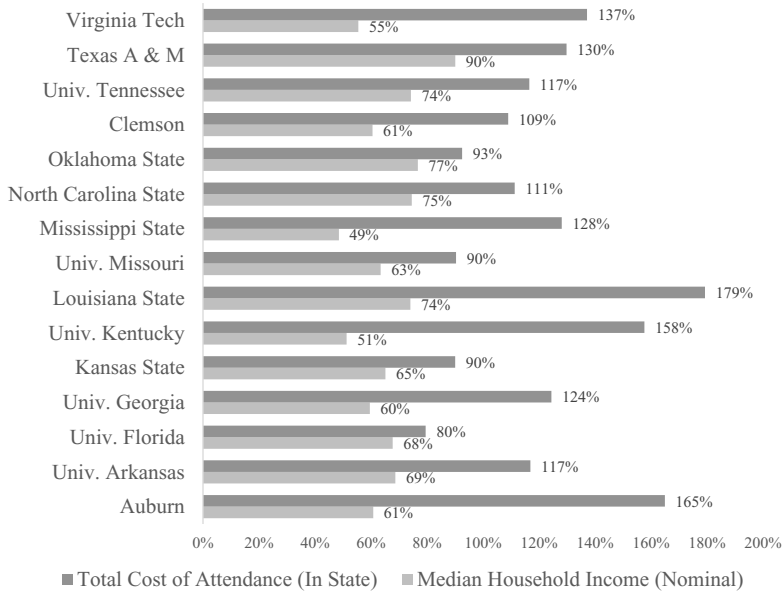
While this contribution is well-documented, stakeholder attitudes toward higher education have eroded over time. Consider a recent Gallup survey about the public's view of higher education, which found that just 36% of U.S. adults had a "great deal" or "quite a lot" of confidence in higher education (Brenan, 2023). In 2015, that figure was almost 60%. If there is any bright side to these findings, confidence in higher education is higher than for many other important social institutions: Congress, 8% (great deal/fair amount of confidence); Big Business, 14%; Organized Labor, 25%; Public Schools, 26%. Even church/organized religions are viewed confidently by only 32% of Americans (Saad, 2023).

The public's perception of higher education is a longstanding concern of university leaders (Bao et al., 2023). The public's attitudes and opinions are particularly important to the land-grant system, whose unique history and purpose (to say nothing of its funding mechanism) mean that the concerns of a broad stakeholder base carry special significance. Indeed, the Cooperative Extension Service was conceived and launched to ensure the land-grant's work was made relevant to stakeholders by distributing that work to those who could use it. R.J. Hildreth, managing director of the Farm Foundation from 1970 to 1991, conceived the relationship between higher education and the public as a social contract that was periodically renegotiated (Hildreth, 1990). Hildreth voiced contemporary concerns that land-grant universities had become captive to disciplinary interests (i.e., prioritizing professional reputation within individual academic disciplines) while downplaying or ignoring stakeholder needs. McDowell (1988) diagnosed the problem as a resource mismatch:

In recent years, it has been difficult if not impossible for that [land-grant] system to produce a sustained flow of benefits to either old or new clients or for those clients to generate the resources needed to support their own scholarly agenda. This inability to sustain an institutionalized test of scholarly relevance is at the heart of the dilemma of land-grant colleges of agriculture (McDowell, 1988, p. 19).

In other words, as the share of support the land-grant received directly from the public declined, so, too, did the broader public's ability to influence the scholarly agenda toward traditional land-grant programming, with a consequent drift away from applied scholarship.

To be fair, changes in land-grant funding models also reflected strategic responses to changing stakeholder needs (Al-Kaisi et al., 2015). For example, some agribusiness Extension programming at Purdue University pivoted to a fee-for-service model alongside the modern needs of its clientele: it no longer made sense to use public funds for the benefit of now large and complex agribusiness firms. Generally speaking, though, in an era of declining public resources, land-grants struggled to identify novel approaches to retaining connections with their evolving state-level stakeholders. Skees (1992) described this phenomenon as a form of social trap to which academia is inherently vulnerable: "Faculty are promoted and rewarded based on a journal article process that reduces problems to the point that they are no longer relevant. Society demands relevant research" (p. 1241).



**Figure 1.** Percentage change in total cost of attendance (in-state) vs. percentage change in state median household income: 2003-2022, selected 1862 land-grant institutions. Data Source: Total Cost of Attendance data from U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, College Navigator. Median Household Income data from U.S. Census Bureau through FRED Economic Data, Federal Reserve Bank of St. Louis.

The funding model for public higher education has changed over the last generation, with significant consequences for accessibility. Perry (2023) notes that over the decade from 2008 to 2018, state funding for land-grant mission areas (academic, experiment station, Extension) remained flat while state budgets grew by 35% and overall land-grant university budgets grew by 52%. In short, state support for land-grant education and research programs fell sharply as a proportion of state outlays. The complementary effect was that, as universities grew funding from other sources, state support fell even more dramatically as a proportion of university budgets.

How did university budgets grow in the face of stagnant state funding? The answer, of course, is increased funds from tuition, grants, fee-for-service activities, and gifts – bringing higher levels of institutional competition for each of these funding sources (Lee, 2017). Financial statements from 50 public flagship universities between 2002 and 2022 indicate that the median flagship raised tuition and fees by \$2.40 for every \$1 lost in state funding (Korn et al., 2023). These numbers do not account for scholarships and financial aid and thus overstate the true (private) cost of a university education; however, the shift from state funding to more tuition-based funding has still proceeded at a pace that has generally outstripped growth in household income (Koch, 2019). Figure 1 illustrates this phenomenon for 1862 land-grant institutions in the southern region (plus Kansas and Missouri) for the two decades between 2003 and 2022 using Department of Education data on the total cost of attendance (which includes the cost of housing and food, as well as books, transportation expenses, some miscellaneous expenses such as a computer, etc.). For all these states over that time, the total cost of attendance for in-state students has grown more than the median household income: substantially more in most states.

In the fields of agribusiness management and agricultural economics, this disconnect between stakeholders and land-grants gave rise to pervasive questions related to the relevance of the discipline and the relevance of institutional arrangements (Akridge, 1992; Beattie, 1991; Eidman,

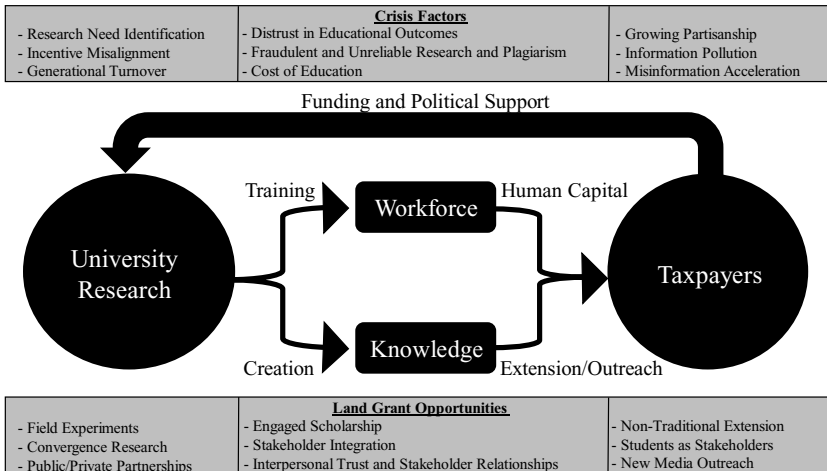


Figure 2. Conceptual framework of the implicit relationship between taxpayers and university research.

1995; Just and Rausser, 1989; King and Boehlje, 2000).<sup>1</sup> Were academics working on the right problems? Were they losing sight of their true “mission”? Could they adjust their mission to continue providing relevant programs for their clientele? Our current situation bears some resemblance to this previous era. In both cases, real concerns are raised about stakeholder buy-in to agribusiness and agricultural economics programs at our land-grant institutions: then due to concerns about stakeholder interest, now due to concerns about stakeholder trust. There is, therefore, an encouraging example in this relatively recent history. Despite those earlier concerns about the field becoming unmoored from stakeholder concerns and drifting into irrelevance, the field has persisted and even thrived as an applied discipline (Coble, 2020). Perhaps a similar outcome is possible in the current time as well.

### Extension opportunities and challenges for the 21st century

Despite the many critics predicting the decline of land-grant institutions, the integrated three-part mission of Extension, teaching, and research has prevailed into a new century. Based on the background literature, Figure 2 presents a simple conceptual framework of the implicit relationship between taxpayers and the university land-grant system, along with ongoing crisis factors and opportunities to address those crisis factors. The conceptual framework depicted in the figure underscores the symbiotic relationship between public universities and taxpayers within the context of funding the land-grant mission. University research is a hub for innovation and knowledge creation, and education/Extension is instrumental in preparing a skilled workforce. When functioning effectively, the research mission at a land-grant institution creates new scholarly output (discoveries, intellectual property, companies, etc.) while engaging scholars at the forefront of their fields in the teaching and Extension missions (McDowell, 2003). This engagement means students and Extension audiences learn from those creating the new knowledge and that the new knowledge is embedded in classrooms and Extension programs. This knowledge creation and education process through graduates and reskilling/upskilling feeds into the workforce, ensuring that the human capital developed is well-equipped with the latest insights and skills necessary for advancing industry and society.

<sup>1</sup>The 1990’s were not the first time the fields of agribusiness management and agricultural economics have confronted an identity crisis. Indeed, even Nobel Prize winner James Buchanan (1969) attempted to answer the question about the enduring relevance of an integrated land-grant model for agricultural economics.

The workforce is better prepared because of the foundation provided by university research. Knowledge transfer through Extension and outreach also builds workforce capabilities through programs designed to disseminate knowledge beyond the academic setting, allowing for a broader societal impact. Through this impact, the human capital within the academic institution uses its expertise to meet the needs of communities, industries, and the broader public, effectively closing the loop of knowledge creation and application.

Taxpayers are pivotal in this process, as they, directly and indirectly, fund university research through mechanisms such as state budget allocations and grants. The public investment is justified by the return on investment through the enhanced workforce and the societal benefits that stem from university-led innovations, education, and outreach. In this framework, the cycle of funding and research needs is perpetuated by the taxpayers' support, which fuels the university's ability to generate new knowledge, make new discoveries, and train future professionals, ensuring the sustained development of human capital and ongoing engagement with community needs. The conceptual framework presented in the figure delineates a complex interplay between university research, workforce development, and taxpayer investment, underscored by a series of crisis factors and opportunities for land-grant universities. These elements reflect the challenges and prospects these institutions face amidst an epistemic crisis.

### **Crisis factors**

Part of the crises currently confronting land-grant colleges of agriculture involve on-campus activities. The first crisis factor, "Research Need Identification," suggests that universities must critically reassess their research agendas. Historically, land-grant universities have played a crucial role in addressing agricultural and rural challenges through targeted research that directly benefited stakeholders. However, in today's rapidly evolving information landscape – marked by the proliferation of misinformation and shifting public expectations – traditional research might be better served by a "convergence" approach that blends multiple academic disciplines and industry stakeholders for public-private partnerships focused on "grand challenges" (Malone *et al.*, 2022). Emergent societal challenges, such as climate change, food insecurity, and public health issues, require innovative approaches that cross disciplinary boundaries and incorporate the latest technological advancements.

Moreover, the rise of misinformation has made it increasingly difficult for the public to discern credible research from misleading information, further complicating the task of identifying pressing research needs. Land-grant universities, therefore, must engage more deeply with stakeholders, including farmers, policymakers, and community members, to ensure that their research agendas address the most urgent and relevant issues. By actively involving stakeholders in the research process – from identifying research questions to disseminating results – land-grant universities can better align their research with societal needs, reinforcing their role as trusted sources of reliable, science-based information. In doing so, they can help mitigate the epistemic crisis by ensuring that their research directly contributes to addressing the critical challenges facing modern society.

Additionally, "Incentive Misalignment" hints at a disconnect between the motivations driving research activities and the broader goals of societal benefit and truth dissemination. The current academic reward structures often prioritize metrics such as publication in high-impact journals, securing grant funding, and achieving tenure, which may not always align with the needs of stakeholders or the public good. This misalignment can lead to a focus on research that is more theoretically driven or narrowly scoped, rather than research that addresses pressing societal challenges or engages directly with communities. Note that such foundational research is essential for any discipline to advance. However, the potential for land-grant universities to act as leaders in public trust and knowledge dissemination is undermined if a substantial portion of their research portfolio does not fully resonate with the needs and concerns of the broader society. Colleges

would do well to reevaluate and potentially redesign incentive structures to encourage research that is *both* academically rigorous *and* directly beneficial to stakeholders.

Complicating this issue is the phenomenon of “Generational Turnover,” where the retirement of seasoned faculty members, who often carry with them deep institutional knowledge and a commitment to the land-grant mission, creates gaps in leadership and continuity. Though “Generational Turnover” is a significant crisis factor for all academic institutions, the impact can be particularly pronounced within stakeholder-focused roles in the land-grant institution (Marshall et al., 2022). This phenomenon involves the retirement of seasoned faculty who possess deep understanding of and commitment to the land-grant mission and equally deep institutional knowledge and expertise. Retirement of such individuals can lead to major transition issues if not managed properly. The retirement of these key faculty members often creates challenges to long-standing stakeholder relationships built by the faculty members over time. Such retirements can mean the loss of valuable insights and mentorship, critical for maintaining the continuity of integrated academic programs and especially applied research and Extension. Moreover, as these experienced faculty members retire, there is a pressing need to infuse new, digitally native approaches to research and education that align with the expectations of a younger generation of scholars and the evolving digital landscape. This transition is critical, as the ability of land-grant universities to remain relevant and impactful in a digital age depends on their capacity to integrate innovative methodologies and technologies into their research and outreach efforts. In some cases, national mentorship programs might help bridge these transitions, but the uniqueness of every state’s agricultural ecosystem and institutional differences mean such programs have challenges of their own (Hagerman et al., 2022).

The issues here are exacerbated by the difficulty land-grant institutions face in replacing these individuals, in part due to concerns about the ability to hire faculty with the same commitment/expectation to pursue an integrated land-grant program. Another challenge is attracting young talent to doctoral programs, partly due to the competitive nature of private sector salaries which can far exceed what is typically offered in academia (Hanks and Kniffin, 2014). Furthermore, in response to budget constraints and the need to fill teaching positions left vacant by retirees, there is a trend toward hiring more non-tenure track faculty. While this can be cost-effective in the short term and these individuals can be highly effective in their roles, this strategy carries long-term risks including potential declines in teaching quality and research output – as well as impacting the ability to develop stakeholder relationships. The reliance on non-tenure track faculty can also impact the university’s ability to offer a stable and rewarding academic environment, crucial for attracting and retaining top students and faculty, thereby accentuating the turnover cycle and its associated challenges.

Additional self-imposed crisis factors challenge the interplay between university research and taxpayers. Distrust in educational outcomes undermines the perceived value of these institutions, as stakeholders and policymakers question the practical impact and relevance of the education provided. When graduates are seen as ill-prepared for the workforce or the university’s research fails to translate into tangible societal benefits (a challenge given the inevitable time lags between discovery and application), the justification for investing public funds into these institutions weakens.

Accusations of plagiarism create questions about academic integrity. Furthermore, fraudulent and unreliable research within university outputs can have a catastrophic impact on credibility. Instances where research is found to be falsified, non-replicable, or methodologically unsound can lead to a withdrawal of financial support from government and private funders who seek accountability and verifiable impacts from their investments – not to mention the impact on the public’s trust in academic research. These crisis factors can spur a vicious cycle of reduced funding and support, constraining the universities’ ability to fulfill their integrated mission of education, research, and public service.

One of the most frequent criticisms of higher education is rising tuition – tuition that has increased faster than the rate of inflation for decades (Schleifer *et al.*, 2022). Using 1992–1993 as a base, adjusted for inflation, published tuition for 4-year public universities was 2.25 times higher in 2022–2023 relative to 1992–1993 (Ma and Pender, 2022). Much of this run-up happened from 1992–1993 to 2012–2013, as increases in published tuition by 4-year public universities have been much more modest over the past decade. 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 the net cost of attendance is the focus. Net cost of attendance deducts grant aid provided to students (not loans) from the total cost. And, the net cost of attendance for 4-year public universities is basically unchanged on an inflation-adjusted basis since 2006–07 once grant aid is factored in. That said, the actual “cost” of college remains complex and a major investment for most families. Hence, regardless of how defined or how measured, the push for lower costs in higher education is neither new nor likely to abate.

Hyper-politicization suggests a departure from the objective pursuit of knowledge to politically or ideologically driven agendas, further eroding confidence. Growing partisanship amplifies the impacts of all of these factors, with missteps magnified by the left and the right. This perception can lead to skepticism among taxpayers and policymakers, adding to their struggle to disentangle “clickbait” from rigorous, objective academic research (Munger, 2019; Luca *et al.*, 2022; Munger *et al.*, 2020).

The figure also highlights the challenges of “Information Pollution” and “Misinformation Acceleration,” which threaten the integrity of knowledge transfer from universities to the public. Makridakis (1995) argued that the linkage of computing technology with telecommunications systems would unleash the long-anticipated information revolution that would transform the economy and culture within the next two decades. As predictions go, this was a pretty good one; with unprecedented computing power and more accessible “big” datasets, new fields of inquiry exploded, generating new career opportunities outside the academy (Lusk, 2017). The proliferation of data and the infrastructure to manage and analyze it moved the entire field of economics in a more applied direction (Coble, 2020; Hamermesh, 2013). This trend is likely to continue, though the question remains whether non-economists will listen to the study findings or – more pointedly – whether anyone will trust the academics generating the research.

The challenges to the epistemology of the current new media landscape obscure the fact that humanity has always been challenged to separate reliable from unreliable knowledge, and the stakes have always been high. Attempts to define and classify knowledge have a long and distinguished history, going back at least as far as Plato (Hepburn and Anderson, 2021). Over the millennia, systematic approaches to inquiry were developed and accepted as leading to reliable knowledge. This systematic approach to inquiry is science in the most general sense of the term (Etheridge, 2004). As such, the grand challenge associated with outreach and Extension is not in “doing science,” as improved computing power means researchers are far better equipped for that than at any time in human history. Rather, the challenge is having our science – the reliable knowledge generated through systematic inquiry – accepted by the public (Malone *et al.*, 2022).

### ***Land-grant opportunities***

The erosion of the public’s trust in the practice of science and higher education in general is a lamentable condition. If trust in higher education is falling – as seems undeniable at this point – and if some form of stakeholder-engaged scholarship offers an effective way to reduce or reverse this dynamic – as seems at least plausible – then land-grant institutions are in – or at least ought to be in – an enviable position. Given their three-part mission, land-grant universities have many opportunities to address the abovementioned crisis factors. These include the ability to conduct “Field Experiments” and engage in “Convergence Research,” which blends disciplines to tackle



complex problems. Moreover, “Public/Private Partnerships” can identify important problems, catalyze innovation, and provide practical avenues to apply research outcomes. This private-sector collaboration can help ensure that research is focused on relevant problems, create synergies between those pushing the boundaries of science and those pushing the boundaries of application, and shorten the path to some form of societal benefit. Taking advantage of these opportunities can help address a number of the crisis factors, including ‘Research Need Identification’ and ‘Distrust in Educational Outcomes.’

Beyond these ideas, to further address the challenge of diminishing public trust and rebuilding public support for higher education, universities might develop strategies directly targeting two important and complementary objectives that have long been the land-grant’s forte: improving stakeholder engagement and expanding student access.

### **Engaged scholarship**

Declining trust has been a major concern of the higher education world since long before Gallup started polling the issue. Boyer (1996) observed that the perception of higher education had shifted from its being – at least in large part – a public good to one delivering purely private benefits, with a consequent decline in public confidence in higher education. In response, he advocated for a “scholarship of engagement” (p. 19), which would include not just the discovery of new knowledge but also knowledge integration, sharing, and application – with these dimensions of scholarship carried on by academics and practitioners working collaboratively. Boyer saw this not so much as a new model of scholarship but rather as a return to an older model that had made U.S. higher education so successful in the first place, as he makes clear in his reflection on comments made by a distinguished panel of university presidents at the close of the 19<sup>th</sup> century:

Frankly, I find it quite remarkable that just one hundred years ago, the words *practicality* and *reality* and *serviceability* were used by the nation’s most distinguished academic leaders to describe the mission of higher learning – which was, to put it simply, the scholarship of engagement (pp. 19–20, emphasis in original).

Boyer’s call for a scholarship of engagement launched an ‘engagement movement’ by a large portion of the higher education establishment – especially among public universities (Wendling, 2020). Perhaps the most comprehensive effort at defining and encouraging engaged scholarship was the work of the Kellogg Commission on the Future of State and Land-Grant Universities. This Commission, convened by the National Association of State Universities and Land-Grant Colleges (NASULGC) and supported by the W.K. Kellogg Foundation, consisted of presidents/chancellors from two dozen public universities along with the chief executive officers of the Kellogg Foundation and NASULGC. Their report was motivated by a “growing public frustration with what is seen to be our unresponsiveness” (Kellogg Commission, 1999, p. 19). Addressing this frustration, the Commission encouraged a recommitment to engagement, proposing “a seven-part test of engagement” to assess institutional efforts (Kellogg Commission, 1999, p. 12). These tests of engagement included 1) responsiveness to community needs/problems; 2) respect for partners in collaborative partnerships (specifically, non-academic partners); 3) academic neutrality; 4) accessibility to potential partners outside of academic circles; 5) integration of the service mission with other institutional missions (especially research and resident instruction missions); 6) coordination of service/engagement agenda across units in the University; and 7) partnerships with government, business, and the nonprofit sector to secure resources for engagement.

Indeed, the literature on engaged scholarship largely focuses on ensuring continued public support for higher education by ensuring that universities, especially public ones, are responsive to community needs (Cook & Nation, 2016). In that era of the recent past, the danger for public higher education was that the public would lose interest in universities, finding them irrelevant to

their lives. The issue of public trust is largely absent from these earlier conversations about engaged scholarship. That the public would trust the University's work (and intentions) was taken for granted. Indeed, the contemporary direct objective of engaged scholarship is not to foster continued public support for public higher education but rather to reestablish the public's trust in public higher education, which is a necessary predicate to more active support.

In a recent article in the *Chronicle of Higher Education*, Fischer (2023) argues that "community-focused scholarship" – perhaps the latest permutation of engaged scholarship – can help counter the decline in the public's trust in higher education. Similarly, Wickert *et al.* (2023) note the rising skepticism toward "the scientific enterprise" and suggest that universities could counter that skepticism by producing "knowledge for the greater good" (p. 297). They identify five forms of impact – scholarly, practical, societal, policy, and educational – and encourage research that aspires to more than just scholarly impact (i.e., a contribution recognized primarily by one's disciplinary peers).

Engaged scholarship demands stakeholder integration. And, stakeholder integration helps build interpersonal trust and enhanced stakeholder relationships. Critical here is using the institution itself as a mechanism to build such relationships. The Cooperative Extension Service provides an especially appropriate formal system for stakeholder input to inform and impact research and resident instruction (Doye, 2006; Herberich *et al.*, 2009). Therefore, the challenge is not to develop a new model of engaged scholarship but rather to implement the existing model more effectively. Here, we run into some of the challenges already identified in the literature related to the misalignment of incentives (see Hildreth, 1990; McDowell, 1988; Skees, 1992).

Stakeholder-engaged scholarship requires tight integration of the land-grant functions. However, in reality, and much too frequently, passing muster with promotion and tenure committees means all faculty must tread the same relatively narrow scholarly path. If stakeholder-focused (engaged) scholarship is not considered adequate for professional advancement, the stakeholder connection to the university will certainly be weakened significantly and may be lost entirely. Then, we need incentive structures within our universities that recognize the essential value of engaged scholarship and provide appropriate incentives for it – or, at a bare minimum, that do not actively penalize it (Foltz and Barham, 2009).

None of this is meant to imply that effectively engaged scholarship looks dramatically different from more traditional scholarship. On the contrary, engaged scholarship can and should lead to publishable work, extramural funding, invited seminars, and everything else relevant for a strong academic vita. That said, the focus should be more on the difference in degree rather than differences in type. Unfortunately, even this difference can cause problems if evaluation criteria are too rigid, narrow, quantitatively oriented, and inwardly focused. Developing more flexible evaluation criteria to accommodate and encourage engaged scholarship will likely not be easy, nor will it happen quickly within most academic disciplines.<sup>2</sup> Still, it is critical to emphasize that internal evaluation criteria must systematically consider what is truly valued by the stakeholders whose tax and tuition dollars fund the enterprise.

### ***Students as stakeholders***

"Non-Traditional Teaching and Extension Programming" offers a pathway for land-grant universities to innovate in education and outreach, ensuring they remain relevant in a rapidly evolving information ecosystem. By embracing these nontraditional opportunities, universities might navigate the epistemic crisis and become beacons of reliable knowledge, bridging the gap between academia and the wider community, ultimately justifying the investment made by

<sup>2</sup>Purdue University has developed an extensive guide to developing and evaluating promotion and tenure cases focused on engaged scholarship. See: <https://www.purdue.edu/engagement/wp-content/uploads/2021/09/The-Guide-Documenting-Evaluating-and-Recognizing-Engaged-Scholarship.pdf>.

taxpayers. The land-grant system has greatly democratized higher education in the United States; by enrollment, U.S. land-grant institutions account for half of the top 30 largest U.S. universities (Perry, 2023). Through this system and the extensive network of public universities, higher education became accessible to a broader socioeconomic class than ever before. Complementary higher education support programs – the G.I. Bill, federal work-study support, Pell Grants, and the Stafford Federal Student Loan Program – expanded that access even more (Strach, 2009). By the late 20<sup>th</sup> century, a high-quality university education was realistically within reach for high school graduates of even very modest means. However, there seems to be little doubt now that many taxpayers no longer consider that the case as ‘cost of education’ is typically at the top of the list of concerns the public has about higher education (ECMC Group, 2023).

That said, higher education bears strong similarities to other service industries requiring a high level of education/credentialing (e.g., the healthcare industry), which have also experienced significant cost inflation, often invalidating comparisons with broader measures of inflation (Archibald and Feldman, 2011). Despite this reality, attempts at significant cost control in higher education have not been particularly impressive – or at least have not impressed the public at large. Koch (2019) offers the following concise summary of the college affordability situation:

... there has been a continuous, unabated increase in the number of hours of work required from a typical private-sector worker for him/her to be able to pay the average student’s published tuition and fee charges at one of our nation’s public institutions of higher education. This tells us that unless tuition and fee increases have been matched by equivalent increases in financial aid (which has not occurred), the affordability of a college education to most families has declined (p. 18).

To the extent that a decline in the affordability of higher education contributes to the well-documented decline in public trust in higher education, universities have a strong vested interest in increasing access. Undoubtedly, many strategies might accomplish this task, though a few principles might be the basis of these efforts. First, universities might do a better job of meeting students where they are. While increasing tuition and fees get a lot of the blame for the unaffordability of higher education, much of the increase in total attendance cost has been due to increases in room and board costs, either on or off campus. Helping students reduce or avoid these costs would significantly impact the affordability of higher education.

Online programs are one possibility, though these programs often confront significant challenges regarding perceptions of quality from faculty, employers, and potential students (Gaskell and Mills, 2014). Despite the challenges, one should not dismiss the potential of online learning to improve affordable access to higher education, particularly if it is implemented as part of a more comprehensive delivery strategy.

Hybrid delivery models that integrate online instruction with periodic in-person contact (e.g., multiple weekend or week-long intensive meetings during the semester) have been used extensively in graduate professional education with considerable success. A similar delivery model might easily be applied to undergraduate instruction as well. Delivering the in-person component of such classes through a distributed model – such as through satellite locations in key population centers, existing R&E centers, county Extension offices, or community college partners – would significantly lower barriers to access (Diekmann et al., 2012). Likewise, synchronous remote delivery – directly to students or through a mediating partner like a community college or R&E center – offers ready access. Work-school programs where students alternate between semesters/years on campus and in employment can help address these costs (including the opportunity cost of lost wages) – and provide a richer educational experience. Online courses here can help make the longstanding ‘cooperative education’ model far more impactful as students can progress toward their degree/credential while working.

Operational and administrative questions must be sorted out with alternative delivery models. For faculty, alternative delivery could require a significant change from the traditional work mode. In some respects, teaching could closely resemble Extension program delivery (Vines, 2018). Determining appropriate appointment splits under alternative delivery models could also be a challenge. What level of teaching appointment should be required to cover a hybrid course with an online component and four-weekend sessions off-campus scattered throughout the semester? What about a week-long intensive session on campus during the winter holiday break? Would a remote section added to a traditional residential class constitute a separate teaching assignment? Do such assignments entail extra compensation? These questions are certainly answerable but will likely require trial and error.

Universities might also benefit from prioritizing access over amenities as a development strategy. Modern institutions of higher education often compete on the quality of amenities. The drive for more and better student accommodations and lifestyle amenities has been driven, at least partly, by an unhealthy obsession with third-party college rankings. Many influential rankings directly reward spending on student experience, providing a strong incentive for spending increases with little or no incentive for efficiency (Korn *et al.*, 2023). The extent to which the costs of improved amenities are passed on to students through higher tuition can directly impact access. This tradeoff between student amenities and access for lower-income students ought to be rigorously evaluated as universities make spending and investment decisions.

A final opportunity exists with new media outreach and science communication (Entradas *et al.*, 2020; Moore and Irlbeck, 2021). Success here starts with a compelling story, and land-grant universities have a compelling story to tell. Beyond the message, the mode matters, and aligning the vast array of media communications with stakeholder groups demands a deep understanding and appreciation of both. It is important to use media to create a feedback mechanism that allows the voice of stakeholders to be captured, helping inform future actions and initiatives. Too often, universities want to tell stories but do not listen to or incorporate meaningful stakeholder feedback (or don't have good mechanisms for doing so). The importance of putting the new media to work effectively is difficult to overstate – in a world full of misinformation, land-grant universities must demonstrate to their varied publics what they are doing for them and why it matters, helping create informed opinions of the work being done and the value created.

## Summary and conclusion

The proliferation of information and the means to disseminate it at very low cost has been a challenge to the traditional model of higher education for years, drastically increasing the value of a reliable separation of signal from noise (Silver, 2012). This valuable cycle is one of the services that public universities were created to provide. Land-grant universities are critical in disseminating unbiased information by reasserting their traditional role as objective, unbiased arbiters of reliable information. This process can only be accomplished if stakeholders consider the university research objective and unbiased, which requires deep, consistent engagement with a diverse set of stakeholders and a demonstrated commitment to the highest standards of scholarship. The modern era is, in short, a perfect opportunity to demonstrate the value and continued relevance of the land-grant university model. To accomplish this task, our work implies five important strategies to expand and enhance the role of land-grant Extension in the modern epistemic crisis.

1. *Adopt Integrated Communication Strategies:* In the wake of misinformation and reduced public trust, land-grant Extension programs should adopt integrated communication strategies that leverage traditional outreach and modern digital platforms (Malone *et al.*, 2022). This process would increase accessibility and ensure stakeholders receive reliable

information that combats misinformation. Such strategies must facilitate two-way communications with audiences, ensuring the voice of the audience is heard if they are to support the kind of stakeholder engagement needed to rebuild trust.

2. *Engage in Policy Advocacy*: Extension programs should engage in policy advocacy, not in the sense of picking sides in political fights but in routinely providing evidence-based research and data to inform policy decisions. This role involves working closely with policymakers, understanding their information needs, and supplying timely and relevant research findings (Perry et al. 2024). Such work can draw on the well-established ‘alternatives and consequences’ model of policy research and education: providing research-based information to stakeholders on the policy options available and the consequences of each so decision-makers can make informed choices.
3. *Strengthening Community Partnerships*: Extension programs should strengthen their engagement with local communities by fostering strong partnerships with commodity groups, local economic development officials, and non-profits, among other community members. This approach helps tailor Extension programs to address specific community needs, build trust, and establish Extension as a key player in community development (Ellison et al., 2017; Lineback et al., 2021).
4. *Expanding Stakeholder Education Programs*: Extension services should expand their educational programs to cover more areas of public interest, such as media literacy and critical thinking, to empower stakeholders in differentiating between credible and non-credible information (Marczak et al., 2019; Taylor et al., 2017).
5. *Encouraging Collaborative Research Initiatives*: Land-grant universities should encourage collaborative research initiatives that involve stakeholders in the research process. By involving the community in creating knowledge, land-grant Extension programs can ensure that the research is relevant and the research process transparent, which can help rebuild public trust in scientific research (Lagoudakis et al., 2020; Yamamoto, 2012).
6. *Innovate Teaching and Learning Approaches*: Beyond Extension, land-grant universities should consider adopting hybrid teaching and learning models that combine online and in-person instruction (Boland et al., 2022; Worley et al., 2024). This approach can increase access to education, particularly for nontraditional students, and help meet the needs of a more diverse student body. By leveraging digital tools and flexible delivery methods, universities can provide high-quality education that is more adaptable to the evolving demands of students and the workforce. This innovation in teaching can also foster a stronger connection between (more) students and the land-grant mission, reinforcing the relevance and impact of these institutions in today’s society.

Each of these recommendations underscores the need for – and potential of – a proactive, engaged, and responsive land-grant Extension system that can navigate and counter the challenges of the epistemic crisis.

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## References

- Akridge, J.T. “Agribusiness and extension: Characteristics of successful programs to serve a rapidly changing clientele.” *Journal of Agricultural and Applied Economics* 24,1(1992):37–43.
- Al-Kaisi, M.M., R.W. Elmore, G.A. Miller, and D. Kwaw-Mensah. “Extension agriculture and natural resources in the U.S. Midwest: A review and analysis of challenges and future opportunities.” *Natural Sciences Education* 44,1(2015):26–33.
- Andersen, M.A., J.M. Alston, P.G. Pardey, and A. Smith. “A century of U.S. farm productivity growth: a surge then a slowdown.” *American Journal of Agricultural Economics* 100,4(2018):1072–90.
- Archibald, R.B., and D.H. Feldman. *Why Does College Cost So Much?*. New York: Oxford University Press, 2011.

- Bagg, S.** “The power of the multitude: answering epistemic challenges to democracy.” *American Political Science Review* 112,4(2018):891–904.
- Bao, L., M.N. Calice, D. Brossard, B. Beets, D.A. Scheufele, and K.M. Rose.** “How institutional factors at US land-grant universities impact scientists’ public scholarship.” *Public Understanding of Science* 32,2(2023):124–42.
- Beattie, B.R.** “Some almost-ideal remedies for healing land grant universities.” *American Journal of Agricultural Economics* 73,5(1991):1307–21.
- Biedny, C., T. Malone, and J.L. Lusk.** “Exploring polarization in US Food policy opinions.” *Applied Economic Perspectives & Policy* 42,3(2020):434–54.
- Benkler, Y., R. Faris, and H. Roberts.** *Network Propaganda: Manipulation, Disinformation, and Radicalization in American Politics*. New York: Oxford University Press, 2018.
- Boland, M.A., C.J. Kopka, K.L. Jacobs, C. Berner, B.C. Briggeman, M. Elliott, D. Friend, P. Kenkel, G. McKee, F. Olson, & J.L. Park.** “Extension programming during a pandemic: the cooperative director foundations program.” *Applied Economics Teaching Resources* 4,2(2022):1–5.
- Boyer, E.L.** “The scholarship of engagement.” *Bulletin of the American Academy of Arts & Sciences* 49,7(1996):18–33.
- Brenan, M.** (2023). Americans’ Confidence in Higher Education Down Sharply. Gallup, Inc. Internet site: <https://news.gallup.com/poll/508352/americans-confidence-higher-education-down-sharply.aspx>, Accessed on July 20, 2023.
- Brennan, J.** “Epistemic democracy.” *Routledge Handbook of Applied Epistemology*, Brennan, J., Eds. 2018, pp. 88–100.
- Buchanan, J.M.** “A future for agricultural economics?” *American Journal of Agricultural Economics* 51,5(1969):1027–36.
- Coble, K.H.** “Relevant and/or elegant economics.” *American Journal of Agricultural Economics* 102,2(2020):392–9.
- Cook, J.R., M. Nation.** “Community engagement: Universities’ roles in building communities and strengthening democracy.” *Community Development* 47,5(2016):718–31.
- Demartini, G., S. Mizzaro, and D. Spina.** “Human-in-the-loop artificial intelligence for fighting online misinformation: challenges and opportunities.” *Bulletin of the IEEE Computer Society Technical Committee on Data Engineering*, 2020.
- Diekmann, F., C. Loibl, M.T. Batte, and M.F. Yen.** “Judging farmers’ willingness to trade distance and taxes for extension services.” *Applied Economic Perspectives & Policy* 34,3(2012):454–71.
- Doye, D.** “The environment for scholarship in agricultural economics extension.” *Journal of Agricultural and Applied Economics* 38,2(2006):261–78.
- ECMC Group.** (2023) Question the Quo: Gen Z Teens Have Changed Their Priorities for Education and Work, June.
- Eddy, E.D.** *Colleges for Our Land and Time: The Land-Grant Idea in American Education*. New York: Harper and Brothers, 1957.
- Ellison, B., N.D. Paulson, M.R. Taylor, G.T. Tonsor, J. Coppess, and G.D. Schnitkey.** “Evaluation of educational offerings associated with the 2014 Farm Bill.” *Applied Economic Perspectives & Policy* 39,4(2017):547–58.
- Eidman, V.R.** “The continuing search for relevance in agricultural economics.” *American Journal of Agricultural Economics* 77,5(1995):1083–95.
- Entradas, M., M.W. Bauer, C. O’Muircheartaigh, F. Marcinkowski, A. Okamura, G. Pellegrini, and Y.Y. Li.** “Public communication by research institutes compared across countries and sciences: Building capacity for engagement or competing for visibility?” *PLoS One* 15,7(2020):1–17.
- Ethridge, D.** *Research Methodology in Applied Economics*. Second ed. Ames, IA: Blackwell Publishing, 2004.
- Fischer, K.** (2023). The Insular World of Academic Research. *Chronicle of Higher Education*, 70. Internet site: <https://www.chronicle.com/article/the-insular-world-of-academic-research>. Accessed on November 3, 2023.
- Foltz, J.D., and B.L. Barham.** “The productivity effects of extension appointments in land-grant colleges.” *Applied Economic Perspectives & Policy* 31,4(2009):712–33.
- Fong, J., T. Guo, and A. Rao.** “Debunking misinformation about consumer products: effects on beliefs and purchase behavior.” *Journal of Marketing Research* 61,4 (2024): 659–81.
- Fukuyama, F.** “America in decay: The sources of political dysfunction.” *Foreign Affairs*. 93,5 Sep/Oct(2014):5–26.
- Gaskell, A., and R. Mills.** “The quality and reputation of open, distance, and e-learning: what are the challenges?” *Open Learning: The Journal of Open, Distance, & E-Learning* 29,3(2014):190–205.
- Hagerman, A.D., T.L. Marshall, M.J. Sullins, and K.H. Burdine.** “The role of mentoring in increasing new extension faculty success rates.” *Applied Economics Teaching Resources* 4,3(2022):12–22.
- Hamermesh, D.S.** “Six decades of top economics publishing: who and how?” *Journal of Economic Literature* 51,1(2013):162–72.
- Hanks, A.S., and K.M. Kniffin.** “Early career PhD salaries: The industry premium and interdisciplinary debate.” *Applied Economics Letters* 21,18(2014):1277–82.
- Hepburn, B., and H. Anderson.** “Scientific method.” *The Stanford Encyclopedia of Philosophy*Hepburn, B., and H. Anderson, 2021, Internet site: <https://plato.stanford.edu/archives/sum2021/entries/scientific-method/>. Accessed on 2023-07-19.
- Herberich, D.H., S.D. Levitt, and J.A. List.** “Can field experiments return agricultural economics to the glory days?” *American Journal of Agricultural Economics* 91,5(2009):1259–65.
- Hildreth, R.** “Land-Grant University on Trial: Testimony for the Plaintiff.” *Proceedings of the 1990 Annual Conference of the Commission of Professors of Adult Education*, L. Hildreth, R., 1990, pp. 37–9.

- King, D.A., and M.D. Boehlje. "Extension: On the brink of extinction or distinction." *Journal of Extension* 38,5(2000):5COM1.
- Kreps, S. "The role of technology in online misinformation." *Foreign Policy at Brookings*, (2020):2–7.
- Irwin, E.G., A.M. Isserman, M. Kilkenny, and M.D. Partridge. "A century of research on rural development and regional issues." *American Journal of Agricultural Economics* 92,2(2010):522–53.
- Kreiss, D. "From epistemic to identity crisis: Perspectives on the 2016 US Presidential Election." *International Journal of Press & Politics* 24,3(2019):383–8.
- Just, R.E., and G.C. Rausser. "An assessment of the agricultural economics profession." *American Journal of Agricultural Economics* 71,5(1989):1177–90.
- Kellogg Commission on the Future of State and Land-Grant Universities. *Returning to Our Roots: The Engaged Institution*. Washington, DC: National Association of State Universities and Land-Grant Colleges, February, 1999.
- Koch, J.V. *The Impoverishment of the American College Student*. Washington, DC: The Brookings Institution, ISBN, 2019, p. 271–271.
- Korn, M., A. Fuller, and J.S. Forsyth. "Colleges spend like there's no tomorrow; These places are just devouring money; students foot the bill for flagship state universities that pour money into new buildings and programs with little pushback." *Wall Street Journal* (2023). Retrieved from <https://www.wsj.com/>.
- Lagoudakis, A., M.G. McKendree, T. Malone, and V. Caputo. "Incorporating producer opinions into a SWOT analysis of the U.S. tart cherry industry." *International Food & Agribusiness Management Review* 23,4(2020):547–61.
- Lee, Y.J. "Understanding higher education institutions' publicness: do public universities produce more public outcomes than private universities?" *Higher Education Quarterly* 71,2(2017):182–203.
- Lineback, C.B., M.G. McKendree, J.P. Schwehofer, and D.D. Buskirk. "Obtaining extension stakeholder input to influence extension education programming and staff needs." *Applied Economics Teaching Resources* 3,1(2021):58–73.
- Luca, M., K. Munger, J. Nagler, and J.A. Tucker. "You won't believe our results! But they might: heterogeneity in beliefs about the accuracy of online media." *Journal of Experimental Political Science* 9,2(2022):267–77.
- Lusk, J.L. "Consumer research with big data: applications from the food demand survey (FoodS)." *American Journal of Agricultural Economics* 99,2(2017):303–20.
- Ma, J., and M. Pender. *Trends in College Pricing and Student Aid 2022*. College Board, 2022. Retrieved from <https://research.collegeboard.org/trends>.
- Makridakis, S. "The forthcoming information revolution." *Futures* 27,8(1995):799–821.
- Malone, T., J. Monahan, K. Nicpon, K.A. Schaefer, and M. Cary. "On the creation of fast-responding extension and teaching content in a new media environment." *Applied Economics & Teaching Resources* 4,2(2022):1–13.
- Malone, T., and F.B. Norwood. "Gluten aversion is not limited to the political left." *Agriculture & Human Values* 37,1(2020):1–15.
- Mandal, B., and T. Lawrence. "Managing the commons: How extension facilitates local participation to manage natural resources." *Applied Economic Perspectives & Policy* 39,3(2017):499–515.
- Marczak, M.S., E.H. Becher, and P. Olson. "Credible and actionable evidence across Extension program areas: A case example." *Journal of Human Sciences and Extension* 7,2(2019):7.
- Marshall, T.L., A.D. Hagerman, H.E. Shear, K.H. Burdine, and B.B. Jablonski. "Building up the next generation of extension specialists." *Applied Economics Teaching Resources* 4,3(2022):1–11.
- McDowell, G.R. "Land-grant colleges of agriculture: renegotiating or abandoning a social contract." *Choices* 2(1988):18–21
- McDowell, G.R. "Engaged universities: Lessons from the land-grant universities and extension." *Annals of the American Academy of Political and Social Science* 585,1(2003):31–50.
- Moore, A.R., and E. Irlbeck. "See you on TV: A phenomenology of careers on extension television in Oklahoma." *Journal of Applied Communications* 105,1(2021):1–14.
- Munger, K. "All the news that's fit to click: The economics of clickbait media." *Political Communication* 37,3(2020):376–97.
- Munger, K., M. Luca, J. Nagler, and J. Tucker. "The (null) effects of clickbait headlines on polarization, trust, and learning." *Public Opinion Quarterly* 84,1(2020):49–73.
- Perry, G.M. "Cooperative extension, experiment station, and land grant universities: competitors or partners for state funding?" *Applied Economic Perspectives & Policy* 45,2(2023):947–69.
- Perry, G.M., T. Malone, and J.T. Akridge. "Strategic Advocacy for Agricultural Experiment Station Funding Within the State Budget Allocation Process." Purdue University Working Paper Series (2024).
- Roe, B., T.C. Haab, and B. Sohngen. "The value of agricultural economics extension programming: An application of contingent valuation." *Applied Economic Perspectives & Policy* 26,3(2004):373–90.
- Saad, L. (2023). Historically Low Faith in U.S. Institutions Continues, Gallup, Inc.. Internet site: <https://news.gallup.com/poll/508169/historically-low-faith-institutions-continues.aspx>. Accessed on July 21, 2023.
- Schleifer, D., W. Friedman, and E. McNally. (2022). America's hidden common ground on public higher education: What's wrong and how to fix it." *Public Agenda*, July.
- Silver, N. *The Signal and the Noise: Why So Many Predictions Fail-But Some Don't*. New York: Penguin, 2012.

- Skees, J.** “The new political economy of agricultural and rural research: implications for institutional change.” *American Journal of Agricultural Economics* 74,5(1992):1241–8.
- Strach, P.** “Making higher education affordable: policy design in postwar America.” *Journal of Policy History* 21,1(2009):61–88.
- Swallow, S.K., and M.J. Mazzotta.** “Assessing public priorities for experiment station research: contingent value and public preferences for agricultural research.” *American Journal of Agricultural Economics* 86,4(2004):975–89.
- Taylor, M.R., G.T. Tonsor, N.D. Paulson, B. Ellison, J. Coppess, and G.D. Schnitkey.** “Is it good to have options? The 2014 farm bill program decisions.” *Applied Economic Perspectives & Policy* 39,4(2017):533–46.
- Vines, K.A.** “Exploration of engaged practice in Cooperative Extension and implications for higher education.” *Journal of Extension* 56,4(2018):24.
- Vosoughi, S., D. Roy, and S. Aral.** “The spread of true and false news online.” *Science* 359,6380(2018):1146–51.
- Wardle, C., and H. Derakhshan.** “Information Disorder: Toward an Interdisciplinary Framework for Research & Policymaking.” *Council of Europe Report DGI09*. The Council of Europe: Strasbourg, October(2017).
- Wendling, L.** “Valuing the engaged work of the professoriate: reflections on Ernest Boyer’s Scholarship Reconsidered.” *Journal for the Scholarship of Teaching & Learning* 20,October(2020):127–42.
- Wickert, C., C. Post, J.P. Doh, J.E. Prescott, and A. Prencipe.** “Management research that makes a difference: broadening the meaning of impact.” *Journal of Management Studies* 58,2(2023):297–320.
- Worley, J.M., W.B. Banks, W. Secor, and B.L. Campbell.** “Awareness and usage of extension and outreach programs.” *Applied Economics Teaching Resources* 5,4(2024):1–16
- Yamamoto, Y.T.** “Values, objectivity and credibility of scientists in a contentious natural resource debate.” *Public Understanding of Science* 21,1(2012):101–25.