

Engagement Opportunities and Challenges of Transdisciplinary Practice: The 1890 Land-Grant Perspective

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Abstract

Land-grant universities' philosophy of education assumes the triumvirate of education, research, and service will produce an improved quality of life and wealth-creating synergies disseminated to communities through Cooperative Extension (Gavazzi & Gee, 2019). In a simpler age, this philosophy worked well. In today's global, technology-mediated, complex society, a transformational overhaul is necessary to amplify and broaden the impact of potential synergies through a robust engagement process. As a path forward, we propose building renaissance transdisciplinary teams, reimagining reward and evaluation systems, and elevating engagement to a position of primacy in strategy and structure. We could elevate Extension to university-wide status and foster engagement as a critical component of teaching (learning) and research (discovery).

Using quantitative and qualitative data from the 1890 research directors, Extension administrators, and community stakeholders, we found strong support for greater university engagement with the community, especially for taking a deeper dive into long-term problem-solving by cocreating and codesigning viable solutions. There was also strong support for allocating additional technical and financial resources to build the university's community engagement portfolio. These data also draw attention to the need to elevate community engagement to the level of teaching and research and to establish the presence of the university in the community.

Brief History and Philosophy

Before the creation of the land-grant system of universities, formal education in the United States emphasized education in the classics and education for professions considered complex enough to require scholars to provide instruction, such as the priesthood, medicine, and law (Croft, 2019; Neyland, 1990). This type of education was generally available only to the children of the rich. However, as Evans and Herr (1978) reported, a few visionaries saw the need for education that combined instruction in agriculture and the mechanical arts with literary and scientific instruction. This new vision of education initially flourished through lyceums and mechanical institutes, eventually evolving into the land-grant colleges. Today, there are three types of land-grant universities (LGUs): 1862s, 1890s, and 1994s. The 1862 institutions are the original land-grant colleges and universities established by the Morrill Act of 1862, as amended. The 1890 institutions are historically Black colleges and universities (HBCUs) established as land-grant institutions by the Morrill Act of 1890. The 1994 institutions are Tribal Colleges and Universities (TCUs) created through the Equity in Educational Land-Grant Status Act of 1994 (Croft, 2019).

The Morrill Act of 1862 is widely regarded as one of America's greatest contributions to the furtherance of higher education—not only at home but also around the world. The land-grant colleges provided access to higher education to those among the “mechanical and agricultural classes” who had historically been deprived of that opportunity. Perhaps more than any educational policy ever conceived, land-grant legislation has democratized higher education and opened doors of opportunity for hundreds of thousands of people spanning several generations of our nation's development (Gavazzi & Gee, 2019).

Under the conditions of de jure separation of the races in the South and de facto separation in the North, African Americans were not permitted to attend the original 1862 land-grant institutions. The overarching objective of the first land-grant act was to enhance educational opportunities for the White industrial class in rural America, thus improving their livelihood. Black Americans were still in slavery. After slavery, four historically Black institutions were granted land-grant charters under the Morrill Act of 1862: Alcorn State University (Mississippi), Hampton University (Virginia), Kentucky State University, and Claflin University (South Carolina). Further, in 1871,

Mississippi was granted approximately 209,000 acres of land to sell for the purposes of establishing a land-grant college for formerly enslaved people and their descendants (Alcorn State University). Only 60% of the proceeds were used to establish Alcorn. There was no 1862 land-grant university in Mississippi in 1871; Mississippi State University (MSU) was established in 1878. After passage of the Second Morrill Act in 1890, the historically Black institutions with 1862 land-grant charters were then converted to 1890 land-grant charters. This conversion made it easier for the federal and state governments to underfund the 1890 institutions without being subjected to legal challenges that may have arisen had some of the Black institutions on the 1862 charter not received the same level of funding as the White 1862 institutions. Today, many of the 1890 institutions are still being underfunded at the federal and state levels (Neyland, 1990).

Current funding disparities continue to drive the inequalities between types of land-grant institutions. Working to ameliorate the consequences of this history and current practices will provide resources to and empower communities that are disproportionately left out of agricultural policy and decision-making.

For decades, there has been an unabated request from students and faculty—one that has gone largely unanswered—for more equitable funding at all non-White land-grant institutions. (Humphries, 1991). More recently, in a letter to governors and state leaders, several congressional Democrats who serve on the House Committee on Education and Labor and the House Agriculture Committee stated quite unequivocally that more attention should be placed on addressing funding disparities between 1890 and 1862 land-grant institutions. “For far too long the funding disparity between 1890 and 1862 Land-Grant Institutions has prevented our country from supporting our students when it comes to agriculture research and innovation,” said U.S. Representative David Scott. “That is why today I am calling on Governors and state leaders to finally put an end to this gap and work to ensure 1890 Institutions are fully funded in order to better support their students and agriculture programs” (Hudson, 2022).

According to a February 1, 2022, report published by *Forbes* magazine, in total, historically Black LGUs have been underfunded by at least \$12.8 billion compared to their predominantly White counterparts (Adams & Tucker, 2022).

Notably, the *Forbes* report only spans the years 1987 to 2020; it does not stretch back into the Jim Crow era of the 1870s to the 1960s, when segregation and open discrimination against Black Americans were the norm. In other words, this apparent discrimination in funding occurred after the Civil Rights Movement, when all relevant authorities were fully aware of racism’s harmful legacy in U.S. history (Adams & Tucker, 2022). Perhaps it is truistic to point out as stated by Lee and Keys (2013) that the land-grant system is strongest when all universities—1862s, 1890s, and 1994s—are funded adequately to conduct the land-grant mission.

Given our global, technology-mediated, complex society, it is fitting and proper that we pause as we confront grand challenges in food and agriculture at this critical time to reflect on the genius of the land-grant vision and to focus on Extension’s seminal role in the continuing development of that vision. At the same time, we must continue looking forward to determine how the land-grant mission must keep evolving and expanding to anticipate and meet the challenges of the future. As we will point out in the ensuing dialogue, now is a defining moment for the land-grant system, particularly Extension. It is a time when all of us will gather forces and/or redefine operational models to envision a new kind of university engagement and reshape our collective future for the 21st century world.

A distinctive feature of the LGUs is their tripartite mission of education, research, and Extension, variously described as the three pillars or the research, education, and Extension (REE) system. The original mandate emphasized instruction (Morrill Act of 1862), with later legislation adding research (Hatch Act of 1887) and Extension (Smith-Lever Act of 1914; Croft, 2019; Mayberry, 1991; Neyland, 1990). The logic of this system reveals a symbiosis among the components: Research generates knowledge that informs and updates instruction and provides Extension with the latest science-based knowledge to support agricultural practice. In addition, and importantly, the feedback from Extension’s application of research enriches instruction and focuses the research agenda on addressing emerging needs. This built-in logic should create a dynamic system that is responsive to the needs of stakeholders and changes in the environment.

Over the years, there has been a sense that LGUs have lost sight of their core mission. Some believe that professors’ career advancement needs

have eclipsed the need to remain committed to LGUs' original philosophy: educating and serving the needs of stakeholder communities and society in general through the application of science to solve important problems. The following historical example illustrates what may happen when the pragmatic focus of education is ignored. In early China, a commitment to the purely "intellectual" in man destroyed what had been the world leader in art as well as in science, in technology as well as in philosophy (Evans & Herr, 1978). Today, we are in a similar danger. As stated by Evans and Herr (1978), education divorced from the pragmatics of reality is sterile and not sensible. It lacks the intelligibility that comes from interaction with the needs of communities and the environment around us; too many people do not connect education with the goods and services they enjoy. After all, there is no good theory without practice and no good practice without theory. Sir Arthur Lewis (1962) contended that there are two types of education: consumption education and education for productive use. He argued that the former type of education does nothing to improve the productive capacity of the individual; it is learning for learning's sake. For example, an Extension agent studying the classics will learn to appreciate fine writing and the way of life of people living during that era. And while they will probably develop a sense of aesthetics that allows them to enjoy their life more fully, this type of learning does nothing to improve their skills in coaxing farmers to learn and adopt new techniques. The latter type of learning, education for a productive purpose, leads to improvement in job performance and productivity (i.e., learning for work). Learning and research for their own sake with the utility of knowledge as an afterthought is a legacy of the past, where it should remain.

The Renaissance, Enlightenment values, the flourishing of liberal democracy, and our collective experience since then have made it clear that if society is to thrive, all citizens must have access to the fruits of education. Moreover, the academic enterprise should maintain a close and symbiotic relationship with communities and relevance to their everyday problems—this is the university's *raison d'être*. Extension served agriculture and rural communities exceedingly well in extending the expertise of the university to farmers and communities, and LGUs in general have been effective in training a cadre of professionals (Kellogg Commission on the Future

of State and Land-Grant Universities, 1999). It is a model of what we can achieve if LGUs can operationalize the land-grant philosophy across the university's mission.

Refreshing LGUs' Mandate

Community engagement today should consider the complexity of the operating environment and the range of messy problems that need urgent attention. Congress conceived and implemented Extension in a simpler time, but we do not live in Kansas anymore. Extending the intellectual and technical resources of the university to serve communities in the spirit of the land-grant philosophy will require a reimagining of Extension to go beyond the expert model (Reed & Swanson, 2022). This effort will also entail embracing communities in a true partnership, i.e., real engagement (Kellogg Commission on the Future of State and Land-Grant Universities, 1999), dealing with communities as cocreators and designers in problem-solving and service delivery, and adopting a transdisciplinary approach in deploying expertise (Reed & Swanson, 2022; Thomas, 2021).

The communities served by 1890 and 1994 LGUs are dealing with extremely messy or ill-defined problems of poverty, food safety and security, community resilience, food and fiber production, equity, and systematic discrimination, among others (legacy problems), on top of the other social and economic problems that affect all of today's society, which are also overly complex and far-reaching.

Many of the problems identified here are not a part of the traditional Extension portfolio. In this context, community engagement offers HBCUs the opportunity to expand the role of Extension to reach underserved communities who are nontraditional clients for Extension services and to address problems not usually considered within the realm of Extension.

The historical evolution of the 1890 and 1994 LGUs may make it seem that this complex set of problems affecting underserved communities belongs solely in their purview, but in fact, it is the business of all LGUs. The question is: How do we employ the resources of the university to address messy, ill-structured problems using the land-grant philosophy as the guiding principle? We believe the answer lies in creating deep collaborative partnerships, adopting the principles and practices of Extension across the university's mission, and embracing a transdisciplinary approach in

deploying university resources and expertise. What is the rationale that supports this approach? We posit that it is a simple one. To remain relevant, the university must

- provide opportunities to observe technologies and solutions at work in a real-world setting,
- take advantage of opportunities to evaluate theories and technologies under real-world conditions,
- learn from feedback and garner insights that would be otherwise impossible to realize; and
- cocreate and design, prototype, and test solutions with stakeholder communities, which makes it possible to develop the social, political, and intellectual capital that enrich and make the engagement experience rewarding.

Without achieving the synergies that flow from integrating theory with practice, the academy will not make meaningful progress in advancing either; most importantly, it will not be capable of solving problems that are important to the public unless it grasps opportunities to engage with stakeholders in a meaningful way. The university will not achieve progress solely from sterile laboratory work or publication of abstruse articles; the university must combine laboratory work with real-world testing before it can realize the practical benefits we expect from scientific and technological developments. Engagement provides the opportunity for moving from the laboratory to the real world, where practical knowledge develops and hitherto deeply hidden insights—the known unknown and the unknown unknown—are brought to light.

Kay and King's (2020) description of the ill-fated British Overseas Airways Corporation (BOAC) 1954 flights from Rome illustrates that there are limits to what we can know from just theory and imagination. The unknown unknown always remains a threat. After the first ill-fated flight, authorities grounded the planes for 3 months. During this time, BOAC made all imaginable modifications. Two weeks after flights resumed, a second aircraft crashed. After exhaustive testing, the data revealed that the two planes crashed because of metal fatigue originating from the square window design. Following this tragedy, Boeing was able to develop oval windows, which solved the problem. No one imagined that this could have happened before it did. The Boeing engineers described the problem as an unknown unknown. This example tells us that engineers can solve problems of aerodynamic flows and the

stresses of high-speed flight at high altitude, but the only way to solve the mystery of what happens to a plane flying at high altitude is to try it—that is, to work with the phenomenon in the real world.

Another example of the value of engagement as a process for lending intelligibility to theory comes from our experience collaborating with participants in nutrition education workshops. The researchers offered workshop participants \$20 gift cards as an incentive to encourage their attendance. The recently established “Renaissance Grocery” issued the gift cards, and the store required participants to redeem the cards at the store as a way of building patronage. These gift cards were not redeemable elsewhere. Participation in the workshop fell because the Renaissance Grocery cards were not as valuable to the participants as \$20 gift cards issued by the credit union, because the participants could redeem these latter cards anywhere. Everyone agreed with the initial decision to purchase gift cards from the community grocery store, but no one foresaw the impact on workshop participation. In addition, everyone was convinced that participants would patronize the store in their community. From a purely rational perspective, the decision seemed appropriate; after all, the theory or logic supporting the decision seemed sound. The store carried most of the items underserved communities would regard as essential, and many workshop participants were members of the cooperative that owned the store. Later, community leaders and workshop organizers came to realize that using store-issued gift cards would not achieve the twin goals of encouraging participation in the workshops and building support for the grocery store. It also became apparent that community members and community leaders had different views about which items were essential. This example illustrates the risk of relying on theory and commonsense solutions without a deeper understanding of the complex variables operating in a given situation. Such an understanding can only come from engaging at a deep level with participants, which means capturing their lived experience where it intersects with the activity or collection of activities of interest. An enormous advantage of engagement is it enables the discovery of patterns of action that work without any obvious theory or rationale that explains why they work—an advantage that aligns with the concept of phenomenology.

Our next example illustrates the “power of the principle.” The Hungarian physician Ignaz Semmelweis observed that regular handwashing

reduced incidents of infection and mortality in the maternity ward of his Vienna hospital. Even though the data were convincing, his colleagues ridiculed him because, at the time, there was no accepted theory or plausible reason why handwashing would work to reduce infection and consequently mortality rates. Time eventually vindicated Semmelweis, but not before he suffered from an infection and died. Engagement tempers our hubris and gives us the confidence to act and work with ideas that we do not understand but may come to understand as we develop insights from continued interaction with opaque situations or phenomena. Taleb (2012) argues that phenomenology is antifragile, while theories outside of the natural sciences are fragile. Social science theories are fragile because the models they support produce relatively large unexplained errors (Watts, 2011). Consequently, it is more fruitful to take action that consistently produces the desired results, even if we do not understand why, than it is to work with a theory that offers plausible explanation but may produce unreliable results.

The Way Forward

To reiterate, we understand engagement to mean partnerships with the community founded on empathy and enacted through cocreation in designing and delivering solutions, services, and products. To achieve the level of public engagement implied in the land-grant philosophy, we will be aggressive in suggesting that engagement as envisioned, especially in the case of the 1890s and 1994s, must be elevated to a position of primacy in structure and strategy at the institutional level (Gelmon et al., 2013). Stated another way, community engagement must enjoy equal status with instruction and research to ensure that universities' responsibility for engagement activities is commensurate with their access to resources and authority. Anything less will not achieve the desired impact. In this institutional positioning of the engagement portfolio, the REE system, research, education, and Extension becomes research, education, and engagement. In this conception, engagement is the third pillar of the LGUs' philosophical foundation that amplifies the traditional mission area of Extension. A leader of the engagement portfolio at the institutional level is necessary to lead the diagnosis of the challenge, initiate strategy, evolve policy, coordinate, focus policy on action, and garner and allocate resources to address the diagnosed challenge.

The task or external environment of the engagement function is dynamic and complex. We can think of this environment as a social-ecological system in which communities—the social component of the system—are nested within a wider ecological system. In the social-ecological system, there are two types of problems that deserve our attention: puzzles and mysteries. Mysteries are not well defined, have no generally agreed on solutions, and remain unsolved (Kay & King, 2020; Liedtka & Ogilvie, 2011; Thomas, 2019); they dominate the task environment of the engagement portfolio. In comparison, puzzles are rather difficult problems, but we know there is an answer; it is more difficult to find but will eventually be discovered. Puzzles play a less dominant role in the task environment.

The leader of the engagement portfolio must be an empowered leader at the institutional level: empowered in the sense that they command deep philosophical and operational awareness that complements the prestige and power of the position, allowing them to harmonize philosophy, strategy, and resources with their task environment to address mysteries and puzzles. This leader must have the capacity to “adjust the sails” and lead high-performing renaissance transdisciplinary teams. They must ensure that mission, motivation, and strategy do not remain remote and esoteric concepts with salience only for the upper echelon of the university. They must ensure that mission, strategy, and motivation are coherent and imbue tasks at every level, providing focus and contextual meaning that inspire creative action. They must be a skilled master gardener who creates, nurtures, and sustains a social ecosystem (McChrystal, 2015) that nourishes their peers so they can bring their full potential to bear on the task. They are unlike the revered chess master who commands specialized pieces to conduct their will.

Teams and Not Command

In this section, we espouse the value of teams and the transdisciplinary approach to problem-solving in a dynamic and complex social-ecological environment. “Command” implies a reliance on top-down direction governed by rules and procedure. Of course, rules and procedures are essential—they build expertise and are a repository of knowledge, and they work well in stable, well-defined environments—but they are insufficient in complex, dynamic environments and can lead to mindless *reactions* (italics our

emphasis) to the situation, complacency, and loss of expertise (Klein, 2009). If we believe that our task environment will get more complex and dynamic—"we don't live in Kansas anymore"—then the ability to adapt and create novel solutions on the fly will be a staple skill. Transdisciplinary teams provide universities with this ability to adapt and create to meet novel and evolving challenges. Failure to employ well-resourced transdisciplinary teams in HBCUs to solve the complex problems they struggle to address is like a well-resourced individual putting a team together at an instant to compete in the finals of a major sport. How well would this approach work? And yet, this seems to be the approach to problem-solving in many areas of research in HBCUs, where individuals from disparate disciplines are brought together in the form of ad hoc interdisciplinary teams with little history of working together to solve challenging problems. In this section, we also provide two examples from an unrelated field to illustrate the value of the team approach in generating novel solutions, on the fly, to challenging problems.

As mentioned earlier, we live in a global, technology-mediated, complex society. Complexity defines the social-ecological task environment in which the engagement portfolio will operate to address the needs of stakeholders. In this environment, problems related to poverty, unemployment, systemic discrimination, food and nutrition insecurity, lifestyle problems, food and fiber production, climate change, marketing, and general economic performance are the result of several variables interacting in a dense web of interconnections and interdependencies. This diverse array of densely connected variables, their frequent interactions, and their interdependence mean that small changes can initiate a chain of events that magnifies the initial disturbance exponentially. Or the initial change may dissipate, undermining attempts to make reliable predictions. Complex systems exhibit nonlinear change; slight changes may have huge effects, or none, or any outcome between these two extremes. Thus, operating in a complex environment renders command and control inadequate and undesirable, since no single expert has the capacity to keep track of all possible outcomes or figure out which set of actions will produce the desirable outcome.

Alternatively, is it possible to identify key drivers of the system that would enable us to interact intelligently with it? What approach should be taken to identify these key drivers? What is the likely impact of interventions on key drivers and on

community stakeholders? These questions require a portfolio of expertise organized to address a range of issues simultaneously. Reductive thinking and analysis, though successful in the past, will not suffice in the current complex environment. Such an approach is counterproductive at best and destructive at worst (Kay & King, 2020; McChrystal, 2015).

The way out of this dilemma—that is, working with complexity—is to organize what we call renaissance transdisciplinary teams. "Renaissance" in the sense that members of the team are multit talented and empathetic, have a growth mindset, and embrace an elevated level of curiosity and the belief that other disciplines can contribute to the efficacy of their own discipline, which enriches their understanding of the world. Team members cherish the Enlightenment values of humanism—emphasizing the basic goodness of humans, common human needs, and the integration of humans in their environment—and they rely on rational means to address human problems. The team is "transdisciplinary" because it views a problem not from a specific discipline but as a problem requiring the collaborative effort of investigators from different disciplines to address it. Transdisciplinary teams work in unison to create new conceptual, theoretical, methodological, and translational innovations that integrate and move beyond discipline-specific approaches to overcome the challenges of our time. That is, the problem as well as the outcome transcends discipline (Association of Public & Land-Grant Universities, 2019).

As Watts (2011) notes, phenomena are the result of emergence, the result of many interacting variables. You cannot recognize the original components in an orange that came together to produce it. If we accept that engagement activity must contend with complexity in its environment—many interacting variables determine outcomes—it will take renaissance transdisciplinary teams to understand and address complexity. No single individual commands expertise sufficient to understand and anticipate the impact of future events that multiple interacting variables will determine. Many scholars, such as McChrystal (2015), Watts (2011), Taleb (2012), and Kay and King (2020), have pointed to the futility of predicating our plans on some predictive vision of the future. They argue instead that adaptive planning and adaptive risk mitigation is a superior option for creating resilience against unknown or poorly understood

threats. It is difficult or impossible to predict with any accuracy how the future will unfold in today's complex environment. But it is far easier, more effective, and logical to fortify our plans and communities against anticipated threats because we can determine with great certainty how our plans, communities, or operations will react to the threats we can perceive. We will always do better at planning and addressing challenges by employing renaissance transdisciplinary teams because team members will bring unique qualities deeply integrated in a coordinated whole to bear on the problem. These include the following:

- T-shaped skills are a configuration of a team member's expertise. The branches of the "T" reach out and incorporate other areas of expertise in the team member's portfolio of skills, and the foot of the "T" reaches deep into their own area of expertise.
- Empathy enables the team member to appreciate the relevance of other areas of expertise, see the problem from many perspectives, and develop a deep understanding of the problem situation relative to the community's lived experience.
- Adaptability provides the team member with the ability to adjust in a dynamic environment. Joint cognition, shared purpose, and understanding of the challenge integrate and focus the efforts of the team, allowing team members to work as a seamless whole.
- Trust is the glue that holds the team together, nurturing and enabling the oneness of an integrated whole.
- Flexible multidirectional communication facilitates the easy flow of information and ensures the sharing of ideas among members without the friction of bias or relative status and the negative impact of hierarchical command.

Emergent intelligence is a unique feature of teams, especially transdisciplinary teams. It produces unexpected, unprecedented, highly creative solutions to problems thought to be unsolvable. These creative, unique solutions arise from the multidirectional interactions of team members under conditions of trust, joint cognition, and shared purpose (Johnson, 2011). Renaissance transdisciplinary teams' competitive advantage is that they can arrive at ingenious, expectation-defying solutions without the intervention of top-down directions, plans,

rules, or how-to manuals. In a volatile, uncertain, complex, and ambiguous (VUCA) environment, where bureaucracy and hierarchy offer little or no guidance, transdisciplinary teams will strengthen HBCUs' capacity to create the novel solutions required to respond to evolving challenges.

The examples of United Flight 173 and US Airways Flight 1549 illustrate the failure of command structures and the effectiveness of a team approach, respectively, as described in McChrystal (2015). In the case of Flight 173, the malfunction of the landing gear should not have resulted in the crash of the plane. But the attachment to procedures and the single-minded focus on a command structure in which the captain saw the crew as instruments for conducting the captain's instructions led to catastrophic failure.

In the case of Flight 1549, the captain had very little time to respond to the flaming out of the plane's engines caused by a bird strike at low altitude. The captain (Chesley "Sully" Sullenberger III) credited crew resource management training for providing his team with the skills to build open lines of communication quickly, share common goals, and work together. There were no codified procedures to follow. Later review in the flight simulator indicated that it should not have been possible to safely land the plane on the Hudson River. It was the emergent intelligence derived from teamwork that saved the day—and lives. In modern complex machines such as aircraft, as well as in complex social-ecological environments, far more possible contingencies can arise than it is possible to devise a plan to address. Taking advantage of emergent intelligence and the adaptability it conveys is the only way forward in complex environments. Teamwork confers a powerful competitive advantage in complex task environments. Hence the value of transdisciplinary teams in problem-solving in VUCA environments, especially for HBCUs.

Upgrading Our Software: Creating a Better Community-University Interface

Social physics (analysis of social phenomena with big data and mathematical tools) provides a novel perspective on engagement and the application of sociometry (quantitative study and measurement of relationships within a group of people) in social research and problem-solving. The concept of "idea flow"—the movement of information in groups or networks that produces a change in behavior—is crucial for understanding behavior change and the formation of culture

or subculture (Pentland, 2015). An embrace of social physics opens fertile avenues for advancing LGUs' engagement portfolio, especially in 1890s and 1994s. From this perspective, engagement is the frequent cooperative interaction among groups. As individuals learn from each other and influence each other's opinions, this interaction leads to a flow of ideas that builds trust and enables the emergence of joint cognition and a shared purpose. Interacting in this way produces an emergent intelligence that generates novel solutions belonging to the group rather than the individual. Thus, buy-in or ownership is automatic. This view contradicts the prevailing opinion that it is possible to get groups together by edict to work on and solve problems, a view that is popular among administrators. An effective team is not an ad hoc group of individuals but one that interacts in a cooperative mode over a significant period during which it develops the features of a renaissance transdisciplinary team.

Social physics points to a new way of studying entire communities, regions, states, or countries. Using sociometric techniques, researchers can collect real-time data based on actual behavior sampled continuously over extended periods of time from large numbers of individuals rather than relying on retrospective or self-reported data. That is, researchers can use "living laboratories" in which they apply sociometric techniques to record and display every facet of behavior as individuals go about their daily lives. Current approaches rely on surveys and laboratory experimental data based on averages. In contrast, big data from living labs enables researchers to examine society in granular detail because the data available for analysis accounts for the complexities of real life—that is, life as all the peculiar mental predispositions and the multitude of social exchanges together affect the behavior of individuals (Pentland, 2015).

Apart from the use of living labs and big data, real engagement would change the basis for developing and making recommendations to farmers or other stakeholders. Take, for example, the current efforts concerning the potential of hemp production for African Americans and other racial minority farmers. Most recommendations are based on or will be based on desk studies—not the actual real-world engagement of farmers in the design and testing of commercial models of the hemp enterprise. In a sense, the basis of recommendations is fictitious. A more realistic approach would be to run a model that captures all aspects of the hemp business in a real-world

situation (preferably on the farmers' holding) that involves the farmer at every step of the enterprise, including production planning, operations, inventory management, processing, transportation, packaging, distribution, marketing, cash flow management, adaptive risks management, and other relevant factors.

Methods and Data

The focus of this study was to describe the perspectives of community stakeholders, 1890 research directors, and 1890 Extension administrators on university-community engagement as it relates to advancing community prosperity. For the purposes of this study, *community prosperity* was defined conceptually in three dimensions: economic (i.e., low unemployment, labor force participation, gross domestic product, wage growth), social (i.e., community connectedness, social cohesion, sense of place, sense of community, income inequality, community capacity), and environmental (i.e., clean water, fresh air, healthy soils, pollution, sustainable ecosystems; Lowe, 2016).

The study employed an ethnographic approach to describe community stakeholders' perspectives. Peacock (1986) described ethnography as a social and scientific description of people and the cultural basis that establishes their peoplehood (as reported in Vidich and Lyman [2000]). Merriam and Tisdell (2016) defined ethnography as an examination of how values, beliefs, and attitudes structure the behavior of individuals as they interact with their environment. This study applies Brown's (2015) and Liedtka and Ogilvie's (2011) interpretations of the core principles of the foregoing definitions in their work, which employs rich, detailed (or "thick") descriptions of stakeholders' lived experiences, rooted in empathy, to access the insights that guide their design work. That is, ethnography seeks to view the world through the eyes of the stakeholder, understand it through their experience, and feel the world through their emotions.

The ethnographic approach employed in this study used deep, intensive interviews to engage with stakeholders who have experience interacting with the university. The intent was to encourage stakeholders to express their feelings and emotions stemming from their experiences engaging with the university and to learn what they think about university-community engagement as "it currently is" versus what "it should be." The idea was to determine the meaning of this interaction for stakeholders in terms of the value university-

community engagement creates for them. Intensive interviews spur deep reflective thinking about both stakeholders' felt needs and their unarticulated needs. The latter needs are usually inaccessible with other methods, such as surveys. Deep interviews do not produce generalizable information; they expand our thinking about stakeholders' vision, help us develop insights, and generate innovative, novel ideas about creating value for the community. The study protocols received IRB exemption.

In this regard, we purposively selected five residents of an underserved community in Eastern Greensboro, North Carolina, for deep, intensive interviewing. Stakeholders included a former professor and president of Concerned Citizens of Northeast Greensboro (CCNEG), a community-based organization; a city council member who is also president of Citizens for Environmental and Economic Justice (CEEJ), a community-based organization; a church deacon; a leader and founder of a community-based organization that operates an urban farm sponsored by USDA and the university; and a young professional who is a graduate of the university and member of the executive leadership of a city agency providing services to underserved communities. All stakeholders are residents of the low-income community in Eastern Greensboro. The university is currently involved in the community and working with these groups to establish an urban farm to address access to fresh fruits and vegetables and train residents to adopt healthy eating habits.

We developed six questions to get an in-depth understanding of the role of the university in creating community prosperity as seen through community stakeholders' eyes, understood through their experience, and felt through their emotions. We asked:

- what is the extent of university engagement with the community to create prosperity;
- what the university should be doing to assist communities;
- whether the university should give community engagement the same emphasis as it does instruction and research;
- whether the communities are knowledgeable enough to define their own problems or whether the university should define problems for them or suggest what should be done; and
- whether the university should use a project approach to assist communities or establish longer-term relationships to address community problems.

Finally, we asked the community stakeholders to name three things they would like to see the university do to build community prosperity. Interviews with community stakeholders lasted for an average of 15 minutes. The community stakeholders had the opportunity to review and modify, if necessary, the researchers' summary of the interview.

To supplement this ethnographic data, we surveyed the population of administrators in colleges of agriculture who were responsible for community engagement in the nineteen 1890 LGUs. The survey was used to obtain administrators' views on university-community engagement and how it may be effective in bringing about community prosperity. A second purpose for using survey data to supplement the ethnographic method was to compare the responses of these thought leaders with those of community stakeholders.

The survey instrument was pretested for comprehension, logic and flow, structure, and content validity. The survey was encoded into Qualtrics and emailed to the population of 1890 agricultural administrators, followed by two email reminders. Since one person was responsible for administering both the research and Extension programs in five of the 1890 universities, the population frame consisted of 33 administrators. Of these 33 administrators, 30 responded, a cooperation rate of 91 percent. Of these 30 respondents, 17 self-identified as Extension administrators and 13 self-identified as research directors. These were seasoned administrators, evidenced most succinctly by the 11.6 median years in their leadership positions. In addition, they had been employed in the 1890 land-grant system for an average of 21.3 years.

Results

Qualitative Data

The aforementioned interview questions represent dimensions of interest that aided in the organization of responses given our research goal (Levitt, 2020). These dimensions facilitated the identification and construction of patterns or meaning deduced from the data to answer our research questions (see Table 1; Kiger & Varpio, 2020).

Summary of Emerging Themes. The community sees itself as rich in resources and opportunities for cocreating community prosperity with the university. The community desires a structured, long-term relationship with

Table 1. Summary of Stakeholders’ Responses to In-depth Interviews

Questions: Dimensions	Description of Response (Source of Themes)
What is the extent of university engagement with community to create prosperity	All participants felt the university was not doing enough to engage the community and that the university has the resources to work with the community to build prosperity. One participant noted: “The university farm should have small demonstration plots in food deserts to show and encourage residents to grow a garden, which would be a good example that inspire action that address the problems.”
What the university should be doing to assist communities	Each program should engage with the community in a structured way. For example, the following quote “students should be apprenticed in the community where they could have the opportunity to work on real problems, each program, faculty, and student should be evaluated to determine effectiveness and progress.” One respondent suggested that the university should “establish a prominent presence in the community (office).” Another participant, president of a community group, said: “the university should capture community support by creating community alumni similar to the traditional alumni to reward the loyalty and support for the university seen at Homecoming.”
Whether the university should give community engagement the same emphasis as it does instruction and research	Respondents agreed that the university should elevate community engagement to a position of primacy in the administrative structure. Such a structure would, according to one participant, signal that “community is a rich source of opportunity” and reflect the fact the “university creates people and people create the university.”
Whether the communities are knowledgeable enough to define their own problems or whether the university should define problems for them or suggest what should be done	It works both ways; in some instances, the community may not know or be able to articulate its need. One participant suggested, “The university should get out into the community and build rapport. By building rapport, the university will be able to understand the problems and community needs and engage the community before producing a solution.”

Table 1 (continued). Summary of Stakeholders’ Responses to In-depth Interviews

Questions: Dimensions	Description of Response (Source of Themes)
Whether the university should use a project approach to assist communities or establish longer-term relationships to address community problems	Participants said that the university should find out what is needed to address problems; this should happen on a regular basis and not when the university feels that it needs the community. One participant described how the university “tends to view the community with mistrust—comfortable in university setting; does not want to give the community resources and does not want to deal with the complexity of operating in the community outside their comfort zone.” Dealing with complex issues in the community and establishing structured programs that provide students and faculty with learning opportunities necessitates the university taking a longer-term approach to community problem-solving.
Three things you would like to see the university do to build community prosperity	Respondents had three main ideas: 1. Designate a position in each program to engage with the community via a structured program—not to have meetings but to engage with community in action and establish a permanent presence in the community (office). 2. Establish programs to address lifestyle, personal finance management, community entrepreneurship, and job search skills. 3. Create a community support group, that is, community alumni.

the university (with the university establishing a permanent presence in the community via an office). To support this view, the community pointed to its support of Homecoming and the university in general as expressed in their desire for the university to create “community alumni.” Given this degree of support, the community believes the university should reciprocate with stronger support for the community.

Survey Data

More than three-fourths of the 1890 agricultural administrators agreed that their university’s administration placed a strong emphasis on the value of “engagement.” Also, more than three-fourths of these administrators noted that a specific “engagement” goal was included in their university’s strategic plan. Thus, it is quite apparent that the 1890 universities value engagement at the very highest level.

The 1890 administrators also responded to a series of questions about university-community relationships. Their answers revealed the following:

- Twenty-six administrators felt that community leaders should be responsible for identifying their community’s problems; however, only 17 of these administrators felt that community leaders were knowledgeable about the challenges they face.
- Twenty-five administrators felt that the community leaders should be equal partners in finding solutions to these problems.
- Twenty-nine administrators said that the university should help the community identify funding to solve their problems, and 24 administrators agreed that the university should use some of its financial resources to solve the identified community problems.
- The research directors were more likely than the Extension administrators to support using their financial resources to help solve community issues. Although we did not ask the community stakeholders about the use of university resources for engagement, community members did report that the university should have program staff and resources to work with the community to build prosperity.

Toward the development of strong, meaningful, and effective university engagement, we asked the 1890 administrators if community engagement should have the same level of institutional support as teaching and research. Of the 30 administrators, 22 agreed with this statement, and 26 described university-community engagement as indispensable for advancing teaching and research. One community stakeholder added, “Community engagement should be elevated to a position of primacy in the administrative structure. This would signal that the community is a rich source of opportunity and reflect the fact that the university creates people and people create the university.”

The questionnaire used four statements to query the 1890 administrators about approaches to university-community engagement. Responses to the statement “University-community engagement should be a top-down approach” showed considerable variability. About one-third of administrators agreed with this statement, about one-third disagreed, and about one-third were not sure. Interestingly, a review of the response differentials revealed that the Extension administrators, as opposed to respondents who self-identified as research directors, were more likely to support a top-down approach.

Among the 30 administrators, there was also variability in the 1890s’ approaches to conducting community engagement. The modal responses were community meetings, surveys, and focus groups/listening sessions. All responses are provided in Table 2. There were minimal research-Extension differentials.

Additionally, three-fourths of the administrators surveyed indicated that their university currently engages with the community on a project-by-project basis. Going forward,

however, nearly all these administrators (28 out of 30) felt that taking a long-term approach would be more fruitful.

Like the question posed to community stakeholders, we asked the 1890 agricultural administrators to name three things they would like to see the university do to build community prosperity. The modal responses were to provide additional technical and financial resources, intensify community engagement activities that involve the community in producing valued outcomes, and place more emphasis on a long-term approach to problem-solving.

Allocation of resources is critically important for accelerating public higher education’s movement toward broad community engagement. When the 1890 administrators were asked how they would allocate resources to operationalize university engagement, the modal responses were to provide qualified personnel and resources for community engagement.

Finally, we asked the 1890 administrators about methods of integrating engagement in the institutional structure at their universities. The modal responses were to appoint a vice president/director of Extension and engagement and to integrate community engagement across university programs. In addition, nearly three-fourths (21 out of 30) of the administrators stated that the university would have to reorganize faculty to integrate engagement in the institutional structure at their universities. Specifically, they felt that the faculty should have more dual appointments with sufficient resources, that their universities should increase the emphasis/weight of community engagement in promotion and tenure standards, and that their universities should “hire faculty who specialize in working in the trenches with marginalized and other communities.”

Table 2. Administrators’ Responses by Mode of Engagement

Approaches to Community Engagement	Number of 1890 Agricultural Administrators
Community meetings	7
Meetings with local churches	3
Focus groups/listening sessions	5
Surveys	6
Situational analysis	3
Online engagement	4
Design thinking	2
Total	30

Discussion

The complexity of today's operational environment poses a strong challenge to the 1890 institutions' ability to accomplish the marquee component of their mission: to serve underserved communities with extremely limited resources. In this situation, the 1890 LGUs can leverage structure and organization to extract extra value from their limited resources. A commitment to university-community engagement will focus and stimulate the strategic thinking needed to realign structure and organization in novel ways that nurture transdisciplinary research and service and amplify the reach and impact of meager resources. For example, community engagement offers opportunities to build community goodwill by solving real problems, alleviating the effects of poverty, and improving the quality of life for those inadvertently left behind in the face of unprecedented progress. Transdisciplinary research is the perfect foil for the challenge of conducting research in an increasingly complex environment. Transdisciplinary research teams have the highest probability of producing transformational change in the quality of life of traditionally neglected groups.

Structure is significant because it is inexpensive to leverage to achieve an objective. Moreover, it signals the strategic importance of a function in the university. A vice president designation commands greater influence, power, and prestige than a dean, director, or head of department. Position in the structure also communicates the priority accorded to the allocation of scarce resources. Of course, it depends on the ability of the incumbent to use the resources of the office to accomplish the mission of the office. Beyond structure, organization—for example, the superiority of teams and the potential of transdisciplinary teams to generate innovation—also offers a potent means to create greater value added from available expertise.

Transdisciplinary teams operate seamlessly because they share a common understanding of the mission, a common culture and understanding of the problem at hand (joint cognition), and, most importantly, a deep grasp of how working together can solve problems that at first glance seem unsolvable. In other words, transdisciplinary teams create emergent intelligence—that is, knowledge and know-how hitherto not available in instruction manuals, recorded professional practice, or the curated literature. Therefore, emergent intelligence is critically important in situations of dynamic complexity where novel

problems arise with increasing frequency and where current literature and professional practice provide no useful guidance.

An innovative approach to research will amplify the contributions of transdisciplinary teams. It will involve creating a living lab using technology that captures real-time digital data from the digital footprint (credit card use, cell phone use, and social media connections) of community members, capturing what people actually do and not what they say they do. This approach is not retrospective as surveys or focus groups are; these latter approaches are subjected to biases and social influence (Pentland, 2015). Rather, it facilitates the collection of real-time data over extended periods of time and over large areas. The result is richer data, which will lead to better understanding and more effective policy.

A new way of research also involves cocreating and prototyping with stakeholders. Current approaches that use demonstrations and trials on experiment stations do not work well for underserved stakeholders, who end up bearing all the risk of attempting to use the recommendations in the real world. A more valid approach is to involve stakeholders in developing a prototype business model that evaluates the recommendations in the real marketplace before stakeholders are asked to adopt the practice. All technology must be incorporated in a business model to be meaningful economically. Usually, the problem is not the efficacy of the technology but the efficacy of the business model in which it is applied. By prototyping the technology in a business model, evaluating it under the full range of market conditions, and iteratively adjusting the business model as needed, risk will be reduced for the resource-poor stakeholder. This approach will ensure valuable learning by both stakeholder and university expert as well as an improved rate of adoption.

As the exploratory data in this study reveal, there is strong support for greater university engagement with the community on the part of community stakeholders, Extension administrators, and research directors. There is also strong support for the allocation of resources to build the university-community engagement portfolio and to nurture a sound foundation of scholarship to support such an expanded level of engagement. This expanded level of engagement also includes renaissance transdisciplinary teams to enable more effective methods, including living labs, of conducting the research needed for

creative and innovative problem-solving toward enabling underserved communities to achieve and sustain a high quality of life. The additional technical and financial resources, as noted by the agricultural administrators, should be allocated by drawing from all units of the university, not just colleges of agriculture.

These data also draw attention to the need to elevate community engagement to the level of teaching and research with an established presence in the community. In this context, the concept of the “adjacent possible” is instructive (Johnson, 2011). It is generally assumed that invention/innovation or new ideas are wholly new creations, but the “adjacent possible” indicates otherwise. This concept suggests that the existing environment contains many resources (some disparate [*or so it seems*] and other closely related resources) just waiting to be reimaged and combined into novel uses. On the other side, many great ideas fail or lay dormant because they are outside the bounds of the “adjacent possible.” There are no supporting spare parts (building blocks of ideas are not available) to be reimaged and assembled into new, innovative products or services. These ideas are said to be “ahead of their time” (Johnson, 2016) in that they do not have the supporting cast of ideas, materials, and institutions to bring them into the “realm” of reality. In the sense of the “adjacent possible,” creativity, innovation, and invention are mostly a bricolage of ideas and existing resources—for example, the observation of the chicken incubator in a Paris Zoo inspired the invention of the incubator for babies (Johnson, 2011). Similarly, all the components for building or innovating community engagement are available to the 1890 LGUs: the practice and traditions of Extension, receptive communities, a number of community engagement models in several universities (Kellogg Commission on the Future of State and Land-Grant Universities, 1999), and Extension administrators and research directors who seem skeptical but open to the idea.

A rarely mentioned—but critical—leadership skill is to clarify the ambiguity in situations facing an organization by describing a clear path forward (Rumelt, 2011). In the case of the 1890 LGUs, it means clarifying the creation of community engagement and what it means for the university. This endeavor includes defining a clear design brief that elucidates the scope and intent of the community engagement portfolio, the stakeholders

served, and performance criteria. The time has come to close the “say-do gap” and embody community engagement into action that takes advantage of university and community resources. Our case study indicates that although community members hold the university in high regard, they express disappointment that the university is indifferent to their needs, since the university offers only rhetorical support through nice-sounding statements. One stakeholder indicated that the “university should create community alumni as a means of recognizing and rewarding the community’s allegiance to the university and mobilize university support for the community. Not everyone can matriculate at the university and be an alum as currently defined.” However, a community engagement program could tap into community expertise by creating a cadre of adjunct community associates who would bring the lived experience of the community to inform and enrich community engagement efforts. The idea of community engagement and a supportive scholarship is not ahead of its time. The relevant adjacent possible is rich with possibilities waiting to be reimaged into a new reality that fits the purpose of the moment.

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