Balancing Preparation for Current Practice with Preparation for Future Learning in High School Agricultural Education

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Abstract

One of the primary goals of school-based agricultural education has always been to maximize student readiness for their careers. However, it is unclear whether this primarily means preparation for careers as they currently exist, or preparation for careers as they evolve and change over time. To improve career readiness among students, an agricultural education program should focus less on the extent to which it provides paper certifications and post-secondary credits, and more on offering high quality career preparation via SAE opportunities for every student in combination with classroom instruction which provides preparation for future learning by developing "trajectories toward expertise." The proposed approach better conforms to the wording and intentions of the National Agriculture, Food, and Natural Resources Academic Standards while aligning with Perkins V language, and may provide more explicit guidance to agricultural instructors as they seek to maximize student preparation for careers through secondary agricultural education.

Introduction & Purpose

Since its inception as a formal educational subject, the primary purpose of school-based agricultural education has been debated. Traditionally, the subject existed to prepare students for careers in the agricultural industry; however, current interpretation of this focus is unclear regarding preparation for careers as they *currently exist* or preparation for careers as they *will exist* as a result of changes and advancements over an individual's career (Hillison, 1997, Hains, Hansen, & Hustedde, 2017).

In this paper, we revisit questions about how agricultural education can most effectively prepare students for future careers in the agriculture industry by considering three different theoretical frameworks. These frameworks were all originally developed in highly-cited publications that have become increasingly influential in educational research. These include: 1) in-school vs. out-of-school learning as compared by Lauren Resnick, 2) preparation for future learning as described by Bransford and Schwartz, and 3) learning via peripheral participation in communities of practice as described by Lave and Wenger. We will use this as a basis in order to respond to viewpoints about effective career preparation that have emerged in response to the most recent version of the Perkins Act. After a discussion on the implications that this may have for secondary agricultural instruction, we will conclude by providing recommendations for how secondary agriculture teachers could implement agricultural instruction in their programs in order to maximize student preparation for careers.

Theoretical Frameworks

Resnick – Comparing Learning Inside and Outside of Classrooms: Lauren Resnick (1987) considers how instruction can result in developing "everyday, practical, real-world intelligence" necessary for success in careers by comparing in-school learning to learning that occurs in less formal and more authentic settings. In this work, entitled "Learning in School and Out", Resnick suggests there are four key differences between how students traditionally learn in classrooms and how individuals perform cognitively outside of formal classrooms. Resnick argues that formal schooling is individualistic, fosters unaided thought, emphasizes symbolic thinking, and primarily teaches generalized skills and knowledge. However, out-of-school mental work is generally much more social, requires the use of specific cognitive tools that directly engage an individual with objects and situations, and prioritizes the development of competencies for use in specific contexts.

Resnick uses a wide range of examples including naval navigators, dairy plant workers, aviation mechanics, and others to argue that even the most occupation-specific forms of classroom instruction provide little preparation for the kinds of tasks and situations students will encounter outside the classroom. Furthermore, Resnick argues the more specific career training is to existing job circumstances, the less students are prepared to become adaptable to changing work environments, let alone multiple career changes in their lifetimes. Resnick sums up this point with the following (p. 16):

> *"…the job training vocational education agenda fails today because of the sheer impossibility of preparing people for the quickly changing requirements of specific jobs. The direct training approach can only work when there is relatively slow change in the technological and social structure of work and when the equipment of the workplace can be duplicated within the economic and safety tolerances of the education system. Neither of these conditions holds today."*

In lieu of classroom instruction emphasizing rote vocational training, Resnick proposes instruction for career preparation must provide students with opportunities to develop and use "mental models". Resnick defines a mental model as "an idea of all its parts, what each does and how they work together, how changes in one part of the system cause changes in other parts" (p. 18). Proficiency in developing and using mental models enables students to work with flexibility when they encounter unexpected situations or shifts in career circumstances. Unlike machines, which are incapable of reasoning about a system from an outside perspective, individuals who are proficient in using mental models recognize breakdowns, function outside of a normal routine, repair systems, and ultimately improve the systems from their original state. This allows for flexibility and fluidity among professionals while better enabling the profession itself to adapt and evolve to changing circumstances. In an ever-changing industry such as agriculture, where rapidly fluctuating international markets, variable consumer trends, and changing global climate patterns result in exceptional levels of increasing unpredictability, this kind of flexibility and fluidity is especially critical.

While classrooms can provide students with the capacity to become more innovative and adaptable professionals, Resnick ultimately argues the transition from a school-based

environment to a career requires skills that cannot be provided in a classroom setting alone. Resnick supports this claim using an example of the struggles that successful law students face when entering law firms after graduation. Often law students are deemed to be "successful" if they have obtained large amounts of relevant career experience (such as experience with law review journals) prior to graduation in addition to successful classroom performances. However, even the most successful law students are generally perceived as poor legal writers by their more experienced colleagues when they begin their careers. While occupation-specific student experience aids individuals as they learn on the job, it is nearly impossible to fully prepare students for on-the-job performance in a school-based setting, even in programs with high levels of career authenticity. As such, Resnick suggests classroom-focused efforts which claim to "ensure students are prepared to seamlessly transition into aligned postsecondary and career opportunities" (Suffren & Mezera, 2017, p. 21) are unlikely to be successful.

Bransford and Schwarz – Preparation for Future Learning: Bransford and Schwartz (1999) explicitly address questions of career preparation in "Rethinking Transfer: A Simple Proposal with Multiple Implications." These authors consider how classrooms can best enable positive outcomes that extend beyond the initial learning, and are critical of assumptions that learning in the context of schooling can effectively result in application of school-based knowledge and practice in a new setting (such as a career). Bransford and Schwartz suggest even the best classroom instruction is unlikely to prepare students for the situations they will encounter after their schooling is completed. They propose classroom environments that emphasize "preparation for future learning" (PFL) are more likely to effectively prepare students for future careers as compared to classrooms emphasizing more narrowly-prescribed notions of career preparation.

Preparation for future learning primarily entails shifting the emphasis of instruction from applying existing knowledge to solve problems to learning from new resources in unfamiliar environments in order to effectively resolve unanticipated circumstances (Lobato, 2009). Unlike traditional instruction and assessment that often emphasizes "sequestered problem solving" (or problem solving in isolation without access to resources), PFL-based instruction utilizes opportunities to learn using resources and collaboration as part of the assessment (Chin *et al.*, 2010).

Preparation for future learning is somewhat similar to Resnick's descriptions of "mental models". Bransford and Schwartz argue a transition from instruction that emphasizes applicative knowledge ("knowing that") to perpetual knowledge ("knowing with") shifts the emphasis to understanding the interacting components of a particular topic or concept and how they may be similar across multiple phenomena (p. 70-77). Through instruction that emphasizes using initial learning to improve their ability to learn from new resources, PFL-based instruction can enable students to develop "well-differentiated knowledge", or the capacity to deeply comprehend a concept or situation from multiple perspectives (Belenky & Nokes-Malach, 2012). In other words, PFL-based instruction enables students to view a concept or situation from a broader, systems-level perspective that enables them to understand complex interactions between the components of that system in a manner that can result in novel explanations or solutions.

To illustrate PFL, the authors use elementary education majors as an example. Similar to Resnick's arguments, Branford and Schwartz suggest there is no form of classroom preparation

or training that can make a college senior fully prepared to be an expert elementary school teacher by the end of their undergraduate training. However, schools of education can place their students on a "trajectory towards expertise" (p. 68) by preparing students to learn from experiences and from coaching in order to minimize the amount of time it takes for them to acquire career expertise. As opposed to teaching about specific skills, PFL-based teacher preparation involves working with teacher candidates as they encounter challenges and problems, and helping these individuals to recognize how and why their successes and failures occur in order to broaden their understanding of what it means to successfully provide instruction across a wide variety of teaching scenarios. The PFL classroom becomes less about teaching specific skills and more about helping teacher-candidates to better comprehend how to learn from the challenges inherent in their field experiences.

From a broader perspective, Bransford and Schwartz suggest when companies or organizations hire individuals in any field, they don't expect them to have learned everything that they will need to know to do their work. In general, companies recognize it is highly improbable that a new hire could be fully prepared for an occupational role the moment they are hired. Rather, companies would expect their new hires to become proficient in the needed skills and proficiencies in a minimal amount of time. The better prepared these individuals are for future learning, the less time it takes to train the employees and the more likely they are to be successful in a given position. As argued by Resnick, this skill becomes even more critical in occupational settings that are volatile and rapidly changing.

This isn't to say students should *never* receive formal training in specific career skills. As students progress from high school to post-secondary education (4-year college, 2-year college, military training, or apprenticeships), they should be positioned to learn specific occupational skills as rapidly as possible in the more authentic environments that can be better provided by post-secondary institutions. However, while classrooms can effectively provide generalizable career skills, both Resnick as well as Bransford and Schwartz argue secondary classrooms are not effective environments in which to provide occupation-specific training. To achieve this goal, it is likely necessary to turn to options outside of classroom instruction.

Lave and Wenger – Communities of Practice: Lave and Wenger (1991) attempt to rethink what it means to learn in "Situated Learning: Legitimate Peripheral Participation." They suggest the exposure to explicit "pieces of information" common in traditional schooling is only a small part of the actual learning process. Lave and Wenger argue that learning is most likely to occur as a result of active participation in what are known as communities of practice, or groups of people who regularly interact in order to achieve outcomes related to a common interest (such as a profession or even a hobby). Even if they have prior formal training, individuals in a community of practice acquire expertise primarily through their interactions with each other. Using evidence drawn from an analysis of individuals in careers ranging from tailors to meat cutters to midwives, Lave and Wenger argue traditional classroom instruction is largely unsuited to prepare students for performing technical skills or trades as they currently exist. While Lave and Wenger's work includes examples of learning in which classroom learning is part of the preparatory process (particularly in their example of naval quartermasters), their primary argument is that instruction for effective career preparation must include authentic learning among a community of practitioners in a particular field.

Wenger (1998) expands on these arguments and suggests socialization is a critical component of learning because humans are social beings. As such, Wenger suggests that in order for learning to serve as effective preparation for performing a skill or occupation, it must be comprised of meaningful activities in which learners engage in actual practices with experienced individuals as part of a community in which they can develop personal histories and an identity. While most of Lave and Wenger's (1991) examples reflect the positive effects of peripheral participation in communities of practice for career preparation, these authors highlight the particular example of meat cutters as a case study in how an over-emphasis on classroom preparation and industry certification can work *against* effective career preparation. They argue (p. 77):

> *"…many contemporary vocational education and union-based "apprenticeship" programs implicitly reject an apprenticeship model and strive to approximate the didactic mode of schooling in their educational programs."*

In other words, these authors observed that in what we now call career and technical education programs, instructors often tried to emphasize the less-effective classroom instruction at the expense of the more-effective apprenticeship model. In the case study of the meat cutters, they argue the six-month classroom-based industry certification program consisted of assignments that were "not relevant to the supermarket" and that "few students bothered to learn them" as a result (pp. 76-77). Lave and Wenger suggest when classroom-based industry training is emphasized more so than situated learning opportunities, it can often result in *less* effective career preparation.

Application of Theoretical Perspectives to Agricultural Education

Taken as a whole, the writings of Resnick, Bransford and Schwartz, and Lave and Wenger all suggest traditional classroom instruction alone is largely incapable of providing a seamless transition into a career. Resnick points to the importance of both in-school and out-of-school learning goals and instructional practices, and argues that narrowly-defined career preparation for current practices is only effective when there can be the expectation of little or no changes in a career. Bransford and Schwartz point to ways schools can prepare students for future learning, arguing students generally cannot transfer what they learn in a classroom setting to a career setting. Instead, classroom instruction is most effective for career preparation when it provides preparation for future learning, minimizing the amount of time it takes for a newly-hired employee to learn on the job. This "trajectory toward expertise" also enables professionals to continue to learn and adapt throughout their career. Lave and Wenger point to the critical role of legitimate peripheral participation in preparation for current practice, suggesting career preparation is dependent on social interactions in authentic occupational settings in which students can gain expertise in specific knowledge and practice through repeated interactions with more experienced professionals who identify with that profession.

Based on these theoretical frameworks, it is possible to conclude the most effective forms of career preparation would consist of two interacting aspects. The first would consist of classroom instruction that emphasizes preparation for future learning, in which narrowly-prescribed career training is eschewed in favor of instruction that develops proficiency for students to continue to learn in knowledge-rich environments in a manner that places them on a trajectory towards

expertise in a field. This would minimize the amount of time it takes for students to learn on the job while providing them with the capacity for flexibility and innovation as their occupations and careers shift, change, and evolve over time. The second aspect would consist of career training emphasizing preparation for current practice. This would occur primarily in authentic non-classroom environments among experienced practitioners with strong identities in that profession. Unlike sterile classroom environments, these settings would provide students opportunities to learn not only concepts but also the language, tool use, problem-solving, and forms of cognition specific to an occupation. While the classroom may play a valuable role in initiating and sustaining these out-of-class situated learning opportunities, it cannot replace them.

In agricultural education, this instructional approach might suggest career-specific instruction would be primarily provided by what are known as Supervised Agricultural Experiences (SAEs), while classroom instruction would exist to provide students with the capacity to understand the agriculture industry from a systems-level perspective that encourages innovation and critical thinking. However, changes to federal legislation known as the Perkins Act may encourage shifts at the state and local levels that emphasize classrooms as the primary form of specific career preparation.

Overview of Perkins V

While agricultural education in the United States is governed by a myriad of standards and expectations at the local, state, and national level, among the most impactful are the stipulations accompanying Perkins Act funding. First passed in 1984, the Perkins Act authorizes federal funding for career and technical education (CTE) courses at the secondary and post-secondary levels (Smith & Boyd, 2018). Perkins Act funding provides a significant amount of financial support to CTE subjects like agricultural education, representing $1.2 billion in federal spending (Beverly, 2018). As such, the requirements that determine how and to what extent schools can receive this form of financial support have an enormous influence on how CTE subjects such as agricultural education are taught at the local level.

With the passage of the *Strengthening Career and Technical Education for the 21st Century Act* in July of 2018, the Perkins Act has now been amended and updated for the fifth time. The accompanying changes to what is commonly known as Perkins V reflect demonstrable changes to labor market expectations as well as rapidly evolving industries. A number of states and organizations have interpreted Perkins V as placing an increased emphasis on streamlining the connections between the demands of the labor market and the instruction provided in secondary schools. This is most noticeably reflected in the strong prioritization of post-secondary and industry accreditation/certification in secondary courses (ExcelinED, 2018). In response to Perkins V, many states have created a clear expectation that schools should do as much as possible to provide students with adult-level industry training prior to high school graduation.

Most of these efforts appear to operate under the assumption that maximizing opportunities for industry certification and post-secondary coursework at the high school level should also maximize student preparation for occupations and careers (Suffren & Mezera, 2017). However, research into what constitutes effective preparation for existing occupational opportunities (particularly research on situated learning such as that by Lave & Wenger) suggests the

traditional manner in which industry certification and post-secondary coursework is designed is poorly-suited for the goal of maximizing career preparation for occupations as they currently exist. Furthermore, efforts to increase the amount of industry and post-secondary training may have unintended ramifications that may harm the industries that depend on career and technical education, especially the agriculture industry. In particular, an increased focus on entry-level industry training may likely come at the expense of creating an innovative and adaptable workforce that is in part necessary to ensure a viable future for agriculture.

The findings of researchers like Resnick, Bransford and Schwartz, and Lave and Wenger arguably do not speak on behalf of the subject of agricultural education (though their research is quite relevant to its objectives). As such, it is worth evaluating these questions in light of some of agricultural education's most important guiding frameworks, the Three Circle Model and the National AFNR Academic Standards.

Critiques Based on the Three Circle Model and the National AFNR Standards

Overview of the Three Circle Model: secondary agricultural education is based on a conceptual framework that proposes this form of instruction should be comprised of three overlapping parts: classroom and laboratory instruction, non-classroom situated instruction in authentic learning scenarios (called *supervised agricultural experiences*, or SAEs), and social learning opportunities through participation in organizations such as the National FFA Organization. This instructional model, known as the Three Circle Model, is typically portrayed as a Venn diagram to illustrate the overlap between these three components (Roberts & Ball, 2009). The Three Circle Model provides little in the manner of specific recommendations for how elements such as classroom instruction or SAEs should be implemented. As such, the Three Circle Model itself does little to address the question of how students can be most effectively prepared for careers other than to suggest all three components are mutually necessary for achieving this goal. However, this instructional model does have the potential for organizing agricultural instruction in high schools to make it more responsive to empirical evidence and philosophical arguments in educational research.

With that in mind, findings from researchers like Resnick, Bransford and Schwartz, and Lave and Wenger suggest no form of classroom instruction is sufficiently effective for career preparation by itself, but that the classroom component of the Three Circle Model can play a valuable role in providing students with the capacity for innovation and adaptability in their future careers. As Bransford and Schwartz suggest, this "frequently requires 'letting go' of previous ideas, beliefs, and assumptions" that conventionally accompany classroom instruction (p. 93). In other words, it is quite unlikely that effective career preparation can be achieved through traditional instruction or assessed by customary means such as a multiple-choice exam.

While SAEs can certainly provide effective preparation for specific occupations, the manner in which SAE opportunities are provided would likely have significant implications for the ultimate effectiveness of this approach. According to Wenger (1998), in order for SAEs to serve as an effective form of career preparation, they would have to provide all of the following (p. 5):

- Meaning (*learning as experiences*): the experiences provided by an SAE would have to be relevant not only to the interests of a student but also specifically applicable to their future career goals.
- Practice (*learning as doing*): it is not enough for students to learn *about* the practices of their anticipated profession; students would need to develop expertise by doing these practices in an authentic setting on a regular basis in order to be maximally prepared for their occupations as they currently exist.
- Community (*learning as belonging*): similarly, students need to be immersed in an authentic setting in which they are surrounded by individuals with explicit experience in their anticipated profession in a manner that enables the students to feel as if they increasingly belong in that setting.
- Identity (*learning as becoming*): even if a student is proficient in the practices of a profession and surrounded by its practitioners, it is necessary that these experiences increasingly become a part of the identity of that student. Without this growing sense of identity, an individual cannot feel that they belong in a community of practice and are likely to eventually look for opportunities in another setting.

As such, it is critical that all students have an SAE that immerses them in authentic environments among experienced practitioners in their intended field over an extended period of time. While FFA proficiency applications and state degree applications are often used as a proxy for successful completion of an SAE, Wenger would argue that this approach would only be effective if the experiences that the student is recording meets the four criteria above. If a student used a FFA award application to document experiences that failed to meet some of these criteria (such as for experiences on a parent's farm in cases where a student intends to eventually seek an unrelated career option), then it is less likely that this SAE would be appropriate preparation for their eventual occupation. As such, caution should perhaps be urged for "blank check" approaches to SAEs in which merely completing a FFA application is enough to assume that a student received sufficient career preparation. This is in accordance with recommendations from the National Council for Agricultural Education, which has explicitly stated that SAEs are not defined by a FFA award program and that "it is possible that students can engage in suitable SAE for which no FFA outcome may currently be available" (National Council, 2015b, p. 4).

National AFNR Standards: Similarly, both the Common Career Technical Core (CCTC) standards and the National Agriculture, Food, and Natural Resources (AFNR) Academic Standards for secondary classroom agricultural instruction were written with a much greater emphasis on preparation for future learning than on narrowly-prescribed preparation for occupations as they currently exist. For example, CCTC standard NRS.02.01 – "*Analyze the interrelationships between natural resources and humans*." – guides students in recognizing the limits of ecosystem services and how this affects the extents to which industries like agriculture can utilize natural resources. The standard, intentionally broad by design, is meant to allow students to understand the industry from a systems-level perspective rather than provide memorization of rote knowledge or machine-like skill performance.

Subsequent *Performance Indicators* for this CCTC standard that are specific to AFNR considerations reflect this approach, using terminology such as NRS.01.04.02.c. – "*Devise and apply strategies to manage, protect, enhance or improve sources of groundwater or surface*

water based on its properties." The National AFNR standards do provide a third tier of organization, called *Sample Measurements,* which sometimes entail more prescribed skills (such as standard NRS.04.01.02.c. – "*Create a timber stand improvement plan for a forest.*"). However, two things should be noted about these sample measurements. First, they are not all-encompassing nor are they meant to be "the actual standards" in this document. They are simply an indication of how student knowledge could be assessed in a given classroom (as is clearly stated on each page of the standards document). The much broader *Performance Indicators* are intended to reflect the expected level of attainment of knowledge and practice in an agricultural classroom. Secondly, even the sample measurements are written broadly in a manner designed to help students understand the broad inter-relationships in the agriculture industry; very few of these sample measurements reflect the narrowly-prescribed forms of industry training more typical in an industry certification curriculum. As an example, consider the broad language of NRS.01.04.01.c. – "*Evaluate and defend the importance of watersheds to ecosystem function*" (National Council, 2015a).

However, states and local districts are increasingly interpreting the language of Perkins as a call to maximize the inclusion of certificate-awarding or post-secondary credit-granting options at the high school level. If a school district felt pressured to include an industry-certification for a natural resources course, for example, one of the most likely options would be hunter safety or boater safety (Hicken, 2019). In Wisconsin, the DNR-sanctioned hunter safety course booklet uses only five pages out of 112 to explicitly address topics included in the AFNR standards (WDNR, 2012). Similarly, the Wisconsin DNR boating safety only directly addresses topics in the AFNR Natural Resources standards in two sections, Unit 4, Topic 17: *Waste, Oil, and Trash Disposal*, and Unit 4, Topic 18: *Protect the Environment* (WDNR, 2019). A single recreation safety course often entails as much as 30 hours of classroom instruction (Somerset School District, 2018); in a school with 45 minute periods, this would encompass almost a half a semester of teaching. As such, a push to include credentialing in a natural resources course would likely come at the expense of covering a large portion of the AFNR standards on this topic. This would also limit the capacity for classrooms to provide students with a trajectory toward expertise as a result of the reduced emphasis on preparation for future learning. While other industry certification options are certainly available, we have been unable to find examples that appropriately reflect recommendations for classroom-based career preparation by researchers such as Resnick or Bransford and Schwartz.

Arguably, it could be possible to have classroom instruction that accomplishes multiple major objectives, such as preparation for future learning in a course that also awards post-secondary credits. However, the greater the push to maximize the amount of industry certification and post-secondary coursework in secondary school agricultural classrooms, the less opportunity these programs likely have to provide preparation for future learning. Furthermore, if classroom-based career training is positioned as a higher priority than providing valuable SAE opportunities for all students, it is unlikely that students would complete an agricultural education program with maximal potential preparedness for their future careers.

Recommendations for Agricultural Education

Based on the writings of Resnick, Bransford and Schwartz, and Lave and Wenger as well as the Three Circle Model and the National AFNR Academic standards, we can perhaps begin to see a clearer picture emerging of how agricultural education might most effectively prepare students for their future careers. Taken together, these sources arguably suggest the following should occur as part of instruction in a secondary agricultural education program:

- Supervised Agricultural Experiences can most effectively prepare students to transition as seamlessly as possible into careers as long as these opportunities reflect legitimate peripheral participation in communities of experienced practitioners in authentic settings outside of traditional classroom instruction. As such, it is imperative that all students have opportunities for structured situated learning opportunities that evolve and expand over time in order to maximize their preparation for careers. Explicit emphasis on SAEs as the primary form of career preparation (in lieu of inauthentic classroom instruction) is likely critical for this purpose.

- While classroom instruction is poorly suited to provide seamless transitions for students into their careers, this form of instruction can be an excellent opportunity for providing students with opportunities to engage in mental modeling and preparation for future learning by emphasizing the development of skills such as quantitative analysis, information literacy, and evidence-based argumentation. Explicit training for students to work collaboratively to use such skills to solve authentic, novel problems would place students on trajectories toward expertise, minimizing the amount of time it takes for a student to become proficient in a range of career options once hired. It would also provide them with the capacities for innovation, flexibility, and adaptability in a rapidly-changing industry in a manner that cannot be provided to the same extent (if at all) by more narrowly-prescribed forms of occupation-specific training.

- Participation in social-based learning opportunities like the National FFA Organization can provide students with proficiency in socio-cognitive skills, as success in an occupational setting is often dependent on an individual's abilities to skillfully socialize with others in a manner that is generally not replicated in formal schooling (Resnick, 1987).

Agricultural Career Preparation, AFNR, and Perkins V

Arguably there is little reason to believe these recommendations for agricultural education would be difficult to implement, and it is likely that many programs already resemble this approach to varying extents. Rather than be pressured to incorporate more certification and post-secondary credentialing regardless of its feasibility, these programs should be encouraged to focus first on ensuring that all enrolled students have valuable SAE opportunities. Furthermore, a greater emphasis is likely needed in providing classroom instruction aligned to both the AFNR standards as well as the recommendations from the field of educational research. Bransford and Schwartz explicitly discuss the difficulties in creating effective PFL-based instruction (p. 93), which

suggests that agriculture instructors will need extensive guidance in developing and implementing this particular form of instruction.

In regards to Perkins V, the language of the requirements for funding already should allow for supervised agricultural experiences (SAEs) to serve as a primary venue for specific forms of occupational training while allowing for more general preparation for future learning as the basis of classroom instruction. For example, Section 135 (20 U.S.C. 2355) of Perkins argues that in order to be eligible to receive funding, a district's agricultural education program must sufficiently meet five requirements:

1. Provide career exploration opportunities to students before enrolling and while participating in a CTE program, which may include classroom instruction and/or "strong experience" in the industry, among other possibilities.
2. Provide sufficient professional development for teachers and faculty.
3. Use instruction to provide the skills needed to pursue careers in "high-skill, high-wage, or in-demand industry sectors or occupations."
4. Integrate academic skills into CTE programs.
5. Implement a CTE plan in a manner that results in increasing student achievement at the local level, which *may* include industry certification and post-secondary credentialing as well as improved relations with local businesses and stakeholders, improved equipment, more stimulating work environments, improved recruitment of CTE instructors, enhanced financial support, and many other options as well.

While some have interpreted Perkins V as an explicit call to maximize the amount of industry certification and post-secondary coursework at the high school level (ExcelinED, 2018; Suffren & Mezera, 2017), the actual language of Perkins V certainly seems to suggest well-designed SAE opportunities can also achieve this goal when made available to all students and supported by appropriate classroom instruction. Furthermore, the National Council for Agricultural Education has made significant efforts since 2011 to design curriculum and materials to guide agricultural instructors in providing SAEs to all students in a manner that more effectively prepares them for careers (National Council, 2015b).

Addressing Overlap in the Three Circle Model

The intent of this paper is not to suggest specific career skills could *only* be learned through participation in an SAE or that classroom instruction can *only* be about preparation for future learning. Just as the Three Circle Model shows clear overlap between all three components, classroom instruction and SAEs should overlap in the content and method of instruction to some extent. For example, if an animal science course used bandaging and suturing as a means to help students better understand how the steps of healing occur in animal tissues, this would be in accordance with instruction that helps students grasp a wider and more comprehensive understanding of animal science in a manner that provides them with the capacity for innovation and adaptability. However, if suturing is taught in a course without any context or connection to biology, physiology, animal welfare, or other broader themes in animal science, it would have limited value for a student's career preparation unless their occupational roles are limited specifically to those skills. When occupation-specific skills are taught as part of classroom

instruction, the emphasis should be on how those skills enable a student to better understand broader phenomena in that particular field.

Similarly, classroom instruction can provide a valuable opportunity for students to develop a plan for an effective SAE while enhancing the capacity for students to learn from these experiences. Bransford and Schwartz used the example of undergraduate student teachers to show that out-of-classroom field experiences can enhance the capacity for classroom instruction to provide preparation for future learning. Similarly, SAE experiences should provide students with a greater capacity to develop a trajectory toward expertise through classroom instruction.

Conclusion

Since its inception, one of the primary goals of agricultural education has been to maximize student readiness for their careers. However, it has always been contentious as to whether effective preparation could be best achieved through preparation for current practices or by preparation for future learning. The educational research cited in this paper argues that perhaps the answer can be both. While classroom instruction is poorly suited to provide preparation for current practices, it can provide a valuable role in preparing students for maximal long-term career effectiveness through an emphasis on preparation for future learning. On the other hand, students can receive maximal preparation for current practices by engaging in situated learning in authentic environments through peripheral participation in communities of practice. The Three Circle Model of Agricultural Education as it is widely interpreted seems to allow for both of these outcomes to occur.

While some have interpreted the fifth revision of the Perkins Act as a call to maximize the amount of exposure that secondary students have to industry certification and post-secondary coursework at the high school level, research by Resnick, Bransford and Schwartz, and Lave and Wenger suggest this is less effective for preparing students for their eventual occupational roles. The findings from their research suggest that specific occupational skills are best taught through participation in communities of practitioners in authentic settings, while classrooms can effectively prepare students by placing them on trajectories toward expertise that maximize their capacity for learning on the job. In order to provide maximal career preparation, an agricultural education program should focus less on the extent to which it provides paper certifications and post-secondary credits, and should focus more on the extent to which it offers high quality career preparation via SAE opportunities for every student, provides preparation for future learning in classroom instruction, and enables social development through participation in opportunities like the National FFA Organization. While arguably no form of classroom instruction can enable a seamless transition into a career, this conceptualization of the Three Circle Model would better fit with what highly-cited findings from the field of educational research might suggest is necessary to maximize student readiness for careers and for their adult lives.

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