

Title:

Overcoming Preconceived Notions: A First Look at the Purdue Agribusiness Student Academy

Topic Area:

STEM Education

Format:

Paper Session

Project Description:

The Purdue Agribusiness Science Academy (PASA) is a program designed to increase youth interest and engagement in agriculture and also increase youth association of agriculture with STEM. The twelve-year history of the program demonstrates support for its existence and success at Purdue University. However, future empirical research needs to be done to determine if PASA can be seen as a model for other universities and organizations to follow.

Paper Authors:

Dr. Shaneka S. Lawson (corresponding author)
USDA Forest Service, Northern Research Station
Hardwood Tree Improvement and Regeneration Center (HTIRC)
Department of Forestry and Natural Resources
College of Agriculture, Purdue University
shaneka.s.lawson@usda.gov

Zachary C. Brown
Office of Multicultural Programs
Department of Agricultural Sciences Education and Communication
College of Agriculture, Purdue University
brow1688@purdue.edu

Dr. Pamala Morris
Office of Multicultural Programs
Department of Agricultural Sciences Education and Communication
College of Agriculture, Purdue University
pmorris@purdue.edu

Overcoming Preconceived Notions: A First Look at the Purdue Agribusiness Student Academy

Lawson, S. S., Brown, Z. C., & Morris, P.

Disparities exist in the college admissions process that makes the pursuit of higher education a difficult concept for many underserved student populations (Bunzel, 1996; Robertson, 2021). With financial aid awards decreasing, applications fees, and tuition costs increasing, students are working harder than ever to find summer programs that align with their chosen field of interest (Ghazzawi et al., 2021). Summer programs are one method of "test driving" a career choice before a financial obligation is made to a University (Salehi et al. 2020).

The Purdue Agribusiness Science Academy (PASA) was developed from the Hoosier Agribusiness Science Academy (HASA) in 2015 after former Lt. Governor (2005 – 2013) Rebecca S. Skillman left office. The HASA program was focused on exposing urban and first-generation college students, throughout the State of Indiana, to the billion-dollar agriculture industry. The change to PASA included a shift from simply an exposure program to a more rigorous academic and research-based experience to mirror college preparatory standards. The focus of the later-created residential two-week immersion experience was to provide students with a more thorough exposure to research and the academic coursework involved in selected career paths. The program was designed to mirror college preparatory standards to determine which careers they are genuinely interested in pursuing at a 4-year institution.

Additionally, a three-tiered system (middle school, high school, high school science teachers) was introduced to serve and reach a bigger program audience. This arrangement incorporated science teachers and students using hands-on learning. Each instructor was provided with a kit containing activity supplies to reproduce experiments taught over the summer

in their classrooms throughout the upcoming year. The co-curricular activities were developed by a select group of College of Agriculture (CoA) faculty and staff with input from and collaborating with middle- and high school science teachers and principals.

Historical Data: The Agricultural Industry

The agriculture industry has rarely attracted employees from underrepresented populations (Williamson, 1975; McNees, 1979). An evaluation of forestry schools in 1970 revealed only eighteen black undergraduates nationwide (Didriksen, 1975). This presumed lack of interest stems from, in part, the plethora of challenges faced by colleges and universities that offer agricultural programs to attract those from underrepresented groups to seek a degree in the field (McNees, 1979; Bowman & Shepard, 1985). Examples of these challenges include, but are not limited to, a significant lack of understanding and exposure to the field (Leatherberry & Wellman, 1988; Otero & Brown, 1996), lack of role models within the area (Outley, 2008), limited knowledge of the college search process (Balcarczyk et al., 2015) and limited financial resources (Balcarczyk et al., 2015). In addition, Wardlow imparted that minorities are underrepresented throughout the nation in professional roles, whether within academic institutions or government agencies (2014).

Many potential students from underrepresented populations are not aware of the expansive selection of career opportunities available in the field of agriculture and within the agricultural industry. Previous research indicates the early introduction of minorities to agriculture and natural resources through high school counselors (Wellman, 1987; Leatherberry & Wellman, 1988) and youth programs will increase later minority participation in agriculture.

The inability of agricultural baccalaureate programs to attract underrepresented students directly impacts the representation of underrepresented populations within agricultural industries.

Government agencies, foundations, and corporations within the U.S. have recognized the lack of underrepresented students within the industry and have actively supported outreach activities such as the PASA program to help encourage youth to learn more about agriculture and natural resources. Enrollment in the CoA at Purdue University by underrepresented students is representative of this statement as registration data notes approximately ten percent of those matriculating through the CoA are domestic ethnic minorities.

Importance of Summer Programs

Offering a summer program to underrepresented students leads to improved learning and knowledge retention as less time passes between formal learning opportunities. Finding affordable and educational summer learning is challenging for most parents as available activities are less likely to be intellectually engaging for students (Duffett et al., 2004). A considerable lack of intellectual stimulation over the summer months often results in loss of learning.

Evaluation of data compiled over the last century has shown, using standardized testing, that student test scores are typically lower at the end of summer vacation than at the beginning of summer (Entwisle & Alexander, 1992; Cooper, 1996; Downey et al., 2004). Cooper further postulated that most students lost nearly two months of grade-level equivalency in mathematical computation skills over the summer months (1996). Low-income students lost greater than two months in reading achievement, despite middle-class peers making slight gains (Cooper, 1996).

Numerous theories abound regarding the lack of diversity in the agricultural field. Nationwide, parents and educators must better prepare students for college to compete in the international economy. "Students are not generally attracted to agriculture because of their perception of what agriculture is," Jade Briggs, an employee with Tyson Foods, says, "We have to educate people about our professions and start talking to students early--you want students to know at a young age that big things are happening at your company." She believes agriculture is beginning to do a better job of targeting minority students, but there's still a long way to go. "Big businesses are not where they need to be in the big chef salad. There's way too much lettuce—we need more color," Briggs quips. These statements suggest that examination of pre- and post-PASA-SI evaluations taken by students may provide a much-needed influx of information into marginalized communities (McClure 2019, personal communication).

By providing summer learning opportunities in agriculture for students already interested in the field before entering college, we can examine the extent to which these participants can learn over a short period. Compared to other career interests, the field of agriculture is disproportionately made up of Caucasian males and, to a lesser extent, Caucasian females (Balcarczyk et al., 2015).

Purdue Agribusiness Science Academy Goals and Structure

As of 2020, the primary goals of PASA include: 1) Identifying and recruiting talented high school students from urban and first-generation underrepresented backgrounds with STEM interests creating a linkage for them to opportunities in the agricultural sciences, 2) providing instruction and hands-on training in STEM in the fields of agriculture sciences, and 3) exposing students to the diverse educational environment of a university campus and promoting interest in

attending and completing a bachelor's degree. PASA attempts to accomplish these goals through a rigorous two-week residential program located directly on Purdue University's campus.

Throughout the two weeks of the program, up to 35 student participants are provided various professional and personal development opportunities through partnership with university staff and faculty, USDA researchers and liaisons, and industry partners. The partners provide multiple methods of exposure for students through hands-on lab experiments, mini-lectures, one-on-one workshops, and field trips. Sessions were designed to provide real-life college experiences for urban and first-generation college students. The students were also exposed to businesses within the agricultural industry through farm and corporation visits to explore career opportunities in agricultural sciences. The visits are designed to help students see the benefit of a postsecondary education degree and connect the academic rigor experienced in summer camp to actual industry demands. Participating students are also granted the opportunity to complete short-term research projects, similar in quality to the much longer Capstone project, led by college professors and/or graduate students from the various academic departments.

Limitations of Past Program Evaluation Future Directions for Research

The PASA Program has consistently included programmatic evaluation over the years. The past evaluation has been focused on internal and stakeholder reporting. The survey design did not follow research-based practices, checks for reliability or validity of survey items, or follow other standard research-based practices. However, this is not a criticism. PASA has served as a critical program area for Purdue Agriculture and was treated as a potential research program. Expectations laid on empirical research cannot be placed on such a program. The tools

used for program evaluation have provided the justification and feedback needed to continue PASA operation over a dozen years on Purdue's campus.

Moving forward, an additional goal of PASA will be to establish PASA as an educational intervention tool that increasing student interest and self-efficacy in relation to agricultural college majors and careers. In efforts to achieve this new goal, the program will follow new practices. First, research approval through the Purdue Institutional Review Board will be sought. Additional student and guardian consent processes will then be embedded into the program. Pre- and post-intervention surveys will be developed and tested following standard protocol design guidelines or adapted from other published tools associated with the program's primary goal areas.

PASA is designed to increase youth interest and engagement in agriculture and increase youth association of agriculture with STEM. The program's twelve-year history is evidence of its support and success at Purdue University. However, future empirical research is needed to determine if PASA can be seen as a model for other universities to follow.

References

- Balcarczyk, K. L., Smaldone, D., Selin, S. W., Pierskalla, C. D., and Maumbe K. (2015). Barriers and supports to entering a Natural Resource career: Perspectives of culturally diverse recent hires. *Journal of Forestry*, 113(2): 231–239. doi: <https://doi.org/10.5849/jof.13-105>
- Bowman, M. L., and Shepard, C. L. (1985). *The Ohio Journal of Science*, 85(1): 29–33. <http://hdl.handle.net/1811/23050> (Accessed July 28, 2021)
- Bunzel, J. H. (1996). Race and college admissions. *National Affairs—The Public Interest*, 122(Winter): 49–58. <https://www.nationalaffairs.com/storage/app/uploads/public/58e/1a4/e86/58e1a4e863584083969251.pdf> (Accessed July 28, 2021).
- Cooper, H., Nye, B., Charlton, K., Lindsay, J., and Greathouse, S. (1996) The effects of summer vacation on achievement test scores: A narrative and meta-analytic review. *Review of Educational Research*, 66(3): 227–268. doi: <https://doi-org.ezproxy.lib.purdue.edu/10.3102/00346543066003227>
- Didriksen, R. G. (1973). Minorities in professional forestry schools. *Journal of Forestry*, 73(5): 283. doi: <https://doi.org/10.1093/jof/77.10.676>
- Downey, D. B., von Hippel, P. T. and Broh, B. A. (2004). Are schools the great equalizer? Cognitive inequality during the summer months and the school year. *American Sociological Review*, 69(5): 613–635. <https://www.jstor.org/stable/3593031> (Accessed July 28, 2021)
- Duffett, A., Farkas, S., Kung, S., and Ott, A. (2004). All work and no play?: Listening to what kids and parents really want from out-of-school time. New York, NY: Public Agenda Foundation. <https://files.eric.ed.gov/fulltext/ED485306.pdf> (Accessed July 28, 2021)
- Entwisle, D. R., and Alexander, K. L. (1992). Summer setback: Race, poverty, school composition, and mathematics achievement in the first two years of school. *American Sociological Review*, 57(1): 72–84. doi: <https://doi.org/10.2307/2096145> (Accessed July 28, 2021)
- Ghazzawi, D., Pattison, D., and Horn, C. (2021). Persistence of underrepresented minorities in STEM fields: Are summer bridge programs sufficient? *Frontiers in education*, 6:630529. doi: [10.3389/feduc.2021.630529](https://doi.org/10.3389/feduc.2021.630529)
- Indiana State Standards for science and Agriculture Indiana Department of Education, <https://www.in.gov/doe/students/indiana-academic-standards/cte-agriculture/> (Accessed July 28, 2021)

- Kerry, T. and Davies, B. (2003). Summer Learning Loss: The evidence and a possible solution. *Support for Learning*, 13(3): 118–122. doi: <https://doi.org/10.1111/1467-9604.00072>
- Leatherberry, E. C. and Wellman, J. D. (1988) Black high school students' images of forestry as a profession. *The Journal of Negro Education*, 57(2): 208-219. <https://www.jstor.org/stable/2295452> (Accessed July 28, 2021)
- McClure, M. (2019). Personal communication.
- McNees, R. E. (1979). Acquainting minorities with forestry careers. *Journal of Forestry*, 77(10): 676–677. doi: <https://doi.org/10.1093/jof/77.10.676>
- Office of Enrollment Management Analysis and Reporting-CoA 2014, <https://www.purdue.edu/enrollmentmanagement/data-reports/annual-report/emannualreport2014.pdf> (Accessed July 28, 2021)
- Otero, R. and Brown, G. N. (1996) Increasing minority participation in forestry and Natural Resources: The MINFORS Conferences. *Journal of Forestry*, 94(11): 4–7. <https://academic.oup.com/jof/issue/94/11> (Accessed July 28, 2021)
- Outley, C. W. (2008). Perceptions of agriculture and natural resource careers among minority students in a national organization. In: Chavez, Deborah J.; Winter, Patricia L.; Absher, James D., eds. Recreation visitor research: studies of diversity. Gen. Tech. Rep. PSW-GTR-210. Albany, CA: U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station. 139-153. Chapter 12. https://www.fs.fed.us/psw/publications/documents/psw_gtr210/psw_gtr210_139.pdf (Accessed July 28, 2021)
- Robertson, R. (2021). A critical race theory analysis of transnational student activism, social media counter-stories, and the hegemonic logics of diversity work in higher education. *International Journal of Qualitative Studies in Education*. doi: <https://doi.org/10.1080/09518398.2021.1885073>
- Salehi, S., Cotner, S., and Ballen, C. J. (2020). Variation in incoming academic preparation: Consequences for minority and first-generation students. *Frontiers in Education*, 5: 552364. doi: [10.3389/feduc.2020.552364](https://doi.org/10.3389/feduc.2020.552364)
- Wardlow, G.W. (2014). Walking with giants. *Journal of Agricultural Education*, 55(1): 1–7. doi: [10.5032/jae.2014.01001](https://doi.org/10.5032/jae.2014.01001)
- Wellman, J.D. (1987). Images of a profession. *Journal of Forestry*, 85(3): 18–19. <https://academic.oup.com/jof/article/85/3/18/4634567> (Accessed July 28, 2021)
- Williamson, R. D. (1975). Urban minorities: Don't we count? *Journal of Forestry*, 73(5): 281–308. doi: <https://doi.org/10.1093/jof/73.5.281>

Welcome to the Twentieth Annual Hawaii International Conference on Education



Aloha!

We welcome you to the Twentieth Annual Hawaii International Conference on Education. For the past two decades, this event has offered a unique opportunity for academics and other professionals from around the globe to share their broad array of knowledge and perspectives. The primary goal of the conference is to provide those with cross-disciplinary interests related to education to meet and interact with others inside and outside their own discipline.

The international aspect of the conference brings a truly diverse variety of viewpoints shaped by different cultures, languages, geography and politics. This diversity is also captured in the Hawaii International Conference's unique cross-disciplinary approach. The resulting interaction energizes research as well as vocation.

With Waiulua Bay and the vast South Pacific as the backdrop, this venue is an important dimension of this conference. For centuries a stopping place of explorers, Hawaii has historically been enriched by the blend of ideas that have crossed our shores. The Hawaii International Conference on Education continues this tradition in the nurturing spirit of Aloha. Along with its ideal weather and striking beauty, the Hawaiian Islands provide natural elements to inspire learning and dialogue.

This year we have more than 800 participants representing more than a dozen countries. Thank you for joining the 2022 Hawaii International Conference on Education!

The 2023 Hawaii International Conference on Education is scheduled for January 3 – 6, 2023 at the Hilton Hawaiian Village Waikiki Beach Resort, in Honolulu, Hawaii. Please check our website in late January for more details!

<http://www.hiceducation.org>

Email: education@hiceducation.org

The **Digital Proceedings Publication** can be found on our website at www.hiceducation.org (ISSN #1541-5880)