A Sample Program Review in Youth Agriculture Leadership: Lessons for Agriculture Educators and Practitioners

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Abstract

The current paper represents an attempt to suggest pragmatic steps for reversing the trend of declining youth interest in the agriculture education and farming profession in the U.S. The findings are based on a pilot project and surveys that were executed at VSU. The program consisted of two components—an online instructional component and an experiential learning segment, in which a cohort of Virginia high school students participated. While the program's broad goal was to prepare Virginia's youth for leadership in the state's agriculture industry, each constituting component addressed specific objectives. The instructional component equipped participants with a foundational knowledge of academic concepts needful for connecting into agriculture disciplines, while the experiential learning component taught vocational competencies needful for youth acquisition of workforce and leadership skills. The study uncovers insightful findings concerning evolving tendencies in the Ageducation practice and suggests broad implications for Ag educators and industry practitioners.

Keywords:USDA, 4-H,youthAgriculture leadership, Agriculture educators,extension.

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1. Background of the Crisis and Underlying Dynamics

The U.S.agriculture industry is currently at crossroads—itscontinuing competitiveness into the twenty-first century is being threatened by a worsening trend of farm workforce attrition. The deteriorating attrition is attributable to the worsening imbalance in the demographics and dynamics of key factors that underlie the industry—evidence corroborated by official NASS data stated in Figures 1 and 2below.

Viewed from its demographic outlook, we see in Figure 1 evidence of increasing aging and the imminent retirement of U.S. adult farmers—with the median age of principal farm operators estimated at 52 in 1987, 54.3 in 1997, 57.1 in 2007, and 59.4 years in 2017. But even more worrisome is the contradictory dynamics inthe key underlying factors andbackdrop setting against which adult farmers' age is rising. Specifically stated, not only areU.S. adult farmers approachingretirement but alongside, there is also the concurrent decline in the number of youththat is enteringinto the farm workforce. Official NASS statistics in Figure 2underscore telling evidence ofcontrasting adult-youth participation rates in the total U.S. agricultural workforce—along the line of which adult farmers'participation rate is rising vis-a-visa a concurrent decline in the younger workforce participation rate.

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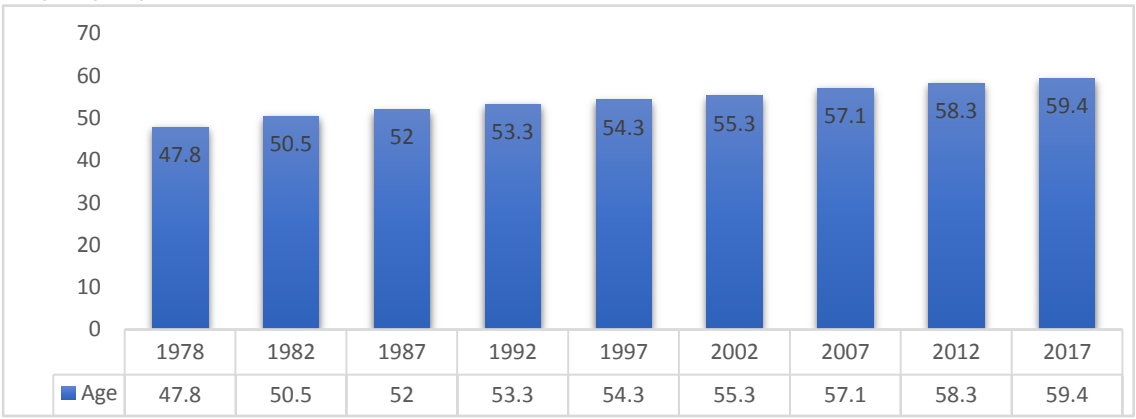
Consistent with this trend, between 2007 and 2017 (an interval that overlaps two official NASS census polls, 2007-2012 and 2012-2017), exceptfor the 55-64 age bracket whose participation rate only marginally declined by 2.6%, participation by other groups in the 55 years-and-abovecategoriesnoticeably rose. Specifically, participation by those in the 65-74 age bracket rose by a whopping 21%, while for the 75 years and older, it rose by as much as 15.9%. Benchmarked against parallel data for the younger workforce, a contrary picture emerges. Except for the 25-34 age bracket for which participation registered a marginal 4.2% increase,the youth participation rate in the total farm workforce across all age brackets substantially declined. Specifically, participation by the 45-54 age bracket declined by a whopping 37.8%; for the 35-44 group, it declined by 22.9%; and for those under 25, by 11.4%.The trend of concurrent decline in youth entry into the U.S. farm workforce in the face of the imminent retirement of adult farmers is a serious cause for alarm—especially considering that the youth population constitutes the very age group that is expected to replacethe retiring adult farmers!

Figure 1

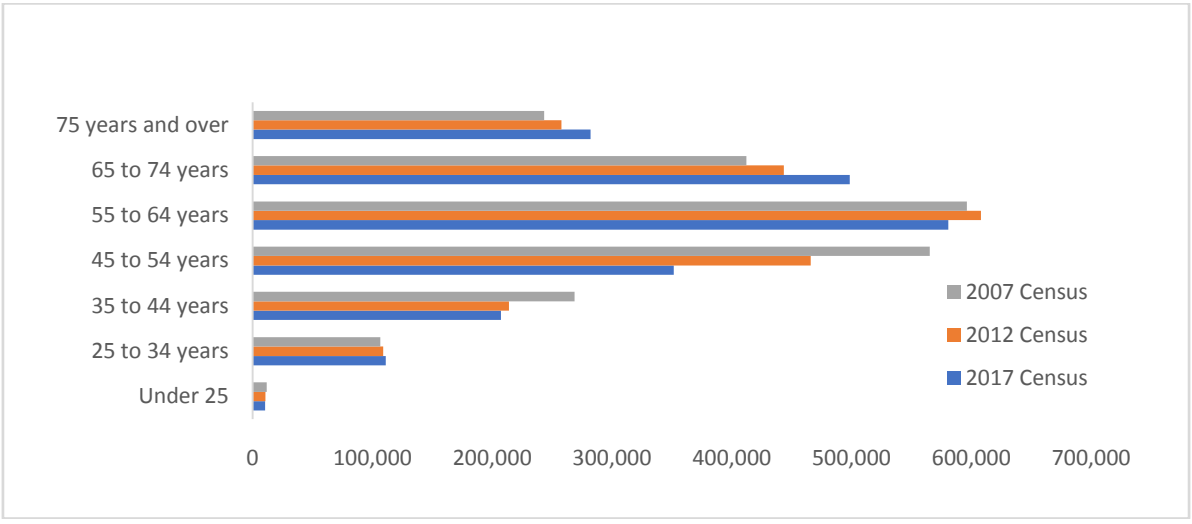
Average Age[2] of U.S. Farm Producers



Source: *USDA-NASS, 2007, 2012, and 2017 data(https://www.nass.usda.gov/AgCensus).*

Figure 2

Number of U.S. Farm Producers by Age Group



Source:USDA-NASS, 2007, 2012, and 2017 data (https://www.nass.usda.gov/AgCensus).

[2] Average Age data for 2019 iscomputed from "primary farm producers" while those for earlier years are computed from "primary farm operators". According to USDA, a farm operator is the same as a primary producer. A principal farm operator is an individual who runs the farm, making day-to-day management decisions. In the case of multiple principal operators, the Agricultural Resource Management Survey (ARMS) data respondent (from a farm unit) identifies the principal farm operator during the ARMS data collection process.

The above-stated trends are symptoms and warning signals of an imminent food security crisis and contain insightful industry-wide revelations.
Lucidly stated, an increasing participation rate by older farmers in the total U.S. farming workforce means that older farmers arebeing forced to stay in farming beyond retirement age since it is becoming increasingly difficult to find a capable, ready-trained youth workforce that could replace them.It also means that the U.S. adult population farmers are not only contributing more to agriculture but the country is becoming more and more dependent on them for its food supplies.

Moreover, the above-stated trend is not limited to the U.S. farming industry at the national levelalone but is beginning to manifest itself in declining farm performance and productivity across Agriculture-producing regions and states. It is particularly taking a heavy toll on rural farming communities, where younger-generation family members are increasingly abandoning farming in place of career-advancement opportunities in other industries. InVirginia for example, documented evidence shows that adult farmers in tobacco-producing regions have not responded well to government land-incentive programs accompanying national tobacco settlement programs, but on the contrary, have continued to reduce total cultivated farmlands—on grounds that younger-generation family members increasingly prefer to pursue alternative career interests outside Agriculture or are simply not educationally or vocationally prepared to farm (Virginia Labor Market Information (LMI), December 2020).

1.1 Tell-Tale Signals in Higher Education

One of the most telling signals of a mounting U.S. food security threat is the worsening student attrition rate in U.S. institutions of higher learning that offer ag educationprograms. As adult farmers progressively approach retirement, U.S. institutions of higher learning continue to fall behind in preparing an adequate number of young professionals for replacement. Official sources authoritatively point to concerning evidence of declining student enrollment and graduation rates in ag education programs and its noticeable effect on farm workforce shortage. According to USDA, the annual estimate of job openings in agriculture and related fields is 57,900, but only an estimated 35,400 graduate annually with matching qualifications—resulting in an annual shortage of 22,500 professionals, when compared to the industry's annual workforce needs (USDA-Purdue University Report, 2015).Considering that the 35,400 is only sixty-one percent of the industry's annually estimated manpower needs, agriculture employers are forced to hire less-preferred job applicants—primarily, graduates from specializations unrelated to agriculture!

The worsening attrition has assumed an epidemic proportion in minority institutions that offer agriculture programs. According to the Journal of Blacks in Higher Education (JBHE), on a sustained basis, national enrollment figures for young African-Americans continue to stay below the national average rate for all students. The journal reported that in half of the Historically Black Colleges and Universities (HBCUs) that were included in its 2014 survey, black students' graduation rate was only 34 percent of the national level, and 44 percent at VSU (JBHE, 2014).The report lamented that the Morrill Act of 1890, which was instrumental in establishing the nation's black land-grant institutions, has yet to translate visibly into acceptable matriculation and graduation rates for minority student populations.

1.2 Literature Review

The worsening trend ofattrition in college-level agricultural education programs in the U.S. and declining youth participation rate in the farm workforce have been investigated by several agriculture scholars, both in past and recent times. Faced with theimminent retirement of the adult farming population and an urgentneed to find a younger replacement workforce, the problemin recent times has elicited attention from a broad spectrum of global and national audiences,many of which include agriculture scholars, policymakers, food producers, manufacturers, and other agriculture industry stakeholders. Prominent scholarly workson the stated problem include studies by Tracy Hoover, et al (1991), Earl Russell (1993), and Allan D. Goecker (2015)—to mention just a few.

Hoover and fellow researchers in their study (1991) which addressed factors influencing student decision-making choices to study agricultural education observed that youth perceptions about agricultural education are formed in lower-level grades and subsequently carry on to influence enrollment decision-making in upper-level grades—thus highlighting the importance of pre-college interventionprograms that emphasize agricultural education. Similarly, Riesenberg(1987) in another study that addressed the problem of declining student enrollment in college-level agriculture educational programs, highlighted specific roles for college-level agriculture educational programs, part of which according to him, include broadening the focus from traditional teaching and research activities to include neglected areas like vocational training, farm extension activities, and youth leadership development.In a similar study, Russell(1993) suggested that youth involvement in 4-H and high school vocational programs heavily influenced student decision-making to enroll in college-level agriculture programs upon graduation from high school.

According to the study,50 percent of most incoming agriculture students have previously been involved in 4-H programs and 50 percent in other types of high school vocational agriculture education—thus leading Russell to conclude that the fate of most college-level agriculture educational programs is inevitably tied to the pool of students who have experienced 4-H or other types of vocational Ag education programsbefore college. Also, in a recent study that investigated the effectiveness of inquiry-based learning when compared to traditional learning methods,Baldock and Murphrey (2020)reported survey-based evidence supporting student perception of inquiry-based learning. The study underlined experiential learning opportunities that involve students in hands-on activities. This is particularly critical for agriculture education, considering the vocational demands of the agriculture industry.The studies cited above, and many others, provided a pivotal guidepost forthe current study.

1.3The Need for Intervention at Grassroots Level

The ongoing attrition in the U.S. farm workforce can be rationalized by the growinggenerational misperception among youths concerning educational and career opportunities in Agriculture. The perception-induced gridlock underscores the urgency for developing a youth-targeted agriculture educational program that addresses the following needs: (1) rectify the misperceptionamong youth concerning education and career opportunities in agriculture; (2) educate youths about educational and career opportunities in agriculture; and (3) train and equipyouths with requisite farming skills for replacingretiring adult farmers.

One of the systemic hindrances undermining the delivery effectiveness and outcome of mainstream ag educational programs in U.S. institutions of higher learning is the uniform standardization requirements that are institutionallyembedded within agriculture educational programs—the underlying intent of which is to help ensure the uniformity of learning content across a broad audience base. Typically, educational standardization isregulatedon a state-by-state basis alongside uniform state laws. Common examples of state-level supervisory agencies that are charged with the task of standardizing ag educational programs and policies along uniform accountability benchmarks are the State Council of Higher Education for Virginia (SCHEV) and the Maryland Higher Education Commission (MHEC). While the enforcement of statutory standardization helps assure state-level uniformity of learning content for the broad agriculture student audiences spread across agriculture educational institutions within jurisdictions in the U.S., paradoxically at the same time, it has over time become an administrative constraint that does not sufficiently allow for the flexibility needed to assurecongruence of learning content with training needsat community and grassroots levels.

The current paper takes the position that the educational standardization requirements and uniformity-based practices inherently built into higher-level ag-educational programs weaken and undermine the relevance of student-acquired learning—especially taking into consideration the unequal conditions into which benefitted knowledge is prospectively applied. Forexample, the unequal living conditions in rural and urban farming regions—rationalized against disproportional access to technologies, unequal training opportunities, unequal geographical proximity, etc.—create visible disparities between living and working conditions in urban and rural farming communities. The recognition of the disparitiesstrongly justifies a need for developing individualized agriculture education and training programs that equivalently match curricular content with grassroots-level needs in farming communities.

Regrettably, for so long, the issue of standardization of ag education programs and the resulting imbalance created has often been overlooked or neglected by agriculture economists and scholars—on account of reluctance by them to excavate beneath the surface of the crisis. Fortunately however in recent times, regional studies and testimonials from farming communities across the nation are beginning to move in the opposite direction. These studies broadly uncover evidence that while generally at the statewide and nationwide levels,farm sector workforce crisesseemingly portray similar characteristics, the dimensions and severity of the crisis are never the same but do vary across regions and communities. It, therefore, makes sense that resolution initiatives addressing farm workforce shortage and training needs arecautiously designed to address grassroots-level conditions in affected farming communities. Examples of farm recovery programs targeting region-specific needs are the Virginia Tobacco Region RevitalizationProgram[3] and North Carolina's Community Assistance Initiative[4]—both of which are revitalization programs that specifically address economic recovery needs in tobacco-producing communities of the two states—following the social disintegration that was triggered by tobacco settlement legislation in the mentioned states and other principalitiesacross the United States.

[3]The *Virginia Tobacco Region Revitalization* Commission was created in 1999 for promoting economic rehabilitation in Virginia's tobacco-dependent communities, using proceeds from the national tobacco settlement.

[4]*Community Assistance Initiative* was launched in 2007 by Golden LEAF in North Carolina. It targeted economically distressed communities and provided direct support for projects that enhanced quality of life for the community.

Moreover, there is a growing stack of empirical evidence suggesting that grassroots-level initiatives targeting community workforce training needs tend to produce better results when they are implemented within the framework ofstrategic partnerships involving collaboration between community agriculture educational institutions[5] and community-based food and fiber industry stakeholders[6]. Agriculture-based partnership programs are particularly effective when they are set up as pipeline training programs for youth acquisition of vocational farming skills and preparation for admission into college-level educational programs. Unlike conventional programs that address rural workforce training needs from a generic standpoint, community educational partnership programs are designed and executed at the grassroots level and are structured to address community-specific training needs. They tend to yield better results, given that they mobilize community resources for community-targeted purposes. Mounting evidence also shows that such programs can be quite instrumental for leveraging community resources and optimizing budgetary expediency—especially during difficult times of budget shortfalls commonly faced by small rural farming communities across the nation. Along this line of rationale, we examine the VSU pilot program initiative and discuss its broad implications.

2. VSU Youth Agriculture Leadership Program—A Suggested Resolution Initiative

2.1 Summary

Recognizing the specific educational and workforce training needs facing southern and southeastern regions of Virginia, the VSU College of Agriculture developed and implemented a youth workforce development training pilot program, targeting a cohort of twenty-six high school students from six selected high schools in southern and central Virginia. While the program's broad goal was to educationally equip the participants with knowledge of foundational disciplinary conceptsin agriculture and vocationally prepare them for leadership in Virginia's agricultural industry, the specific objectives consisted of the following: (1) establish a transitional pipeline for preparing high school students for college-level education and career opportunities in agriculture; (2) strengthen recruitment practices at VSU to help increase student enrollment into agriculture programs; (3) rectify cultural misconceptions that discourage college-bound youth from seeking educational and career opportunities in agriculture; (4) create an environment for cross-matching Virginia's next-generation farmers with some of the State's veteran farmers for training and skill acquisition.

The program was organized into two constituting components: (1) an online academic learning component for equipping participants with knowledge of fundamental principles of agriculture disciplines; and (2) a farm extension-based experiential learning component that involved students in a variety of hands-on activities (i.e. fish pond management strategies, field crop production, irrigation installation, greenhouse operation, demonstrations and hands-on in farm technologies,and other types of skill-building and leadership development activities).

2.2 Administration

Program administration ran the course of the 2017-18 academic year, including spring, fall, and summer semesters. The academic component was organized into fall 2017 and spring 2018 semesters, and the experiential component into spring and summer sessions.The selection criteria for high schools that were included in the program consisted of the following: (1) an existing agriculture program already mainstreamed into selected schools' educational curricula; (2) an existing or the prospect of a future working relationship between VSU and selected school; (3) commitment by Ag/Vocational Teachers to collaborate program implementation with VSU project team and provide mentoring support for students; (4) commitment of technology/infrastructure support (i.e. computers, workstations, connectivity to the internet, etc.) fromselected schools assuring student access to program's weekly academic assignments;(5) assurance of administrative and other types of logistics support from selected schools.

[5]*Community agriculture educational institutions*in current paper refers to community-based Ag educational institutions that have committed to work together with the local agriculture industry in addressing community-specific food security needs. Typically, the institutions include: (1) colleges and institutions of higher learning that offer four-year baccalaureate degree programs in agriculture and agricultural disciplines; (2) community colleges that offer two-year associate degree programs in any one or more of the agricultural disciplines; (3) pre-college secondary schools and vocational programs that offer one or more educational programs in agriculture.

[6]*Community-based food and fiber industrystakeholders* in current paper refers to community-based farming institutions and food producers—including governmental agencies, private commercial institutions, non-governmental organizations, charitable organizations, religious institutions, and private individuals—that have partnered to collaborate with community-based Ag educational institutions in advancing initiatives for addressing food security threat and workforce-development needs affecting the local agriculture industry.

Agriculture (Ag) teachersand vocational instructors particularly played a pivotal role in the program and successful implementation would not have been possible without their sustained involvement throughout the program duration. Typical roles performed by Ag Teachers were:(1) collaboration of student recruitment and selection processes with VSU project staff; (2) coordination of program's curricular content with the Program Director (PD) to assure synchrony between SCHEV-required college-level curricular standards and high school curricular requirements; (3) providing mentoring support for studentcontinuing participation inprogram's academic activities all through program's duration.Eligibility was open to all high school students from participating schools—from freshman to senior year grades. Rubrics for student selection consisted of the following: (a) academic achievement based on student academic records; (b) student academic interestsand commitment to study Agriculture at the collegelevel; (c) student-written essay demonstrating a commitment to pursue an Agriculture-related career.

2.3 Structure

Participants were required to take part in the program's two constituting educational components—i.e. academic and experiential. Participation in both components helped assure that students achieve a holistic workforce development training that combinesacademic learning of rudimentary agricultureconcepts with experiential learning. Students that completed both components were credited with 3.0 college-level academic credithours.

2.3.1 Academic Learning Component

*(a) Objectives.*The academic component of the program was operated as an interactive e-learning instructional platform from which participants were taught rudimentary principles needed for understandingand synthesizing fundamental agriculture concepts.Specifically, it addressed participant learning in the following ways:(1) increase participant understanding of the role of the food and fiber sector in the U.S./Virginia's economy; (2) equip participants with base-knowledge needfulfor synthesizing multidisciplinary agriculture concepts; (3) increase learning of fundamental concepts needful for understanding some of the revolutionary breakthroughs in agricultural sciences; (4)academically prepare participants for hands-on involvement exercises; (5) equip participants with decision-making skills fora future professional career in agriculture.

(b) Curriculum Content.The academic curriculum consisted of an introductory course in agriculture (Introduction to Agriculture and Sustainable Society/AGRI 140). Among other candidate courses, AGRI 140 was selected for the program's pilot-phase testtrial for the following reasons: (1) it is an introductory-level course for which the curricular requirements and workload are not considered to be excessively demanding for high school students; (2) it is an existing curriculum-required course, already cataloged into departmental course listing, andrequired of all Agriculture majors; (3) the curricular content consists of fundamental cross-disciplinary concepts that are needful for student understanding of the interdisciplinary linkages that underlie and connect agriculture disciplines.

(c) Delivery.Teaching and learning were digitally administered via VSU's Blackboard Learning Management System (LMS) in the form of weekly lecture series and coursework. Course materials comprised of text-based lectures, audio, and video materials,while weekly assignments consisted of discussion forums and quizzes. Lectures werepedagogically designed to stimulate knowledge dissemination while weekly quizzes served as anassessment tool for trackingparticipant involvement and learning progression. The course materials consisted of instructor-researched electronic materials, compiled from multiple sources, which targetedthe program's goals and objectives—(e.g.USDA reports, Agri-pulse materials, slide-share, YouTube videoclips, and otherappropriate web-based multimedia sources).

2.3.2 Experiential Learning Component

(a) Objectives.The objectives consisted of the following: (1) create opportunities for participants to apply the knowledge acquired from the program's academic component into hands-on exercises;(2) create opportunities for correcting the wrongful negative perception,among youth, concerning agriculture; (3) involve participants in farming exercises that foster skill-building and generational transfer of farmhabits; (4) create opportunities for the youth to experiencemodern technologies that are routinely deployed in contemporary agriculture,which could enable them to begin to visualize contemporary agriculture as a youth-compatible,technology-driven professional career.

(b) Activities.Experiential learning activities primarily consisted of farm extension activities that targeted the accomplishment of program-stated objectives and were supervised by VCE[7]agents. Students were able to apply

[7]VCE is a collaborative partnership in research and education between Virginia Tech and VSU established for the purpose of using scientific knowledge to provide solution for statewide needs in food and agriculture.

classroom knowledge into the real world through hands-on and other skill-building exercises.Typical activities included GIS/GPS installation, management of aquaponics and greenhouses, demonstration of drones, installation of drip irrigation systems, field day farm activities, and other farm technologies.

(c) Administration.To maximize youth participation, program activities were organizedaround the off-season/spring and summer vacation schedule at VSU and participating schools, and all related costs (i.e. lodging, transportation, insurance, etc.) were paid through the grant.

3. Program Review and Survey

3.1 Results and Analysis

Survey questionsdescribing program activities were administered to participants.They were designed to monitor participant evaluation of program activities and perceived impactin fostering youth interest in agriculture education and career.The findings are summarized inthe two panels ofTable 1. The first panel describes results from the academic component while the second describesthe combined results from the experiential learning component and overall program. Survey questions and participant responses from the academic component aregrouped into four categories, namely: (i) instructor-specific theme questions; (ii) course-specific theme questions; (iii) instructional tools, course delivery & technology, and (iv) VSU and career-related questions. The corresponding questions and responses for the experiential learning component and overall program are grouped into five categories, described as (i) presenter-centered theme questions; (ii) experiential learning and vocational skills; (iii) camp's effectiveness for transfer of farming skills; (iv) camp's benefits for college and career options; and (v) open-ended questions for program improvement. The results are very enlightening and insightful. They help to uncoverimportant dynamics thatdrive youth decision-making concerning agricultureeducation and career interests.

Under the "overall teaching effectiveness" section of "category i" questions, participants rated the instructor's effectiveness in creating a learning-conducive environment at 72% "excellent", and 28% "good"—generally implying an overwhelming satisfaction level with both the instructor and the delivery method. It is also striking that under "course content/balance and appropriateness", participants were undividedly united in their view that the course content was generally appropriate for high schoolers—the 100% divided between 72.2% that 'strongly agreed' and 27.8% that 'agreed'. It is equally reassuring that 94.4% (consisting of 61.1% 'strongly agreed', and 33.3% 'agreed') found the course content to be well-balanced between classroom learning and the realworld. Under 'theory and knowledge acquisition', 88.9% 'strongly agreed' or 'agreed' that the course increased their knowledge of the food and fiber sector. Also, 94% 'strongly agreed' or 'agreed' that the course fosteredcritical thinking about agriculture, while an equal percentage responded that the course helped them to synthesize disciplinary concepts learned from various agricultural disciplines. Under the "knowledge and skill acquisition" section, 88.9% responded that the course exposed them to solution ideas for the real world, and 94.4% reported that it boosted their confidence about a future career in agriculture. It is also noteworthy that the audience was overwhelmingly satisfied with "knowledge improvement concerning ag-related educational and career opportunities" benefited fromthe program—with 72.2% rating it as "excellent", and 27.8% as "good". Equally reassuring from a scholarly standpoint, under "category iv/VSU and career-related", to see participants overwhelmingly respond that the course helped to defuse agriculture-related stigma—appraised at 70.5% 'strongly agreed', 11.8% 'agreed', and 17.7% 'moderately agreed'.

From a practical standpoint, participant responses to survey questions from the program's experiential learning phase are even more insightful and consequential for industry stakeholders—educators, researchers, farmers, policy-makers, and others. In the "acquisition of hands-on skills in agriculture" section, 100% responded that the program's experiential learning helped increase their exposure to vocational agriculture—rated as 40% that "strongly agreed", 40% that "agreed", and 20% that "moderately agreed". In the "relevance and application to real-world farming" section, 85% respondedthat farm demonstrations were instrumental in connecting classroom learning with real-world farming, and an equal percentage that demonstration activities increased their knowledge of solution ideas for real-world problems. In the "overall learning effectiveness benefitted from the camp" section, participants expounded a uniform view that they benefitted from their exposure to hands-on agriculture—ratingtheir exposure experience at 50% "excellent", 35% "good", and 15% "moderate"; and knowledge improvement at 40% "excellent", 50% "good", and 10% "moderate".

Under "category iii/camp's effectiveness for transfer of farming skills", participants were equally united in their response that the program's camp activities were instrumental in fostering adult-to-youthgenerational farm skills—scored as 40% 'strongly agreed', 45% 'agreed', and 15% 'moderately agreed'; and that the mentoring provided by veteran farmers increased their educational and career interests in agriculture—at50% 'agreed', 45% 'agreed' and 5% 'moderately agreed'. Under "category iv/camp's benefits for college and career options" addressing the cultural stigmatization of agricultural education and related careers, participants' responses also conveyed a very hopeful, optimistic future concerning the Ag industry—respectively measured at 35% 'strongly agreed', 40% 'agreed', and 15% 'moderately agreed'—that the program helpedto dispel wrongful cultural perceptions about agriculture. Under 'open-ended questions for program improvement', participants identified 'GIS/GPS', 'greenhouse demonstration', 'adult-youth farm mentoring', and 'VSU Randolph farm tour' as the most rewarding off-classroom activities, and 'learning about hands-on agriculture' and 'farm demonstrations/exercises' as the greatest strengths of the program. They cited "time management", and "training for counselors" as program areas needing improvement the most.

4. Lesson and Implications

Agriculture educators, researchers, and food industry stakeholders can benefit from the VSU pilotinitiative and utilize it as a baseline for benchmarkingtheir ag education programs. Perhaps, themost instructive lessons are stated below.

First, there is the urgent need for agriculture educators to recognize and connect two emergent trends in ag educationprograms targeted at youth audiences: (1) modern technology has revolutionized and transformed agriculture from a labor-intensive into a knowledge-based, technology-driven sector—consequent of which the industry and associated careers have become more youth-compatible than ever before; (2) today's youth are certainly more technologically proficient than their predecessors and are therefore better positioned to harvest and utilize the tremendous opportunities spawned by modern-day revolutionary technologies. Consequently, a historical opportunity has just been created for promoting and teaching agriculture to youth audiencesas a preferred, youth-centeredbranch of learning with abundant career advancement opportunities. But to enable them to effectively leverage the persuasive promotional opportunities spawned by technological innovations, educators must first learn to pick out specific technology-driven lifestyle preferencesand habits that are associated with the youth, andnext, find creative ways toconnect those preferences with agriculture education and career opportunities.Specific examples of youth-centered technology-driven lifestyle habitsthat could help sensitize and recruit youth audiences into agriculture education and related careersinclude—technical proficiency at an early age,fostered by youth early access into educational technologies; the broadening accessibility into web-based digital platforms that connect youth into LMS;earlyyouth orientation into revolutionary e-learningsoftwareandenterprise reporting systems; and other youth-centered technology-driven opportunities.

Second is the recognition that agriculture can no longer be effectively taught or delivered from an isolated classroom learning setting that physically separates teaching from vocational learning experiences—(i.e. farm extension activities, ag leadership programs, adult-youth mentoring programs, research/lab activities that stimulate innovations and discoveries,etc.)—allof which are needful for sensitizing youths into agriculture-related opportunities. Effective delivery of teaching and learning in agriculture requiresa sustained, holistic approach that must necessarily involve students in a mix of in-class and off-class learning experiencesthathelp prepare them for transition into the agriculture workforce. Several studies, including the ones cited earlier in this paper, also agree with the findings from the current studythat holistic ag education is not only vital for retaining existing students in ag education programs but is also instrumental for recruiting new learners—given that currently enrolled students view them as pathway opportunities for transition into the workforce and incoming students perceive them as a necessary information-gathering step for decision-making concerning future educational choices.

Third, Agriculture educators must be willing to adjust to the ongoing technology-induced, practice-informedrevolutionary transformation, taking place in the ag education sector andstand ready to evaluate itsevolvingimpacts on student learning preferences and behavior. The recognition, in its turn, deemsnecessary a re-appraisal ofthe coreconstitutingcomponentsupon which pre-existing ageducation infrastructure and practices are based—i.e. the instructionalmethodologies, curricular content,delivery tools, technical adequacy of faculty, student recruitment strategies, quality control metrics, etc.Agriculture-based teaching and learning support programsneed to be expanded to accommodate a broader variety of programs and knowledge dissemination modes thattargetcontemporary educational needs of youth—i.e. 4-H and youth leadership programs, extension-based experiential learning, research-based learning experiences, online learning/hybrid modules, and other types embraced by youth audiences.

Generally, the VSU pilot program provided an insightful opportunity for connecting with Virginia'syouth audiences and understanding their needs and aspirations concerning college and career optionsconcerning agriculture. Through the experience, it became clear that the future of the American agriculture industry is not as gloomy asgenerally thought to be. By and large, today's youth are more willing to explore a variety of educational and career options in agriculture, provided that a commensurate,youth-sensitizing learning environment and support programs are available.

Table 1

Survey Results: Online Academic Component

Category I: Instructor-Specific Theme Questions	**1= Strongly Disagree**		**2= Disagree**		**3= Moderately Agree**		**4 = Agree**		**5= Strongly Agree**		**Total Number of Respondents**
A. Presentation of Learning Materials& Content	**Total**	**%**	**Total**	**%**	**Total**	**%**	**Total**	**%**	**Total**	**%**	
1) Instructor presented core course concepts	0	0.0	0	0	0	0	5	29.3	12	70.7	17
2) Instructor was organized in presenting content	0	0.0	0	0.0	0	0	7	38.9	11	61.1	18
B. Clarity of Expectations & Directions											
1) Instructor clearly articulated required expectations	0	0.0	0	0.0	0	0.0	3	16.7	15	83.3	18
2) Instructor clearly articulated performance standards	0	0.0	0	0.0	1	5.6	5	27.7	12	66.7	18
C. Feedback on Weekly Academic Progress											
1) Instructor provided guidance on assignments	0	0.0	2	11.1	0	0.0	3	16.7	13	72.2	18
2) Instructor regularly provided feedback	0	0.0	1	5.6	1	5.6	6	33.3	10	55.5	18
D. EncourAgement of Interactions & Discussions											
1) Instructor provoked critical thinking learning	0	0.0	0	0.0	2	11.1	5	27.8	11	61.1	18
2) Instructor provided opportunities for interactions	0	0.0	0	0.0	1	5.6	5	27.8	12	66.7	18
E. Overall Teaching Effectiveness	**1= Poor**		**2=Moderate**		**3 = Good**		**4=Excellent**				18
	Total	**%**	**Total**	**%**	**Total**	**%**	**Total**	**%**			
How do you rate the instructor's effectiveness in creating an environment that is conducive to	0	0.0	0	0.0	5	27.8	13	72.2			

learning?											
Category II: Course-Specific Theme Questions	**1= Strongly disagree**		**2= Disagree**		**3= Moderately Agree**		**4 = Agree**		**5= Strongly Agree**		**Total Number of Respondents**
A. Course Content (Organization, Clarity of Expectations, Balance & Appropriateness)	**Total**	**%**	**Total**	**%**	**Total**	**%**	**Total**	**%**	**Total**	**%**	
1) Course content was appropriate for high-schoolers	0	0.0	0	0	0	0.0	5	27.8	13	72.2	18
2) Content suitably balanced classroom & real world	0	0.0	0	0	1	5.6	6	33.3	11	61.1	18
B. Theory & Knowledge Acquisition											
1) Course increased my knowledge of food & fiber	0	0.0	0	0	2	11.1	4	22.2	12	66.7	18
2) Course fostered my critical thinking in Agriculture	0	0.0	0	0	1	5.6	6	33.3	11	61.1	18
3) Course helped to synthesize Agriculture concepts	0	0.0	0	0	4	5.6	4	22.2	10	72.2	18
C. Knowledge & Skill Acquisition in Agriculture											
1) Course exposed me to solution ideas for real-world	0	0.0	0	0	2	11.1	4	22.2	12	66.7	18
2) Now, I feel more confident about a career in Agric.	0	0.0	0	0	1	5.6	4	22.2	13	72.2	18
D. Knowledge Improvement & Overall Satisfaction from Taking Course	**1 = Poor**		**2= Moderate**		**3 = Good**		**4= Excellent**				**Total Number of Respondents**
	Total	**%**	**No**	**%**	**No**	**%**	**No**	**%**			
1)How do you rate your knowledge improvement concerning Ag-related educ. & career opportunities?	0	0.0	0	0.0	5	27.8	13	72.2			18
2) How do you rate your knowledge of food & fiber?	0	0.0	1	5.5	5	27.8	12	66.7			18
3) Were your expectations for the course met?	0	0.0	1	5.5	5	27.8	12	66.7			18
Category III: Instructional Tools, Course Delivery & Technology	**1=Strongly disagree**		**2 = Disagree**		**3=Moderately disagree**		**4 = Agree**		**5=Strongly Agree**		**Total Number of Respondents**
	Total	**%**	**Total**	**%**	**Total**	**%**	**Total**	**%**	**Total**	**%**	
1) I rate the delivery	0	0.0	0	0.0	2	11.1	5	27.8	11	61.1	18

mode to be very effective											
2) The instructional tools were effective for learning	0	0.0	0	0.0	2	11.1	2	11.1	14	77.8	18
Category IV: VSU & Career-Related Questions	**1=Strongly disagree**		**2 = Disagree**		**3=Moderately disagree**		**4=Agree**		**5=Strongly Agree**		**Total Number of Respondents**
	Total	**%**	**Total**	**%**	**Total**	**%**	**Total**	**%**	**Total**	**%**	
1) Course was helpful in defusing Ag-related stigma	0	0.0	0	0.0	3	17.7	2	11.8	12	70.5	17
2) Now I have a better understanding of educational opportunities in Agriculture available at VSU	0	0.0	0	0.0	0	0.0	5	27.8	13	72.2	18

Table 2

Survey Results: Experiential Learning Component and Overall Program Experience

Category I: Presenter-Centered Theme Questions	**1 = Strongly Disagree**		**2 = Disagree**		**3 = Moderately Disagree**		**4 = Agree**		**5 = Strongly Agree**		**Total Number of Respondents**
A. Clarity of Presentations & Demonstrations	**Total**	**%**	**Total**	**%**	**Total**	**%**	**Total**	**%**	**Total**	**%**	
1) Demonstrations were clear, conducive to learning	0	0.0	2	9.5	6	28.5	4	19.1	9	42.9	21
2) Presenters provided directions and expectations	0	0.0	0	0.0	5	25.0	6	30	9	45.0	20
B. Student Involvement & Peer-to-peer Interaction											
1) Presenters created opportunities for involvement	0	0.0	0	0.0	4	20.0	8	40.0	8	40.0	20
2) Presenters were responsive to students' questions	0	0.0	0	0.0	2	10.0	7	35.0	11	55.0	20
C. Relevance for Creativity and Real World											
1) Presenters connected learning to real-world farming	0	0.0	0	0.0	5	25.0	5	25.0	10	50.0	20
2) Presenters prompted creativity & application ideas	0	0.0	0	0.0	6	30.0	5	25.0	9	45.0	20
D. Overall Effectiveness of Presentation & Delivery	**1 = Poor**		**2 = Moderate**		**3 = Good**		**4 = Excellent**				20
	Total	**%**	**No**	**%**	**No**	**%**	**No**	**%**			
How do you rate the program's overall effectiveness?	0	0.0	1	5.0	7	35.0	12	60.0			

Category II: Experiential Learning & Vocational Skills	**1=Strongly Disagree**		**2 = Disagree**		**3=Moderately Disagree**		**4 = Agree**		**5=Strongly Agree**		**Total Number of Respondents**
A. Acquisition of Hands-on Skills	**Total**	**%**	**Total**	**%**	**Total**	**%**	**Total**	**%**	**Total**	**%**	
1) Activities increased my exposure to hands-on	0	0.0	0	0.0	4	20.0	8	40.0	8	40.0	20
2) Training was beneficial for experiential learning	0	0.0	0	0.0	4	20.0	5	25.0	11	55	20
B. Relevance & Application to Real-World of Farming	**1=Strongly Disagree**		**2=Disagree**		**3=Moderately Disagree**		**4 = Agree**		**5=Strongly Agree**		**Total Number of Respondents**
	Total	%	Total	%	Total	%	Total	%	Total	%	
1) Demonstrations connected learning with real world	0	0.0	0	0.0	3	15.0	10	50.0	7	35.0	20
2)Activities increased my knowledge of solution ideas	0	0.0	0	0.0	3	15.0	7	35.0	10	50.0	20
C. Overall Learning Effectiveness Benefitted from Camp's Experiential Learning Activities	**1 = Poor**		**2 = Moderate**		**3 = Good**		**4 = Excellent**				**Total Number of Respondents**
	Total	**%**	**Total**	**%**	**Total**	**%**	**Total**	**%**			
1) How do you rate your exposure to hands-on Ag?	0	0.0	3	15.0	7	35.0	10	50.0			20
2) How do you rate your knowledge improvement?	0	0.0	2	10.0	10	50.0	8	40.0			20
Category III: Camp's Effectiveness for Transfer of Farming Skills	**1 = Strongly Disagree**		**2 = Disagree**		**3 = Moderately Disagree**		**4 = Agree**		**5 = Strongly Agree**		**Total Number of Respondents**
	Total	**%**	**Total**	**%**	**Total**	**%**	**Total**	**%**	**Total**	**%**	
1) Camp fostered adult-to-youth skills transfer	0	0.0	0	0.0	3	15.0	9	45.0	8	40.0	20
2) Camp fostered exposure to generational farming	0	0.0	0	0.0	3	15.0	8	40.0	9	45.0	20
3) Mentoring increased my interests in Agriculture	0	0.0	0	0.0	1	5.0	9	45.0	10	50.0	20
Category IV: Camp's Benefits for College and Career Options	**1 = Strongly Disagree**		**2=Disagree**		**3=Moderately Disagree**		**4 = Agree**		**5=Strongly Agree**		**Total Number of Respondents**
	Total	**%**	**Total**	**%**	**Total**	**%**	**Total**	**%**	**Total**	**%**	
1) Helpful for rectifying perceptions about Agriculture	1	5.0	1	5.0	3	15.0	8	40.0	7	35.0	20
2) Increased my exposure to Ag-vocational skills	0	0.0	0	0.0	2	10.5	10	52.6	7	36.9	19

3) Increased my knowledge of educ. & career options	0	0.0	0	0.0	1	5.0	10	50.0	9	45.0	20
4) I plan to seek admission to VSU College of Agric.	0	0.0	1	5.0	6	30.0	7	35.0	6	30.0	20
Category V: Open-Ended Questions for Improvement	**Summary of Responses to Open-ended Questions and Responses**										
1) Which learning activities did you find most beneficial?	(1) field trips to VSU farm & other farm sites; (2) learning in a college setting; (3) hands-on exercises; (4) GPS/GIS demos; (5) greenhouse farming										
2) What are the strengths and weaknesses of the program?	**Strengths:** 1) learning about Agriculture; (2) demonstrations & hands-on; **Weaknesses:** (1) time management; (2) better training forcounselors (3) Sporadic online connection in rural areas; (4) include more camp activities										
3) What advice do you have for future students?	(1) be open-minded about Agriculture; (2) not to fall behind in assignments										
4)Would you recommend the program to future students?	Yes = 100%										

Source: Summary results in the table are computed by the author from the survey's primary data.

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