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A Retrospective Look at the University of Maryland Extension AGsploration Agricultural Literacy Program

Abstract

The University of Maryland Extension AGsploration program uses hands-on experiential learning lessons to teach youth about agriculture. It was developed by Extension faculty with support from industry partners. The goal is to improve agricultural literacy and increase interest in pursuing agriculture-related careers. AGsploration is based on a 24-lesson curriculum, a teacher's guide, a materials kit, evaluations, and supplemental resources including a website and a YouTube channel. Lessons focus on animal science, plant science, environment, and technology. The program is offered through in-school, after-school, and outreach programs. The team has documented short-, medium-, and long-term positive outcomes and impacts.

Keywords: agriculture education, agricultural literacy, agriculture careers, teens as teachers, 4-H youth development

Introduction

In 2009, a team of University of Maryland 4-H faculty members identified the need to address decreasing agricultural literacy among Maryland residents. Maryland is a rapidly urbanizing state and is currently ranked fifth in population density (United States Census Bureau, 2024). Most Marylanders are several generations removed from direct

work in agriculture. As a result, families often lack basic knowledge about the origins of food and fiber and the importance of agriculture to the state's economy. An often-referenced survey conducted by U.S. Farmers and Ranchers Alliance (USFRA, 2011) found that 72 percent of consumers know nothing or very little about farming and ranching. For agriculture to remain a viable occupation and industry, residents need to be educated about its importance in their everyday lives.

The University of Maryland Extension faculty team decided to address the need by creating a program titled AGsploration. The program uses hands-on experiential learning lessons to teach youth about agriculture science and agriculture-related careers. It was developed with support from fellow educators and industry partners. A primary objective is to improve youth agricultural literacy and increase interest in pursuing agriculture-related careers. A secondary objective is to promote teen life skills development through a teens-as-teachers delivery model. AGsploration educational materials consist of a 24-lesson curriculum, a teacher's guide, a materials kit, evaluations, and supplemental resources including a website and a YouTube channel with 41 videos focusing on career connections, background information, and lesson walk-throughs. Lessons focus on topics in animal science, plant science, environment, and technology. The program is offered through in-school, after-school, and outreach programs and has been taught in various forms since 2010. Extended-duration programs include summer agriculture learning days and educator/volunteer/teen teacher curriculum training workshops. The team collected survey data that documents positive program outcomes for youth participants, trained educators and volunteers, and trained teen teachers.

Material and Methods

Program development

In December 2009, a team of University of Maryland educators came together to brainstorm ideas that led to the creation of the AGsploration program. With seed funding of $33,367 provided through a NIFA grant, the project was launched. Since the initial

grant, the team has received over $169,000 in additional grants and funding from a variety of sources, which has enabled the expansion of the program.

During the development phase, a team of University of Maryland Extension educators wrote 13 lessons and had them reviewed by subject matter experts. These lessons were pilot tested, revised, and finalized based on feedback. Following the initial development phase, the team created an additional 11 lessons and pilot tested, revised, and added them to the AGsploration curriculum, bringing the total to 24 comprehensive lessons. Prior to final publication, all lesson objectives were aligned with the Next Generation Science Standards (NGSS) to ensure educational consistency and relevance for school use.

To enhance accessibility and ensure brand consistency, the team hired a graphic designer to professionally format the curriculum and supplementary materials. Additionally, the team assembled and distributed over 140 teaching supply kits to trained educators. These kits supported easy implementation and included necessary materials. Recipients included trained University of Maryland Extension (UME) faculty and volunteers, teen teachers, and public and private school educators.

As part of the program rollout, the team implemented a robust training structure for educators, volunteers, and teens. The teens as teachers model was successfully implemented and participant data was collected. This peer-led model not only enhanced lesson delivery but also helped inspire many teen participants to pursue careers in agriculture, including becoming agriculture educators.

To support and expand the program’s reach and impact, the team developed a dedicated website and YouTube channel. Long-term impact was assessed through follow-up surveys with teen teachers, many of whom reported continued involvement in agriculture-related fields.

The AGsploration program has since been recognized as a University of Maryland Extension Signature Program, reflecting its sustained success, innovation in youth engagement, and contribution to agricultural literacy and career exploration. In 2016,

the team had a journal article published in the *Journal of Youth Development* reporting AGsploration program adoption (Barczewski et al., 2016). Since that time, the curriculum has become a University of Maryland Extension peer-reviewed publication (EC-6) and has received national 4-H peer-reviewed status through National 4-H Council.

Delivery methods and program implementation

AGsploration's primary target audience is youth in middle school, but the lessons are easily adaptable for younger or older students. In-person and virtual teaching venues include full-day programs for middle and high school students plus individual lessons taught at schools, after-school programs, 4-H club meetings, and community locations such as libraries and county fairs. The team also conducts state and national train-the-trainer sessions for adult educators, volunteers, and teens who then teach the lessons to youth in their home areas. To date, the team has taught 21 intensive trainings to 547 4-H educators, volunteers, and classroom teachers. More than 1,000 others have been reached via program overviews. These efforts have expanded the program's reach. Since 2010, single or multiple lessons have been taught by the UME team, teen teachers, and volunteers to 55,375 youth during 1,389 learning sessions.

A particular emphasis was placed on training teens to deliver the lessons to younger youth. The teens-as-teachers model was designed to promote the development of life skills including general teaching ability, confidence in teaching agriculture, learning to learn, relationship building, leadership, marketable skills, teamwork, self-motivation, decision making, planning/organizing, keeping records, and communication. Participants spent an immersive weekend experiencing the lessons, practicing implementing the lessons, and gaining relevant agriculture content knowledge. In an effort to expand the program's reach, the AGsploration team challenged the teens to return to their home counties and complete a minimum of 30 hours of teaching either individually or collaboratively. The team maintained multi-year contact with the trained teens via email, phone calls, and in-person conversations. The ongoing contact was deliberate and contributed to the team's ability to collect medium-term and long-term

program outcomes data. The survey sample size declined over time due to difficulty tracking some former teen teachers through their college and early career years.

As part of the program's development, the website has been redesigned to enhance usability and now features dedicated resources for students and educators, as well as streamlined access to the full AGsploration curriculum. (https://extension.umd.edu/programs/4-h-youth-development/curricula/agsploration/)

To further support and enrich the curriculum, the team produced a series of videos that are available on the AGsploration YouTube channel (Figure 1).

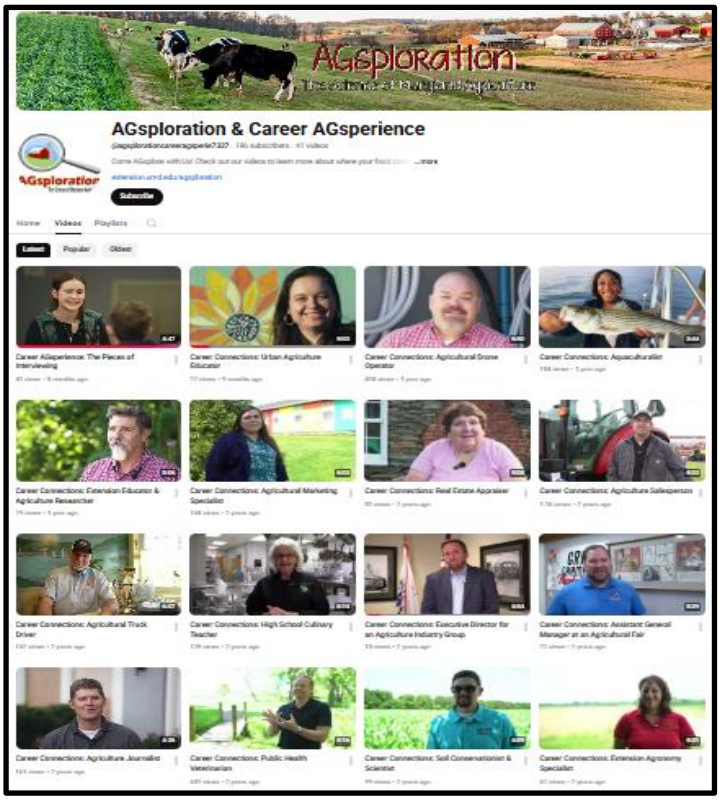

Figure 1. YouTube channel screenshot showing a selection of career connections videos. https://go.umd.edu/agsplorationyoutube

These videos are organized into playlists covering background content, lesson walkthroughs, career connections, and lesson supplements. A highlight is a set of 32 career interviews with agriculture professionals.

Since AGsploration's inception, the team has showcased the program at numerous national professional conferences and events, providing hands-on learning opportunities and curriculum training to thousands of individuals. The curriculum has been delivered to youth and adults at eleven high-profile events (some multi-year). The program has also been presented to representatives from the National Institute of Food and Agriculture (NIFA) and several agriculture-focused organizations, further expanding its visibility and impact.

Replication

The AGsploration website contains the curriculum, which is free to download and a link to the YouTube channel. The lessons may be easily adapted for teaching in formal and non-formal educational settings. Although the curriculum consists of 24 lessons organized by the themes of animal science, plant science, environment, and technology, the lessons are designed to stand alone. This format permits educators to teach individual lessons or select multiple lessons and plan a sequence that supports learning standards. Additionally, many of the hands-on activities can be extracted from the full lesson and taught independently, which is ideal for venues in which teaching time and group size are limited.

Results

To date, the curriculum has been downloaded 1,036 times from 49 states, 4 United States territories, Australia, Cameroon, Canada, Ireland, and Liberia. Since 2010, 55,375 youth have experienced an AGsploration lesson taught by trained teen teachers, volunteers, and UME educators during 1,389 learning sessions. The 41 educational YouTube videos have had 31,640 unique views.

The AGsploration team has collected paper and online Qualtrics post-survey data and follow-up survey data from three populations: youth program participants (short-term outcomes), educators and volunteers (short- and medium-term outcomes), and trained teen teachers (short-, medium-, and long- term outcomes). All surveys documented a variety of positive outcomes.

Table 1 summarizes the data collected from youth who participated in one or more lessons or other program activities. Participant ages ranged from 8 to 18 years old. Self-reported increases in content knowledge depended on the lesson taught, and the means for the lessons ranged from 23% to 70%. Participants also reported gains in career knowledge, knowledge of how agriculture benefits them, and interest in agriculture careers.

Table 1. Short-term outcomes from post-surveys of youth participants (N=1,941).

Participated in one or more AGsploration lessons	
48%	could more easily identify careers connected to agriculture
28%	better understood how agriculture benefits their families and communities
28%	were more interested in pursuing an agricultural science career
Participated in AGsploration summer day programs	
75%	better understood the connection between agriculture and science
74%	better understood how agriculture benefits their families and communities
50%	were more interested in an agricultural science career

As mentioned previously, the team has reached educators and volunteers through numerous venues. Table 2 summarizes the post-survey data collected. It is evident that the AGsploration program is highly valued as a teaching resource. Training helped the participants feel better prepared to teach agriculture lessons. In addition, there was a high level of intent to teach the lessons to youth.

Table 2. Outcomes from post-surveys of trained educators and volunteers (N=62).

Short-term: post survey immediately following training	
100%	agreed that AGsploration is an effective tool for teaching agricultural science
97%	increased their agriculture knowledge and felt better prepared to teach youth about agriculture
92%	intended to teach the AGsploration curriculum
90%	(teens) indicated interest in a science, technology, engineering, math (STEM) career
65%	indicated interest in an agriculture career
Medium-term: two-year follow-up survey of trained educators	
82%	felt better prepared to teach agriculture lessons
73%	still planned to teach lessons from the curriculum on a regular basis

To thoroughly assess the ongoing effectiveness and impacts of the teens as teachers model, the team collected survey data at three time intervals via paper surveys (short-term) and Qualtrics surveys (medium-term and long-term). Table 3 summarizes the results. The survey also documented long-term positive program impacts such as majoring in an agriculture-related field, being employed in an agriculture field, and volunteering with 4-H in a teaching capacity.

Table 3. Outcomes from post-surveys of trained teen teachers.

Short-term: One-year follow-up surveys of teen teachers (N=46)	
75%	increased their ability to teach agriculture and their communication skills
50%	increased self-confidence
Medium-term: 3- to 4-year follow-up survey of teens trained to teach the curriculum (N=36)	
100%	were more able to help students understand agriculture
100%	increased organizational skills
80%	increased general teaching ability and confidence in teaching agriculture
80%	increased leadership and communication skills
Long-term: 4- to 5-year follow-up survey of teens trained to teach the curriculum (N=13)	
100%	said serving as a teen teacher helped them better understand agriculture science
92%	said the program had a positive impact on their lives
86%	increased teaching ability and confidence in teaching agriculture
77%	increased planning and organization skills
77%	were currently volunteering with 4-H and giving back to the program
73%	were currently employed in an agriculture or science career, indicating longer-term impact
62%	increased agriculture content knowledge, leadership, and communication skills
62%	majored in agriculture or another science, indicating longer-term impact

Discussion

AGsploration is empowering youth around the world through hands-on agriculture education. This dynamic curriculum brings agricultural concepts to the forefront and has been successfully taught and implemented both nationally and internationally.

Short-term evaluation data demonstrates that the AGsploration program increases youth interest in science, technology, engineering, and math (STEM); enhances their knowledge and attitudes about agriculture; their competencies; and promotes educational and career aspirations in agriculture-related fields. Training educators and volunteers is an effective method of delivering the program to geographically dispersed youth.

In addition, implementing a teens as teachers model is an effective way to expand the reach of the AGsploration program. While teaching the curriculum, the teen teachers themselves benefited by increasing their agriculture knowledge, life skills, and interest in pursuing agriculture science education and careers. The AGsploration program had unanticipated long-term positive impacts for the trained teen teachers with regard to postsecondary agriculture education and pursuit of agriculture careers. Several teens went on to earn associate, bachelor's, master's, and even doctoral degrees in agriculture-related fields of study. Many former teen teachers are now giving back to society by teaching and inspiring the next generation while increasing agricultural literacy. Others are working directly in agriculture, thereby contributing to innovation and strengthening the United States agriculture industry. Employment status examples of current employment of former teen teachers include the following:

- agriculture consultant
- agriculture entrepreneur
- agriculture influencer
- agriculture program coordinator
- agriculture tourism operator
- elementary school teacher
- extension specialist
- food scientist
- high school agriculture science teacher
- State Department of Agriculture employee

Considering the substantial number of curriculum downloads from the United States and other countries, it is evident that the program is well received and valued by professional educators. Within Maryland, the curriculum has been adopted as part of a local school system's countywide curriculum. The lessons are also taught as part of several county agriculture education days, where students are brought to a central location for an intensive day of learning about agriculture.

The AGsploration program has increased the knowledge and appreciation of agriculture in Maryland and has created a network of individuals trained to effectively continue the educational cycle. In addition, it is currently used and will be used in the future by extension educators and teachers within and beyond the United States. In recognition of the program's quality, it has received national awards from the National Association of

County Agriculture Agents, National Association of Extension 4-H Youth Development Professionals, and Epsilon Sigma Phi. AGsploration's success has led to the development of new University of Maryland initiatives in recent years. An example is a new curriculum and program titled Career AGsperience that helps to teach students about careers in agriculture-related fields while developing their workplace skills.

Conclusion

The AGsploration program was developed in response to a need for improved agricultural literacy and a need to recruit more workers into the United States agriculture workforce. The program has increased youth knowledge and appreciation of agriculture and youth interest in agriculture careers. It has also created a network of trained individuals who are teaching the next generation and/or contributing to the agriculture workforce. Program data has documented positive outcomes for youth participants, educators, volunteers, and trained teen teachers.

Acknowledgements

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