

**Instructional Needs for Developing High School Students' Understanding of International  
Agricultural Concepts**

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## **Introduction**

There is a need to feed an ever-growing global population riddled with global challenges such as humanitarian crises and natural disasters (National Research Council, 2009), drought, displacement, and armed conflict (Brück & d'Errico, 2019). These challenges can lead to increased food insecurity, and agriculture (and by extension, agricultural adjacent disciplines) finds itself poised to help solve complex and nuanced problems (Heinert et al., 2020).

Organizations such as the Food and Agriculture Organization of the United Nations (FOA) and the United Nations Sustainable Development Goals (SDGs) call for “transformative shifts, integrated approaches and solutions to structural barriers to sustainable development and it recognizes the fundamental role played by sustainable agriculture in the connection between people, planet and prosperity” (FAO, 2021, p. 7).

However, to achieve the SDGs and meet 21st-century global challenges, today’s students need to be equipped with skills and knowledge related to solving complex problems in teams and individually, interpersonal and civic competencies, cultural awareness, global citizenship, and operating in a global context (Malik, 2018). The Virginia Governor’s School for Agriculture (VGSA), a month-long summer residential program for gifted and advanced high school students, focuses on the transdisciplinary nature of agriculture and on developing future leaders and scientists for careers in agriculture (Virginia Tech, 2025) and agricultural adjacent disciplines in a global society. Recently, the VGSA program leadership increased its programmatic focus on broadening students’ global perspectives and developing their understanding of international agriculture.

## **Purpose and Objectives**

The purpose of this evaluative study was to identify and determine the influence of international agricultural instruction on VGSA participants' attitudes toward understanding international agricultural concepts. For this study, we utilized the conceptual framework for global awareness and understanding of international agriculture as established by Radhakrishna et al. (2003), which states that high school students’ understanding of international agricultural concepts can be connected to several factors, including their attitudes and beliefs regarding international agricultural concepts. The following objectives guided this study:

1. Identify the geographic concepts that help participants understand international agricultural concepts.
2. Determine participants’ attitudes towards instruction for understanding international agricultural concepts.

## **Methodology**

We utilized an instrument from Conner et al. (2017), which was adapted from Elliot and Yanik (2002). Others have previously adapted the same instrument to study international concepts among high school students (Heinert et al., 2020; Radhakrishna et al., 2003; Wingenbach et al., 2003). Notably, Radhakrishna et al. (2003) utilized the instrument with the Pennsylvania Governor’s School for Agricultural Science, while others have used this instrument on populations of students who were actively engaged in school-based agricultural education programs.

The instrument was comprised of 45 items and measured four constructs using a five-point Likert scale (1 = strongly disagree to 5 = strongly agree). The reliability of the constructs was: attitudes (14 items,  $\alpha=.83$ ), understanding (6 items,  $\alpha=.78$ ), attitudes toward instruction (13 items,  $\alpha=.86$ ), and beliefs (13 items,  $\alpha=.78$ ). Reliability was previously determined post-hoc by Conners et al. (2017). This study specifically focuses on participants' understanding of geography in international agriculture and attitudes toward instruction for understanding international agriculture concepts. Each participant was asked to complete an online survey regarding their attitudes, beliefs, understandings, and instruction of international agricultural concepts before the first day of the program to avoid any influence from VGSA programming. 99 of the 100 students chose to participate in the study.

The population for this study was all 100 participants ( $n = 100$ ) who were accepted into the 2024 VGSA program. 71% of program participants identified as women and 29% as men. Participants identified as Asian (49%), White (32%), Black/African American (7%), more than one race (5%), preferred not to answer (5%), and Hispanic/Latino (2%). Using the National Center for Education Statistics locale classifications and criteria (NCES, n.d.), participants' school divisions were identified as city/urban (15%), suburban (74%), town (2%), and rural (9%). Participants' school standings included juniors (40%) and seniors (58%), with 2% abstaining.

### **Results and Conclusions**

**Objective 1:** Participants were asked to identify how the United States and world geography allowed them to better understand international agriculture. This construct contained six items that focused on the locations of continents, countries, U.S. states and regions. The summated mean for understanding United States and international geography was 4.48 ( $SD = .59$ ). When strongly agree and agree were combined, no single item was below 90%, indicating that participants generally agreed that an understanding of the United States and world geography contributed to their understanding of international agriculture.

**Objective 2:** Participants were asked to identify topics of instruction that aided in their understanding of international agriculture concepts. This construct contained seven items focused on the desired characteristics of instruction about international issues. The summated mean for instruction regarding international issues was 4.41 ( $SD = .63$ ). When agree or strongly agree were combined, all but two items were 90% or higher. 16.33% of students neither agreed nor disagreed or disagreed that they were *likely to understand international agriculture when given instruction about how the U.S. works with other countries on political issues*, indicating that knowledge of U.S. relationships with other countries is not likely to increase their understanding of political issues. Additionally, 25.51% of students neither agreed nor disagreed or disagreed that *a proposed set of lessons on international issues should not be too complex*, indicating that lesson complexity likely is not a challenge to learning about international issues.

### **Recommendations**

The results of this study cannot be generalized beyond the context of VGSA, though they may prove useful for others seeking to understand the instruction needed to help high school students develop international agriculture concepts. As global connectivity increases, a continued focus on geographic concepts is important to help students understand the global nature of agriculture. Additionally, considering the diverse participant population of VGSA, program planners and instructors should carefully consider their audience and provide differentiated entry points and complexity of topics and resources to motivate a variety of learners from diverse backgrounds.

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