Global Guides: Defining Teachers' Viewpoints About Global Food Insecurity Using Q Methods

Abstract

As global food security concerns continue to expand, education systems are called to help produce globally competent students nimble in addressing complex issues. Secondary educators are vital in this mission of developing a globally competent workforce, and their perspectives on global issues impact how students learn about these concepts. We aimed to explain the viewpoints of a group of educators on global learning issues, specifically food security. We conducted a Q method study with 34 educators to characterize their viewpoints of priority issues related to global learning of food security. In relation to food insecurity, we identified five personas from educators' prioritization of global food security issues: conservative conservationists, enlightened equalists, futurists, trainers and teachers, and mindful producers. The perspectives of these personas were used to further understand the educators' perspectives of global competency of the group through the Asia Society's (2018) model of Four Domains for Global Competence and of current international sustainability goals.

Key words: educators, food insecurity, global competence, Q method

Introduction

The world is experiencing relentless growth and diversification of economic, technological, and cultural factors (Asia Society, 2018). Despite this growth, 795 million people worldwide are unsure of where their next meal is coming from (FAO, 2015), and according to the World Food Programme (Welsh, 2023), the number of individuals facing food insecurity globally will double in growth from 2019 to 2022 with people in 49 countries currently at risk of famine. A large portion of the U.S. population views food insecurity as a "silent" and removed issue, even though more than 15 million households in the U.S. experience this problem (David, 2017; USDA, 2016). As the U.S. population continues to grow, its worldview of food security remains stagnant because Americans often see food insecurity as a distant problem (David, 2017). Despite this perspective, food insecurity remains a worldwide problem, and the need for an effective workforce to solve this issue continues to grow (FAO, 2015; Jones, 2003). For the effective mitigation of global food, it is necessary insecurity to promote productive practices for individuals to be involved in local, national, and global civic entities (Asia Society, 2018). The global workforce is supported by students who should graduate with skills sensitive to the needs at hand. Students must be adequately prepared to work in an increasingly globalized society to sustain thriving communities, and to work toward ending food insecurity (Asia Society, 2018).

In response to this need for more globally-aware students, secondary educators must implement instruction on the increasingly complex, interdependent, and dynamic world (Asia Society, 2018). A broadened spectrum of thought including issues across the globe, rather than only U.S.-centric challenges, is needed to address issues that threaten U.S. interests, yet potentially are not currently viewed as pressing by the nation's citizens (David, 2017). The implementation of global learning is manifested by academic institutions targeting global citizenship in their learning outcomes. Many U.S. institutions of higher education target global citizenship as a priority for their students (Stebleton et al., 2013). Globalized education should begin at the secondary level because not all students entering the workforce attend college. In addition, secondary educators who aid students in global skill development, enhance their value on the world market, and to local employers, and in turn make them more productive members of society (Hopkins et al., 2011). The positioning of educators as key drivers in student global competency development is impactful to workforce outcomes.

Curriculum embracing cultural diversity and sustainability have become prominent in secondary education as schools make an increasing effort to improve students' understanding of globalized interconnectedness and interdependence (Aydin et al., 2019; Cesario, 2017). The role of the educator has shifted to include the preparation of students with knowledge, skills, and the dispositions to be productive in a global society (Davies, 2006; Isin, 2013). This promotion and support of global skills is vital to preparing an educated workforce dedicated to promoting human rights and recognizing food insecurity issues (Osler & Vincent, 2002).

Entities such as USAID, including its Feed the Future Program, and the United Nations, specifically with their framework of the Sustainable Development Goals (SDGs), published learning agendas that identify global issues related to food security as important for educators to address (Feed the Future, n.d.; United Nations, n.d.; USAID, n.d.). Yet, researchers (Parker, 2008; Tye, 2009) have reported that the United States and a majority of countries emphasize curricula focused on national interests only, forgoing the benefit of globalized education and the related deeper understanding of food insecurity issues. Global mindedness includes international education goals of preparing students to be citizens, workers, and leaders on a worldwide stage and expands to incorporate perspective consciousness (Carano, 2010; Hanvey, 1976; Kagan & Stewart, 2004). Global-mindedness aims to improve students' abilities to recognize cultures and nations different from their own and the different kinds of worldviews that these unique perspectives create (Hanvey, 1976). A global education focuses on forming global-participation and emphasizes the importance of understanding international interconnectedness (Kelly, 2004).

Secondary educators need to format students' global-mindedness by teaching global competencies in their curriculum to create globally prepared students, and, therefore, better world citizens (Carano, 2010; Thornton, 2005). Without globally minded learning in the classroom, students may receive their education on worldviews only through mass media, which is problematic because mass media may emphasize stereotypes and cause students to make assumptions that hinder their global-mindedness (Cortes, 2005; Hahn, 1998). The difference a global educator makes can be identified in their fostering of a platform for critical thinking through examining multiple perspectives throughout history and including cultural descriptions (Gioseffi, 1993). Educators pursuing a global approach discuss multiple sides of a controversial topic to formulate a habitual pattern of mental processes that allow students to grow into globally minded citizens. Students can then look at other perspectives, including those of minorities and other marginalized groups, who lack portrayal and attention from the mainstream media, or in many U.S. textbooks (Gioseffi, 1993).

Student learning is at the foundation of the argument of educator impact (Sanders et al., 1997; Lindner et al., 2016). The most important factor affecting student learning was the teacher, regardless of classroom complexion, according to a study by Sanders et al. (1997). Metos et al. (2019) investigated the role of self-efficacy principals such as modeling and observation in determining education structure. This study found that self-efficacy (in this case tied to nutrition) sifgnificantly predicted classroom time spent on nutrition education. Rubeli et al. (2020) examined the effect of the implementation of an individualized teacher frame of reference (iTFR) and a reflexive teaching style on the global self-esteem of physical education students, finding that reported self-esteem rises, and students were able to recognize differences in teaching styles. Students are aware of the opinions and styles of teaching that educators bring into their classrooms but are also influenced by the confidence that the teacher has in their understanding of the subject matter. Science teachers, as well as school-based agricultural educators, generally had positive attitudes toward teaching science content within their curricula (Balschweid & Thompson, 2002). If educators can influence student success, and the role of educators is critical in disseminating new global perspectives through awareness (Larsen, 2014), then, new awareness regarding global change (Merryfield, 1998) depends on educators' self-efficacy and in return, students' improved self-esteem.

Global perspectives, that are taught, are formed based on what an educator believes, and those beliefs are drawn from their personal experiences (Lincoln, 2005); however, a lack of research exists within the global education sector that warrants investigation (Aydin et al., 2019; Gaudelli, 2003), especially regarding teachers' beliefs on global issues, such as food insecurity. Research should be conducted to understand the global perspectives of educators and how they interpret global food insecurity issues, especially as these issues are exceptionally important as identified within the agendas of USAID and the United Nations' (Feed the Future, 2018; United Nations, n.d.; USAID, 2020; USAID 2017).

The conceptual framework for the study was adapted from the Asia Society's model for global competency which examines globalization through a practical lens, making it applicable for secondary educators. This framework guided how we explored educators' perceptions of global competency. Global competence is a multifaceted concept, incorporating ideas such as "intercultural education, global citizenship education, twenty-first-century skills, deeper learning, and social and emotional learning" (Asia Society, 2018, p. 12). The global competency model intertwines four ideas within cognitive development, socioemotional skills, and civic learning (Asia Society, 2018). If students are globally competent, they can (a) critically examine controversial topics in global issues; (b) understand multiple perspectives and culturally-diverse views; (c) positively interact with people of other cultures, genders, and religions; and (d) work toward global issues constructively (Asia Society, 2018). Together, these four elements build on each other to create global competence (Asia Society, 2018). The four dimensions of global competence create a dynamic developmental learning structure that enables student success in virtual situations, face-to-face, and in international settings. These skills, taking action, communicating ideas, recognizing perspectives, and investigating the world, work in tandem to give individuals the ability to solve problems with a global mindset (Asia Society, 2018). Overall, globally competent students contribute to the progress of society (Asia Society, 2018). This framework was used when analyzing the factors to understand the strengths of each educator group's viewpoints. By using Q methodology, factors with evidence of strength in one or more categories were identified.

The research study was approved by the Institutional Review Board and aligned with the American Association for Agricultural Education Research Agenda Priority Area 3: *Sufficient Scientific and Professional Workforce That Addresses the Challenges of the 21st Century* (Roberts et al., 2016).

Purpose and Objectives

The purpose of the study was to describe educators' viewpoints on global competency by understanding their priorities regarding global learning issues, especially involving food insecurity. We used Q methodology to better understand how educators prioritize global learning through the creation of characterizations. Two research objectives guided this study:

1. Identify personas of educators' priorities for global learning and food security issues, and
2. Describe educators' viewpoints through the lens of Asia Society's (2018) conceptual framework for global competency.

Methods

We used a Q methodology design (Watts & Stenner, 2012) to characterize educators' viewpoints based on their priorities of issues related to global learning in food security. We employed q method because it utilizes individual subjectivity, which may be omitted in traditional quantitative research methods, to record a holistic view of a person's perspective (Brown, 1996). Q method is specifically designed to characterize viewpoints developed from individuals' personal experiences (Brown, 1996). Q method studies identify how perceptions, opinions, and views about a topic group together (Legette & Redwine, 2016). Thus, a Q method study was appropriate for studying secondary teachers' views from

across the United States and world, who teach different subjects, and inherently have different life experiences and perceptions that shape their views about food security issues.

Q method uses operant subjectivity as a tool for rigorous holistic analysis of types of views given a specific topic (Watts & Stenner, 2012). Operant subjectivity is a core component of the holistic analysis of participants' views on selected topics (Watts & Stenner, 2012). The term *operant* describes behaviors (Leahy, 2004) produced naturally without the need for induction and exist because of the relationship the behavior establishes with the environment and the impacts made (Watts, 2011). *Operant subjectivity* defines observable behavior that "has meaning relative only to its impact upon the immediate environment" (Watts, 2011, p. 39). Q sort does not require introspection; therefore, the method is "not an expression of someone's subjectivity as such, but rather *is* their subjectivity, captured experimentally by Q methodology" (Watts, 2011, p. 39). The steps involved in implementing a Q method study include a) define a concourse; b) derive a Q set; c) recruit a P set; d) administer a Q sort; and e) perform factor analysis steps including factor extraction, factor rotation, and final factor analysis (Watts & Stenner, 2012).

Defining a Concourse

The concourse is a population of ideas around a topic (Watts & Stenner, 2012). In this study, we sought ideas for a concourse coming from groups or entities that guide and inform stakeholders at the intersection of global learning, food security, and education. We identified five sources to define the concourse: a) literature in academic journals, b) UN Goals for Sustainable Development (U.N., n.d.), 3) USAID Global Food Security Research Agenda (USAID, 2017), 4) Feed the Future Learning Agenda created as part of the U.S. Government, Global Hunger and Food Security Initiative (Feed the Future, 2018), and 5) a panel of international food security experts including university faculty, USAID staff, and senior scientists from the Norman Borlaug Center for International Agricultural Development.

Deriving a Q Set

A Q set, or a subset of the concourse, consists of statements to be sorted by the participants (Watts & Stenner, 2012). These are identified by synthesizing material from the concourse to provide a cohesive, workable sample of statements. A team of two researchers used the constant comparative method to identify coded units, that were indicative of importance to global food security, from the concourse and, through open, and, axial coding, arrived at a sample of 36 items. These 36 items created the Q Set (see Table 1).

Table 1.

Q Set Items (N=36)

No.	Statements
1	Access to nutritious food
2	More hygienic household and communality environments
3	Direct nutrition specific interventions and services
4	Relationships between policy systems and food security
5	Identifying the determinants of waste
6	Identifying the determinants of stunting
7	Using sound Ag water management tech and practices
8	Stakeholder incentives, constraints, capacity, preference
9	Reducing reliance on emergency food assistance
10	Effective approaches to measuring nutritional gains
11	Improved resilience of vulnerable populations
12	Improved nutrition and dietary quality
13	Improved research and development
14	Improved agricultural productivity

15	Collaboration between water users in a community
16	Food systems being sustainable
17	Zero loss of food due to waste
18	Zero children being stunted under the age of two
19	Sustainably increasing agriculture production
20	Access to safe food
21	Improved gender integration and women's empowerment
22	Increasing scarcity of viable farmland
23	Inadequate intakes of micronutrients by mothers and infants
24	Ending rural poverty
25	Empowering small farmers
26	Increase in smallholder productivity and income
27	Promoting natural resource conservation
28	Implementation of drought resistant crops in arid areas
29	Improved irrigation systems and water storage technology
30	Restoration of degraded farmlands
31	Invest in long term research for food security innovation
32	Promotion of diet diversification
33	Education of populations about global food security
34	Adding post-harvest value to agricultural products
35	Increasing genetic yield of crops, fish, and livestock
36	Reduce and manage impacts of abiotic and biotic stress

P Set

A P set represents the number of participants in a Q method study (Watts & Stenner, 2012). We used a convenience sample derived from educators who opted into an intensive professional learning experience focused on global learning and food security with the World Food Prize (WFP) Global Guides (GG) program. The Global Guides program is a multidisciplinary professional development program catered toward empowering secondary educators who participate in the World Food Prize. The 34 participants in the program, from 15 states, were secondary educators who had a minimum of one college degree (see Table 2). The population was comprised of 56% females, and 44% males. The disciplines represented by the participants included: Agriculture, English/Language Arts, Science, and Social Studies.

Table 2.

Participant Selected Characteristics

Name	State	Sex	Ethnicity/Race	Years of Teaching	Teaching Discipline
Jack	WI	Male	White	21 + years	Science
John	MI	Male	White	6-10 years	Agriculture, Science, Extension or 4-H
Jessica	MI	Female	White	1-5 years	Social Studies, English/Language Arts
Darcy	IA	Female	White	6-10 years	Agriculture
Christian	NJ	Male	Did not disclose	21 + years	Social Studies
Patricia	IN	Female	White	11-15 years	Science
Sally	IA	Female	White	6-10 years	Agriculture
Ali	IN	Female	White	6-10 years	Agriculture
Jerica	IA	Female	White	11-15 years	Agriculture
Emmet	IA	Male	White	21 + years	Science
Jessa	OH	Female	White	1-5 years	Agriculture, Science
Gary	MI	Male	White	21 + years	Agriculture, Social Studies
Brock	MO	Male	White	21 + years	Agriculture
Annie	MS	Female	Asian	16-20 years	Social Studies
Bud	IA	Male	White	6-10 years	Agriculture
Alexis	IA	Female	White	1-5 years	Science
Lena	MD	Female	White	11-15 years	Agriculture, Science
David	OH	Male	White	1-5 years	Extension or 4-H
Payton	ME	Female	White	6-10 years	Science
Bri	IA	Female	White	16-20 years	English/Language Arts
Arnold	KS	Male	White	6-10 years	English/Language Arts
Lynette	IA	Female	White	21 + years	English/Language Arts
Bailey	IA	Female	White	6-10 years	Agriculture
Elliot	MN	Male	White	16-20 years	Social Studies
Leandra	MN	Female	White	1-5 years	Agriculture
Jacob	AR	Male	White	6-10 years	Agriculture, Science

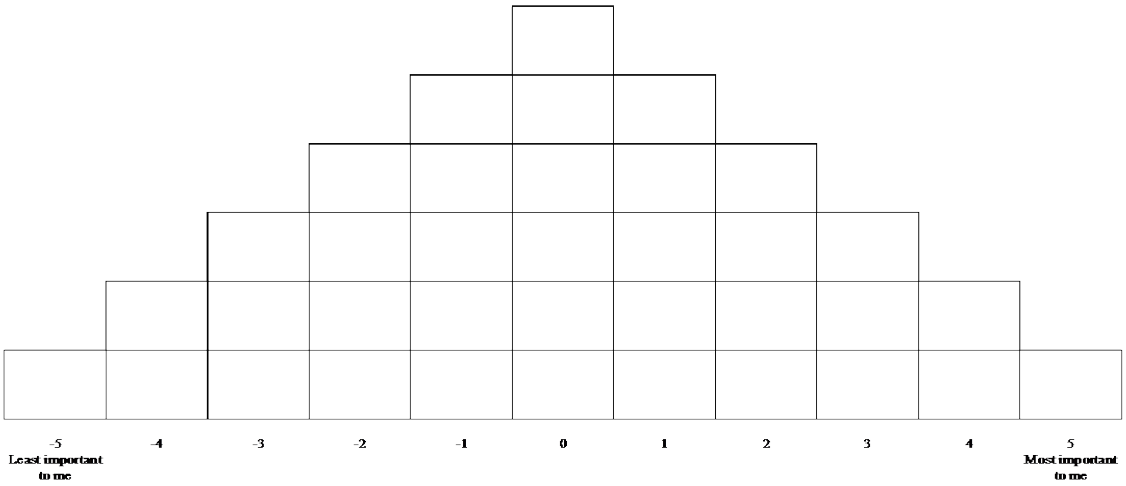
Grace	WI	Female	White	11-15 years	Agriculture, Science, Extension or 4-H
Riley	IN	Female	Did not disclose	16-20 years	Science
Elijah	IA	Male	White	21 + years	Science
Carmen	IA	Female	White	21 + years	Agriculture, Science
Baker	IA	Male	White	6-10 years	Agriculture

Administering a Q Sort

The primary form of data collection in a Q Study is the Q Sort, wherein participants, i.e., members of the P-set, sort items, the Q-set, to show an ordered preference (Legette & Redwine, 2016). Participants sort the statements (printed on cards) from negative, i.e., least important, to positive, i.e., most important, on the form board (Legette & Redwine, 2016). The form board was created to have an amount of space equal to the Q Set, as shown by Figure 1 (Herrington & Coogan, 2011). The board contains fewer rows at the ends where more polarized views are reflected than toward the middle, more neutral, columns (Herrington & Coogan, 2011).

Figure 1.

Example Form Board



The overall shape is symmetrical, due to only one row under the +5 column and one row under the –5 column (Herrington & Coogan, 2011). Participants were given form boards and statements on cards coinciding with the size and shape of the squares on the board. We asked them to first sort each card into one of three piles*: definitely important*, *definitely not important*, and *unsure or neutral*. Participants were then asked to place cards from each pile onto the form board, ordering each card from *most important* to *least important*. On the back of each statement was a number identifier. After all participants completed this activity, they wrote the number into the exact quadrant on which they placed the statement in order to document the placement of items in their sort.

Factor Analysis

We collected Q sorts using a forced normal distribution and analyzed them using PQMethod software. We used principal component analysis (PCA) to determine the number of factors, or number of viewpoints, to extract a solution (Parrella et al., 2021). By following the Kaiser-Guttman Criterion, we identified nine factors that had Eigenvalues of greater than 1.0, indicating they may warrant further investigation (Watts & Stenner, 2012). However, a nine-factor solution yielded factors with higher standard error and lower reliability composites than we deemed acceptable (Watts & Stenner, 2012). Therefore, to maximize reliability and minimize standard error, we chose to extract only factors that explained more than 5% of total variance, as per Watts and Stenner (2012). As such, we identified five factors for extraction.

We used varimax factor rotation to apply a non-orthogonal rotation, allowing us to highlight what was most similar and different about each viewpoint for analysis (Watts & Stenner, 2012). Each factor represents a distinct viewpoint. By understanding how people who most closely associated with each

viewpoint sorted the Q set, we could see a best fit or exact sort of the Q set for each viewpoint. We assigned Z scores to determine statistically significant items in each viewpoint, i.e., distinguishing statements. Last, we identified which persons most closely aligned with each viewpoint to determine the defining sorts (Watts & Stenner, 2012).

We assigned pseudonyms to each participant to ensure confidentiality and used demographic and psychographic characteristics of each defining sort to characterize personas for the various viewpoints. The personas, informed by the defining sorts and distinguishing statements, represented different viewpoints, or groups of thought, regarding statements the educators viewed to be important to global food security.

Validity and Reliability of Q Method

It is important to note that validity and reliability are psychometric properties for Q methodology, even though the method does not fit perfectly within the paradigms of either qualitative or quantitative research methodologies (Ramlo & Newman, 201; Wratten et al., 2019). Q methodology contains generalizations based on theoretical implications, as well as the validity of identified opinions or concepts (Valenta & Wigger, 1997). To achieve reliability in a Q method study, the composite reliability sore of factor groups must be 0.80 at a minimum (Watts & Stenner, 2012). The five factors within this study met the composite reliability score. Transferability was applied because of its relevancy to the method in that researchers develop personas through careful consideration of the data. We were able to generalize results based on Q methodology's employment of investigator triangulation and intercoder reliability that ensure the study's validity within themes in the Q set. Q methodology does not make inferences based on a sample within a population, but rather, it transfers perspectives of an idea (Legette & Redwine, 2016). Because of this, it is not always intended to generalize the results of a Q method study (Wratten et al., 2019).

Results

Using the individuals' distinguishing statements to understand their priorities regarding global learning issues within food security, we identified five personas—conservative conservationists, enlightened equalists, futurists, trainers and teachers, and mindful producers. Distinguishing statements aid in characterizing personas. Such are Q set items within persona groups' that individuals placed in a position on the sorting board significantly differently from participants in other personas (Herrington & Coogan, 2011). A persona is defined by the pattern of where the statements are placed during the sort, and the distinguishing statements aid in the definition of said persona by demonstrating subtle differences between the personas (Herrington & Coogan, 2011).

Persona One: Conservative Conservationists

The *Conservative Conservationists* explained 10% of the variance and had a .88 composite reliability. This group indicated that "promoting natural resource conservation" was the most important and "improved research and development" was least important. Conservative conservationists value natural resource conservation and reducing aid; however, they did not value research and development of technologies or products. Also, as indicated by their desire to reduce aid and assistance, they value independence and self-sustainability over interdependence and system-sustainability. Participants who aligned with this viewpoint perceived that the best way to conserve natural resources was to empower and allow everyone (or nation) to do what works for them. The defining sorts for factor one included Riley, a science teacher from Indiana, and Jacob, an agriculture teacher from Arkansas.

Table 2

Distinguishing Statements for Factor 1 – Conservative Conservationists

Q sort value	Statements
+ 2	Promoting natural resource conservation
+ 1	Reducing reliance upon emergency food assistance
+ 1	Promotion of diet diversification
- 2	Improved research and development

Persona Two: Enlightened Equalists

The variance explained for the *Enlightened Equalists* persona was 16%, and the composite reliability was .96. The most important statement was "inadequate intake of micronutrients by mothers and infants," and the least important statement was "hygienic households and community practices." Enlightened equalists valued nutrition for mothers and infants, yet they also valued food safety over food security. They recognized the need for research and post-harvest value yet were neutral or unsure about increasing education about food security and increasing the genetic yield of crops, fish, and livestock. Individuals aligning with this viewpoint desired safe food—especially for mothers and infants—and placed value on research. However, they viewed safety and security as issues to be handled at the system level (nationally/globally) rather than the individual level (home/community). The defining sorts for factor two were Amanda an Iowa science teacher with five years of experience and single mother; Jessa, an Ohio agriculture teacher with five years of experience and new mother; Eric, a Minnesota social studies teacher with 20 years of experience; Bri, an Iowa English teacher with 20 years of experience; Jack, a Wisconsin science teacher with 20 years of experience; Carmen, an Iowa agriculture teacher with 20 years of experience; and Payton, a Maine science teacher with 10 years of experience.

Table 3

Distinguishing Statements for Factor 2 – Enlightened Equalists

Q sort value	Statements
+ 3	Inadequate intake of micronutrients by mothers and infants
+ 2	Improved research and development
+ 1	Adding post-harvest value to agricultural products
0	Increasing genetic yield of crops, fish, and livestock
0	Education of populations about global food security
-1	Access to nutritious food
-2	Improved resilience of vulnerable populations
-5	More hygienic household and community environments

Persona Three: Futurists

Within the third persona, *Futurists*, the variance explained was 11%, and the composite reliability was .94. The factor's most important statement was "identifying the determinants of stunting," and least important statement was "reducing reliance upon emergency food assistance Futurists were results-driven doers. This group sought logical steps to solve problems and focused on solutions for the future, based on sustained, long-term research. They also sought cause and effect relationships, particularly related to stunting. This group deemed immediate and short-term solutions, such as nutrition interventions and food assistance, to be less valuable. Defining sorts for Factor 3 were David, an Ohio 4-H educator with five years of experience; Lina, a Maryland agriculture teacher, Christian, a social studies teacher; and Sally, an Iowa agriculture teacher.

Table 4

Distinguishing Statements for Factor 3 – Futurists

Q sort value	Statements
+5	Identifying the determinants of stunting
+2	Investing in sustained, long-term research (towards food security innovations)
+2	Improved agricultural productivity
-3	Direct, nutrition-specific interventions and services
-4	Reducing reliance on emergency food assistance

Persona Four: Trainers and Teachers

For *Trainers and Teachers*, the variance explained was 16% and the composite reliability was .96. The factor's most important statement was "empowering small farmers," and least important statement was "increase in smallholder productivity and income." Trainers and teachers saw outreach and education as a valuable solution to global food security. They valued empowering small farmers, yet did not value increased productivity for the same group. This conflicted juxtaposition may highlight their focus on outreach as a tool to empower rather than results as a measure of empowerment. This group was unsure or neutral about specific scientific technologies, but positively valued interventions and services related to nutrition. The factor's defining sorts were Brock, a Missouri agriculture teacher with 20 years of experience and a daughter in college; Grace, a Wisconsin agriculture teacher; Gary, a Michigan agriculture teacher with 20 years of experience; Leandra, a Minnesota agriculture teacher with little experience; Darcy, an Iowa agriculture teacher with 10 years of experience; Bailey, a female Iowa agriculture teacher; and John, a Minnesota agriculture teacher.

Table 5

Distinguishing Statements for Factor 4– Trainers and Teachers

Q sort value	Statements
+4	Empowering small farmers
+2	Direct, nutrition-specific interventions and services
0	Implementing sound agriculture water management technologies and practices
-1	Improved gender integration and women's empowerment
-3	Increase in smallholder productivity and income

Persona Five: Mindful Producers

For persona 5, *Mindful Producers,* the variance explained was 6% and the composite reliability was .92. The most important statement was "adding post-harvest value to agricultural products," and the least important statement was "inadequate intake of micronutrients by mothers and infants." This persona placed value on agricultural production, infrastructure, and economy. Systems-thinking and group solutions were important, especially when water and communities are concerned. These producers valued nutrition over food safety, but also valued nutrition for all above nutrition for infants and mothers as priorities. Mindful Producers were likely to consider cost-effectiveness, maximizing impact, and big-picture solutions. The defining sorts for this group were Emmet, an Iowa science teacher with 20 years of experience; Bud, an Iowa agriculture teacher with six years of experience; and Elija, an Iowa chemistry teacher with 20 years of experience.

Table 6

Distinguishing Statements for Factor Five – Mindful Producers

Q sort value	Statement
+5	Adding post-harvest value to agricultural products
+3	Collaboration between water users in a community
+3	Access to nutritious food
0	Access to safe food
0	Identifying the determinants of waste
-5	Inadequate intake of micronutrients by mothers and infants

Consensus Items

A consensus item (Herrington & Coogan, 2011) is a statement that participants sorted similarly and consistently among all viewpoints, thereby, agreeing on the position of that statement (see Table 7). The stability of these statements is noteworthy because it indicates that the participants agreed on the placement of these items regardless of their views on any other item. This showed that the participants were unsure or neutral about effective approaches to measuring nutritional gains and eliminating stunting under the age of two. Both items were more technical and scientific, which may have been the cause of uncertainty. Most noteworthy is that almost all participants agreed that the restoration of degraded farmlands was not important, relative to the other items in the Q set.

Table 7

Consensus Items

Average Q sort value	Statements
0	Effective approaches to measuring nutritional gains
0.4	Zero children being stunted under the age of two
-3	Restoration of degraded farmlands

Conclusions and Recommendations

The educators in this study prioritized global food security issues through five perspectives: *Conservative Conservationists, Enlightened Equalists, Futurists, Trainers And Teachers,* and *Mindful Producers*. Through greater awareness, educators can begin to enhance their effectiveness in global education by understanding their personal perspectives and how they may view, and, thus, interact with a framework for developing global competency in their students. Their understanding of multiple educator personas regarding global issues contributes to their capacity for the development of globally minded students.

"Promoting natural resource conservation" was the strongest statement for *conservative conservationists*. This value strongly reflects goals 14 and 15 of the UN's Sustainable Development Goals (SDGs) to conserve and sustainably use resources from the world's oceans and lands (United Nations, n.d.). This group's least valued statement was "reducing reliance on emergency food assistance," which aligns with SDG two (United Nations, n.d.). In addition, food assistance is highlighted as important in the Risk and Reliance and Policy Systems sections of the Feed the Future Learning Agenda (2019). This group valued independence and conservation of natural resources through empowering nations to work in their best interest, which reflects the *recognizing perspectives* domain of global competence (Asia Society, 2018).

Persona two, *enlightened equalists*, selected "inadequate intake of micronutrients by mothers and infants" as its strongest statement. This factor's values incorporate goals from SDGs five and 10—to achieve gender equality for women worldwide and reduce inequalities among populations (United Nations, n.d.). Enlightened equalists valued "more hygienic household and community environments" the least. Hygiene is the focus of SDG six, emphasizing sanitation for all (United Nations, n.d.). These individuals perceived the need to take action through global competence, as they supported research efforts and viewed safety and security as issues that should be managed on the system level (nationally/globally) rather than the individual level (Asia Society, 2018).

"Identifying the determinants of stunting" was the strongest statement for the *futurists*. This factor's highest value mirrored that of the SDG three, to ensure healthy lives for humans of all ages. Similar to *conservative conservationists*, *futurists* did not value "reducing reliance upon emergency food assistance" (United Nations, n.d.). Rather they were concerned with health, which was related the *taking action* and *investigate the world* components of the Asia Society (2018) model.

Trainers and teachers selected "empowering small farmers" as their strongest statement. The values of this group did not align with a SDG, although some goals emphasize women's empowerment and economic support of farmers—but do not specifically address empowering small farmers. The SDGs do not emphasize the importance of small farmers who are often pillars of their rural communities. For instance, *trainers and teachers* did not value "increase in smallholder productivity and income," which aligns with the SDG eight for sustained economic growth (United Nations, n.d.). Seemingly contrary to concepts within their distinguishing statement involving small farmers, this persona valued identity much more than income. They recognized perspectives, potentially making them more globally competent (Asia Society, 2018). The *trainers and teachers* recognized perspectives beyond themselves and were concerned with the empowering the marginalized.

The strongest statement for *mindful producers*, persona five, related to goal nine of the SDGs, working toward increasing the support for value-added products (United Nations, n.d.). *Mindful producers*, however, did not value concepts in SDG number three, promoting health among all ages. This persona group indicated a desire to take action, indicating a quality of global competence as per the Asia Society (2018).

Through the analysis of these personas, we found relationships between national and international goals for development regarding food security issues, but we also identified points of disconnect because some of the factors' viewpoints on important issues were not reflected by the SDGs. It is important for researchers and practitioners to understand the perspectives and values of educators to create a united holistic effort toward understanding the importance of these global issues, as it could impact their students, and therefore the citizens and leaders of our world (Carano, 2010; Hanvey, 1976; Kagan & Stewart, 2004). These viewpoints may be a tool to identify gaps in the knowledge base and curricula regarding global learning, food security, and related sciences.

Secondary educators who teach global issues, and those who participated in the Global Guides program are likely apt to seek out information and dedicate time to the study of global issues. Educators, including those who teach in career and technical education fields, are at the forefront of educating tomorrow's workforce. Similar studies observing their attitudes related to global competence and perceived important of sub-categories of global competence could reveal possibilities for novel curriculum centered on global issues, and unfolding within the context of culinary arts, automotive technology, computer science, and other subjects, as well as agriculture. When understanding these secondary educators' global competency through the Asia Society's (2018) model of Four Domains for Global Competence, we saw strength in understanding three areas: Investigating the World, Recognizing Perspectives, and Taking-Action. These educators were strong in their understanding of others'

viewpoints, the need to explore peoples and places outside their environment, and the need to turn ideas into action to help those in need (Asia Society, 2018), including the attainment of food security.

Future research should develop quantitative and qualitative follow-up studies to specifically characterize knowledge gaps, such as a lack of representation in smallholder farmer empowerment, in the knowledge base and curricula for global learning, food security, and related sciences. Officials who work to develop agendas, such as the SDGs, should seek interdisciplinary curricula to engage educators on global issues to create a more informed and knowledgeable workforce development pipeline. In addition to representation from more knowledge bases, this line of inquiry and use of Q methodology could be beneficial to explain similar issues in other contexts such as teachers in urban settings, pre-service teacher candidates who are entering the field without classroom experience bias, and educators in other areas, e.g., university extension professionals.

References

Asia Society. (2018). *Teaching for global competence in a rapidly changing world*. Asia Society. https://asiasociety.org/sites/default/files/inline-files/teaching-for-global-competence-in-a-rapidly-changing-world-edu.pdf

Aydin, H., Ogurlu, U., Andrew, K., Masalimova, A. R., Dorozhkin, E. M., & Malygin, A. A. (2019). High school students' perceptions of global citizenship in central public high schools: Implications for teacher educators. *Revista De Cercetare Si Interventie Sociala, 65*, 187-205.

Balschweid, M. A., & Thompson, G. W. (2002). Integrating science in agricultural education: Attitudes of Indiana agricultural science and business teachers. *Journal of Agricultural Education*, 43(*2*), 1-10. https://doi.org/10.5032/jae.2002.02001

Brown, S. R. (1996). Q methodology and qualitative research. *Qualitative Health Research, 6*(4), 561-567. https://doi.org/10.1177/104973239600600408

Carano, K. T. (2010). Through the lens of a global educator: Examining personal perceptions regarding the construction of world-mindedness. University of South Florida.

Cesario, S. K. (2017). What does it mean to be a global citizen? *Nursing for Women's Health, 21*(1), 59-63. https://doi.org/10.1016/j.nwh.2016.12.007

Cortes, C. E. (2005). The information media: Social studies' main competitor. In M. S. Crocco (Ed.), *Social studies and the press: Keeping the beast at bay?* (p. 25-35). Information Age.

David, E. (2017). *Food insecurity in America*. Social Connectedness Fellowship Program.

Davies, L. (2006). Global citizenship: Abstraction or framework for action? *Educational Review, 58(*1), 5-25, https://doi.org/10.1080/00131910500352523

Feed the Future. (2018) *Feed the Future learning agenda*. https://www.agrilinks.org/sites/default/files/learning_agenda_draft_for_public_comment_sep102018_v5.pdf

Food and Agriculture Organization. (2015). The state of food insecurity in the world. In *The state of food insecurity in the world 2015. Meeting the 2015 international hunger targets: Taking stock of uneven progress*.

Gaudelli, W. (2003). *World class: Teaching and learning in global times*. Routledge.

Gioseffi, D. (1993). *On prejudice: A global perspective*. Anchor.

Hahn, C. L. (1998*). Becoming political: Comparative perspectives on citizenship education*. Suny Press.

Hanvey, R. (1976). An attainable global perspective. The American forum for global education. *Center for War/Peace Studies. New York*.

Herrington, N., & Coogan, J. (2011). Q methodology: an overview. *Research in Teacher Education*, *1*(2), 24-28. https://repository.uel.ac.uk/download/4dac1711cd3fed256394aed1adc8357331cb132d4b9f3b0ea3b362341327b90d/528678/2046-1240_1-2_pp24-28.pdf

Hopkins, C. D., Raymond, M. A., & Carlson, L. (2011). Educating students to give them a sustainable competitive advantage. *Journal of Marketing Education, 33*(3), 337-347. https://doi.org/10.1177/0273475311420241

Isin, E. F. (Ed.). (2013). Democracy, citizenship and the global city. Routledge.

Kagan, S. L., & Stewart, V. (2004). Putting the world into world-class education: Introduction. *Phi Delta Kappan*, *86*(3), 195.

Kelly, J. A. (2004). Teaching the world: A new requirement for teacher preparation. *Phi Delta Kappan, 86*, 219-221.

Leahy, T. H. (2004). *A history of psychology: Main events in psychological thought* (6th ed.). Prentice Hall. https://doi.org/10.1177/003172170408600310

Larsen, M. A. (2014). Critical global citizenship and international service learning. *Journal of Global Citizenship & Equity Education*, *4*(1).

Leggette, H., & Redwine, T. (2016). Using Q methodology in agricultural communications research: A philosophical study. *Journal of Applied Communications*, 100(3), 57–67. https://doi.org/10.4148/1051-0834.1230

Lincoln, Y. S. (2005). Perspective 3: Constructivism as a theoretical and interpretive stance. *Introduction to the philosophies of research and criticism in education and the social sciences*, 60-65.

Merryfield, M. M. (1998). Pedagogy for global perspectives in education: Studies of teachers' thinking and practice. *Theory & Research in Social Education*, *26*(3), 342-379. https://doi.org/10.1080/00933104.1998.10505855

Metos, J. M., Sarnoff, K., & Jordan, K. C. (2019). Teachers' perceived and desired roles in nutrition education. *Journal of School Health*, *89*(1), 68-76. https://doi.org/10.1111/josh.12712

Osler, A., & Vincent, K. (2002). *Citizenship and the challenge of global education*. Trentham.

Parker, W. C. (2008). International education: What's in a name? *Phi Delta Kappan, 90*, 196-202.

Parrella, J. A., Spence, J. R., Redwine, T., & Leggette, H. R. (2021). Characterizing viewpoints of scholars in agricultural communications as they relate to research themes in the Journal of Applied Communications: A Q methodological study. *Journal of Applied Communications, 105*(3), 3.

Ramlo, S. E., & Newman, I. (2011). Q methodology and its position in the mixed methods continuum. *The International Journal of Q Methodology*, *34*(3), 172–191. https://www.researchgate.net/profile/Susan-Ramlo/publication/257942977_Q_Methodology_and_Its_Position_in_the_Mixed-_Methods_Continuum/links/0046352668cc7f3329000000/Q-Methodology-and-Its-Position-in-the-Mixed-Methods-Continuum.pdf

Roberts, T. G., Harder, A., & Brashears, M. T. (Eds). (2016). *American Association for Agricultural Education national research agenda: 2016-2020*. Gainesville, FL: Department of Agricultural Education and Communication.

Rubeli, B., Oswald, E., Conzelmann, A., Schmid, J., Valkanover, S., & Schmidt, M. (2020). Promoting schoolchildren's self-esteem in physical education: testing the effectiveness of a five-month teacher training. *Physical Education and Sport Pedagogy*, 1-15. https://doi.org/10.1080/17408989.2020.1712348

Sanders, W. L., Wright, S. P., & Horn, S. P., (1997). Teacher and classroom context effects on student achievement: Implications for teacher evaluation. *Journal of Personnel Evaluation in Education*, 11(1), 57-67. https://doi.org/10.1023/A:1007999204543

Stebleton, M., Soria, K., & Cherney, B. (2013). The high impact of education abroad: College students' engagement in international experiences and the development of intercultural competencies.

Thornton, S. J. (2005). *Teaching social studies that matters: Curriculum for active learning*. Teachers College Press.

Tye, K. A. (2009). A history of the global education movement in the United States. In T. F. Kirkwood-Tucker (Ed.), Visions in global education: *The globalization of curriculum and pedagogy in teacher education and schools* (pp. 3-24). Peter Lang.

United Nations. (n.d.). Sustainable development goals. https://www.un.org/sustainabledevelopment/

USAID. (2020). *Education*. https://www.usaid.gov/education

USAID. (2017). *The U.S. government's global food security research strategy*. https://www.usaid.gov/sites/default/files/documents/1867/GFS_2017_Research_Strategy_508C.pdf

USAID (n.d.) Taking a holistic view at the sustainable development goals. https://www.usaid.gov/globalgoals

USDA. (2016). WIC - *Special supplemental nutrition program for women infants and children*. USDA Food and Nutrition Service.

Valenta, A. L., & Wigger, U. (1997). Q-methodology: Definition and application in health care informatics. *Journal of the American Medical Informatics Association*, 4(6), 501–510. https://doi.org/10.1136/jamia.1997.0040501

Watts, S. (2011). Subjectivity as an operant: A conceptual exploration and discussion. *The International Journal of Q Methodology, 35*(1), 37–47. http://doi=10.1.1.967.2988&rep=rep1&type=pdf

Watts, S., & Stenner, P. (2012). *Doing Q methodological research: Theory, method & interpretation*. Sage.

Welsh, T. (2023, January 4). *"Very, Very Worried": Another bleak year expected for food security.* Retrieved from: https://www.devex.com/news/very-very-worried-another-bleak-year-expected-for-food-security-104605

Wratten, S., Eccleston, C., & Keogh, E. (2019). Perceptions of gendered and ungendered pain relief norms and stereotypes using Q-methodology. *Pain, 160*(2), 395–406. https://doi.org/10.1097/j.pain.0000000000001409