

# Teaching Locally, Engaging Globally to Enhance the Undergraduate Curriculum: A Social Science Research and Evaluation Perspective

K. E. Dooley<sup>1</sup>, G. Roberts<sup>2</sup>, M. Navarro<sup>3</sup>, A. Harder<sup>2</sup>, T. Murphrey<sup>1</sup>, J. Ricketts<sup>3</sup> and J. Lindner<sup>1</sup>

1. Department of Agricultural Leadership, Education, and Communications, Texas A&M University, College Station, Texas 77843, USA

2. Department of Agricultural Education and Communications, University of Florida, Gainesville, Florida 32611, USA

3. Department of Agricultural Leadership, Education, and Communication, University of Georgia, Athens, Georgia 30602, USA

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**Abstract:** The purpose of this project is to reach more students in food, agricultural, and environmental sciences with a globalized undergraduate curriculum, by providing contextually-rich reusable learning objects (RLOs) and authentic case studies that address multidisciplinary issues. Reusable learning objects (RLOs) are self-contained, digital learning activities that range in length from 2 to 15 minutes. RLOs can contain a wide array of media, including text, web sites, charts, maps, models, PowerPoint presentations, photos, case studies, simulations, video clips, audio clips, and assessments. Food and agricultural sciences faculty at the University of Florida, the University of Georgia, and Texas A&M University have been selected to be part of a Faculty Learning Community that will work together in curriculum and RLO development, and will participate in an international study experience funded by this project. For each experience, a group of approximately ten faculty and three project team members will spend roughly two weeks in a Latin American/Caribbean basin country. Various social science data collection processes and evaluation strategies will be the focus of the presentation. The use of pre-reflective and reflective instruments to measure initial attitudes or beliefs about the context-rich multidisciplinary experience and expected gains from participating in the curricula development will be demonstrated.

**Key words:** Reusable learning objects (RLO), social science research, internationalizing curriculum, global competency.

## 1. Introduction

Modern agriculturalists no longer have the luxury of hiding behind geo-political borders and ignoring what is happening on the other side of the world. Recognizing this, many colleges of agriculture have embraced international opportunities for undergraduate students [1].

A recent examination of international activities at United States universities [2] revealed that most students and faculty expressed support for

international activities, but failed to participate in these activities. "While the number of participants had increased, only a small portion of undergraduates participated in academic programs abroad and many of those that did have short-term experiences" [2]. Green and his colleagues [2] specifically acknowledged low levels of participation in international experiences and recommended that universities should refocus resources on globalizing the curricula so that more students can benefit. However, limited funds and interest prohibit providing global experiences directly to all students.

The importance of producing graduates that are culturally-literate and capable of solving problems in a

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**Corresponding author:** K. E. Dooley, Ph.D., professor, research fields: inquiry-based learning and assessment, international agriculture development and education, educational technology. E-mail: k-dooley@tamu.edu.

global context is widely embraced by institutions of higher education. However, traditional globalization strategies such as globally-focused courses, study-abroad, and travel courses reach only a small number of students. The instructional opportunity addressed by this project is to reach more students in food and agricultural sciences by globalizing the undergraduate curricula with contextually-rich reusable learning objects (RLOs) and authentic case studies that address multidisciplinary issues.

Reusable learning objects (RLOs) are self-contained, digital learning activities that range in length from 2 to 15 minutes. RLOs are created using a standardized structure and tagged with metadata that allows cataloging and searching. RLOs can be used independently, or multiple RLOs can be linked to create a more in depth lesson. RLOs can be delivered in a variety of ways, such as in class, through an eLearning platform, or on an independent web page. RLOs contain a wide array of media, including text, websites, charts, maps, models, PowerPoint presentations, photos, case studies, simulations, video clips, audio clips, and assessments. The intent of this project is to widely distribute the RLOs in a repository so they can be used by others.

Using a global and cultural perspective, this project will focus on Latin America and the Caribbean basin. Although the activities and methods proposed in this project could be replicated in any geographic region, Latin America and the Caribbean basin are geographically close to the United States, particularly the states of Florida, Georgia, and Texas. Latin America and the Caribbean basin are important trading regions for agricultural commodities. For example, two of the top 15 export destinations and six of the top 15 import sources for agricultural commodities were in Latin America and the Caribbean basin [3]. Therefore, it is reasonable to expect that graduates in the food and agricultural sciences at these participating institutions will engage in global business activities that involve this region of

the world.

By engaging faculty through an international experience, faculty will be better equipped to develop and integrate culturally-rich RLOs and authentic case studies into their courses. In addition to participating in an international experience, the faculty will work in a faculty learning community (FLC), which will help them transfer the international experience into their RLO and curriculum. It is believed that being active in a FLC rather than working in isolation will facilitate the transfer and diffusion of the RLOs through the colleges. Engagement in a FLC also energizes its members and provides more visibility to individual and group efforts (for more information about faculty learning communities, see <http://www.units.muohio.edu/flc/>).

## **2. Global Competency**

To strengthen the global competency of food and agricultural science students, it is essential for faculty members to expose them to a global, interdisciplinary, and multidimensional perspective of the complex interaction of sociocultural variables, food production, and the biophysical environment. Equally fundamental in developing global competency is the recognition of the importance of global processes in our everyday lives by enabling the student to draw connections between global issues and their personal lives.

Preparing students to function in an increasingly complex and interdependent world is a considerable undertaking. It is a challenge for faculty to motivate students and instill the importance of developing and cultivating global competency. Students may have the opportunity to develop global competency through general education offerings, foreign language courses, and ethnic studies. However, what truly strengthens a worldview mindset is a globally competent curriculum. A globally competent curriculum is one through which faculty ensures the development of the diverse and knowledgeable worldview of the student. A global mindset enables students to evaluate possible

solutions generated from a diversity of perspectives and approaches addressing food and agriculturally related issues.

A globally competent curriculum provides an understanding of the international dimensions of the student's discipline; particularly those associated with the interconnectedness between societies, food production, natural resources, and the environment. Given the appropriate curricular context and sound pedagogical processes, students will recognize the need to become internationally aware in his/her discipline; and will seek out faculty members and curricula offerings that fulfill this need, regardless of discipline. Faculty, thus, must be internationally experienced and pedagogically prepared to teach courses with international content through a multidisciplinary approach.

Critical to the development of global competency is the advancement of cross-cultural sensitivity and adaptability. To complement the development of competencies in the student's area of study, a globally competent curriculum seeks to increase the student's knowledge of and background in the sociological, anthropological, and psychological perspectives of cross-cultural communication and cultural competency. Therefore the student develops skills and abilities and acquires tools to be an effective cross-cultural communicator and a culturally competent individual. This approach allows the student to understand and work with others and be able to make comparisons across cultures. Through cross-cultural exposure and experience the student learns to assess his/her own assumptions about the world and his/her own cultural context.

A globally competent curriculum comprises a multiplicity of disciplines to reveal the global interdependence of agriculture and food production; and their interconnectedness to natural resources, people, cultures, and the environment. The student is enabled to integrate and synthesize knowledge from several disciplines to not only understand complex

agricultural systems, but to gain personal and professional competencies to be successful in a highly diverse and interdependent world. Thus, students become globally competent citizens that are equipped to contribute to the food and agricultural sciences on both a local and global scale.

### **3. USDA Higher Education Challenge Grant: Project Phases**

This USDA higher education challenge grant is focused on building a globally competent curriculum in these priority areas [4].

(a) Globalizing agricultural business, markets and trade, including international food security; (b) Developing sustainable agricultural technologies and systems promoting energy conservation and efficiency, including on-farm/ranch renewable bioenergy and wind, solar and hydro capabilities, together with related economic and social implications (e.g., marketing, distribution of products, goods and services, entrepreneurship, rural community opportunities and risks, etc.); (c) Developing technologies and systems for sustainable crop and animal production (including genomics and plant breeding) to enhance the capabilities of both domestic and international production systems to meet the needs of producers and consumers worldwide, while enhancing environmental services, ecosystem health and animal well-being; (d) Promoting human sciences that address rural youth, individual, and family well-being in a community context; (e) Increasing food safety and food defense; protecting the safety of America's food supply; (f) Supporting healthy food choices and lifestyles, and obesity and chronic disease prevention; and (g) Sustaining forest, farmland, and rangeland health and protection including improved ecosystem services such as soil, air, and water quality, including agriculture and forestry's adaptive responses to address global climate change [4].

The project will be executed in three phases. Phase 1 is complete and the project team is currently

executing Phase 2.

### *3.1 Phase 1 Developing Faculty Expertise*

Phase 1 focused on developing faculty experience and expertise necessary to create global content related to the USDA priority areas. Food and agricultural sciences faculty at the University of Florida, the University of Georgia, and Texas A&M University have applied and were selected for the program. The University of Florida will lead a 13-day faculty study trip to Ecuador. Participants will examine (a) the intersection of culture and large-scale sustainable agriculture and aquaculture systems in the coastal areas; (b) the intersection of culture, community, and small-scale agriculture systems in the high sierra; and (c) the interplay between culture and ecotourism in the Galapagos Islands, a World Heritage site. Nine participants, representing 8 academic departments will collaborate to share their technical expertise in the biological, physical, and social sciences to create Reusable Learning Objects (RLOs).

The University of Georgia created a faculty learning community (FLC) composed of 11 faculty members representing 6 departments. The FLC will coordinate professional development activities for the faculty, as well as facilitate curriculum and RLO development. The UGA FLC will engage in a 12-day professional development trip to Costa Rica, where they will visit several ecological zones and interact with local representatives of a large range of systems (traditional large-scale high-input agriculture, low-input subsistence agriculture, sustainable agriculture demonstration farms, biodynamic farms, organic family farms, conservation areas, ecotourism centers, national parks, and reserves).

Texas A&M University is hosting a faculty study trip to Trinidad and Tobago. The faculty will collaborate with the University of the West Indies, Ministry of Agriculture, Land and Marine Resources, and farmers and agriculturalists. The 12 TAMU faculty will collaborate with 12 UWI faculty and 5

MALMR personnel to create RLO's during the 12-day trip. Project participants will interact with local farmers, farm market employees, extensionists, NGO employees, and citizens while focusing on the adoption and diffusion of food safety, food security, and food production innovations.

Table 1 includes a list of faculty program areas and RLO topics. In the application and recruitment process, faculty specified the focus of the global curricula (RLOs) and case studies they propose to create. There was a requirement that the curricula focus on one of the USDA priority areas and relate to an existing or new undergraduate course in their discipline. To create consistency between all the global experiences funded by this project, the project team established requirements and expectations for the curricula. All faculty participants received training on the creation of RLOs.

### *3.2 Phase 2 Creating Reusable Learning Objects*

Phase 2 will focus on creating and hosting culturally-rich, content-based reusable learning objects that can be integrated into on-campus classes. Faculty participants will create the technical content based on their content outline and using the data/materials gathered during the international experience. The reusable learning objects will focus on scientific content (i.e., tropical forest sustainability) and on how culture interacts with the discipline and USDA priority area (i.e., how native people use the tropical forests). RLOs will go through a peer review process to verify the accuracy and presentation of the material. The RLOs will be hosted on a server at the University of Florida.

### *3.3 Phase 3 Globalizing On-Campus Courses*

Phase 3 will focus on globalizing on-campus courses by integrating the RLOs created in the previous phase into courses. The project web site will be broadly disseminated through academic deans and international program coordinators from colleges of

**Table 1 RLO topics by expertise.**

Expertise	RLO Title(s)
Agricultural economics	Marketing to and from latin american countries Cultural marketing practices
Agricultural leadership, education, Communications	Youth development and education in agriculture Farmer field schools: an extension education method to transfer agricultural technology Increasing animal protein feed sources in trinidad & tobago: improving meat production, processing, & distribution Intercultural motivation The influence of grassroots organizations in ecuador on policy makers Salamanders and evaluators: so much in common! From stakeholders to stakemolders: promoting their ownership in program development Co-creation of knowledge: the brainchild of technology transfer and indigenous knowledge
Agronomy	Sustainable soils management in tropical systems Plant diversity, evolution and population structure of rice and sugarcane in different demographic regions of costa rica Use of food crops for bioenergy and sustainability in costa rica
Animal and dairy science	Horse health management in costa rica Horse production in costa rica The use of horses in costa rica
Biological & agricultural engineering	Renewable energy in the caribbean (wind, solar, bioenergy) Pesticide usage in ecuador
Ecosystem science & management	Aerial photography & satellite imagery Mapping land use and land cover types Characterizing the 3-dimensional structure of vegetation canopies
Family, youth, and community sciences	Risky behaviors of youth in latin america
Food science and human nutrition	Screening for nutritional risk in the community Organic coffee production, processing, and distribution: a virtual tour
Forest resource and conservation	Sustainable aquaculture production
Horticultural sciences	Sustainable agriculture Horticulture in the west indies Gardening in the grow box Understanding tropical forest plant morphology Propagation practices for tropical plant species in costa rica Organic/sustainable production of coffee and other alkaloid-containing crops Medicinal species and ethno medicinal practices of costa rica
Religion	Indigenous culture and agriculture in ecuador
Plant pathology	Tropical macro-fungi Fungal amphibian decline Management of coffee rust in organic coffee production in costa rica Disease management in melon and watermelon production systems Threats posed to costa rican citrus by citrus canker and citrus greening diseases
Poultry science	The influence of large-scale poultry production practices in costa rica poultry production Poultry production through backyard flocks in costa rica: economics and disease Determining the attitudes towards use of genetically modified plants and animals in costa rica Dietary preference towards poultry meat types in costa rica
Wildlife & fisheries sciences ecology & conservation	Coastal fisheries in trinidad & tobago Training for fisher-folk Integrated watershed & coastal area management in tobago Conservation birding: sustainable ecotourism partnerships

food and agricultural sciences. The web site will also be indexed with popular search engines. It is envisioned that agricultural faculty will search for RLOs that can contribute to globalizing their classes.

As a result of this project, faculty and students will

be able to access and download RLO materials by visiting the project website. It is anticipated that the use of RLOs in food and agricultural sciences courses will increase the quality of postsecondary instruction by providing faculty with ready-to-use, globally

relevant, peer-reviewed curricula based on USDA priority areas. Faculty can use the RLOs to increase students' technical knowledge and their awareness and interest in pursuing careers in food and agricultural sciences. The global context of the RLOs will allow students to vicariously experience a different culture, preparing students to work in the global market place.

#### 4. Social Science Research Products and Evaluation Plans

The Logic Model divides program evaluation into three components: planning evaluation, process evaluation, and outcome evaluation [5]. The first component, planning evaluation, determines the needs of the population and subsequent program priorities. A process evaluation examines the activities conducted during the program and the participants who attended them [6]. Process evaluations compare what was done to what was planned. Process evaluations also describe the participants, their relationship to the target population, and their reactions to program activities. Specific indicators to be measured in the process evaluation include: numbers of faculty reached, global experiences completed, reusable learning objects created and disseminated, and numbers of students impacted by the use of reusable learning objects in the dissemination stage.

An outcome evaluation examines short, medium, and long-term outcomes [6]. Short term outcomes include intended and unintended changes in participants' knowledge, attitudes, skills, and aspirations. Medium term outcomes are changes in behavior. Long-term outcomes are changes in social, economic, and environmental conditions. As their labels suggest, the outcomes occur at progressively longer intervals and subsequently become increasingly more difficult to evaluate [7]. Within the scope of this program, it is realistic to evaluate short and medium term outcomes. The accomplishment of the short and medium term outcomes is anticipated to lead to long

term improvements in higher education by improving instructional capacity and therefore student preparation for careers in the food and agricultural sciences. Specific indicators to be measured in the outcome evaluation include an increased ability to teach globally-relevant food and agricultural sciences topics, increase in knowledge of technical content in a global context, and changes in attitude as reported by faculty and students.

Social science research relies upon quantitative and qualitative methods to answer research questions. Qualitative methods compliment quantitative methods by providing insight into *why* people think and act as they do, as compared to quantitative measures of *what* people think and do [8]. For this reason, mixed methods will be used to formatively and summatively assess the accomplishment of project goals and ensure project accountability.

Qualitative research can be defined in general terms as "multimethod in focus, involving an interpretive, naturalistic approach to its subject matter...Qualitative researchers study things in their natural settings, attempting to make sense of, or interpret, phenomena in terms of the meanings people bring to them" [9]. Qualitative data uses both participants and researchers direct, firsthand experiences [10, 11]. The approach "involves a return to the experience in order to obtain comprehensive descriptions that provide the basis for a reflective structural analysis that portrays the essences of the experience" [11].

The evaluation plan for this project will determine (a) perceived changes in attitudes/beliefs, (b) expected gains, and (c) actual benefits/opportunities of faculty participants. Data will be collected using a modified version of preflective and reflective instruments [12-15].

Preflection is a process of being consciously aware of the expectations associated with the learning experience. It increases the readiness capacity for learning from the experiences, thereby increasing the capacity to reflect upon the concrete experience and increase the overall learning. Preflection provides a

bridge between thinking about an experience and actually learning from the experience [16].

Guiding questions on the *reflection* instrument will be asked about initial attitudes or beliefs about the context-rich multidisciplinary experience and expected gains from participating in the curricula development. The *reflection* instrument will ask faculty to elaborate on what they learned and plans for implementation.

An open-coding content analysis will be used to determine emerging themes and patterns based upon hand-written reflections by the participants (archival data). Content analysis is a “qualitative data reduction and sense-making effort that takes a volume of qualitative material and attempts to identify core consistencies and meanings” [17]. Content analysis requires deciphering skills and pattern recognition to ensure that variations can be “rigidly and consistently applied so that other researchers or readers, looking at the same messages, would obtain the same or comparable results” [18]. Data themes and categories will be peer reviewed by the key personnel. An audit trail of all responses by emerging categories will be included in the results.

After the reusable learning objects have been created and peer reviewed, focus group sessions will be conducted using Centra™ (A LIVE Online Classroom). Centra™ is proven as an effective data gathering tool for focus groups and is cost-effective for dispersed participants [19]. Conferencing tools within Centra™ allow respondents to raise hands, indicate agreement and provide verbal feedback. The focus group sessions will ask faculty participants about knowledge, skills, and abilities gained as they incorporated international/global concepts into the RLO. Centra™ can also be used as an interactive communication tool for discussions with the key personnel and faculty participants as the context-rich curriculum is developed. The Centra™ meetings can be recorded to allow accurate transcription.

The constant comparative method will be used for

data analysis of the focus group data [20]. Each unit (idea) will be initially listed, without placement into categories. Tacit knowledge will be employed in making initial judgments for categorization. The researchers will summarize findings into categories and broad themes and conduct a peer debriefing session with key personnel. This debriefing and analysis will allow the researchers to further identify constructs and verify emerging themes.

Quantitative methods will provide the basis for the continuous evaluation and improvement of reusable learning objects developed during the project. Faculty and student evaluation forms will be embedded into the Web site to collect: (a) course and university identification, (b) numbers of enrolled students, (c) faculty perceptions of the RLO, (d) student perceptions of the RLO, and (e) recommendations for RLO improvement. The integration of evaluation forms into the project Website will enable the standardization of evaluation criteria and data collection methods across all three universities. The evaluation forms will be reviewed by a panel of experts for face and content validity and pilot tested to improve validity and reliability prior to the start of data collection in Phase 3. The evaluation form analysis will allow the researchers to refine the reusable learning objects as needed and will provide a mechanism for tracking numbers of faculty and student reached. Similarly, Google™ Analytics will be used to track the number of visitors to the project Website, pages visited, length of time on site, and number of downloaded materials. The data obtained from Google™ Analytics will be used to strengthen the marketing component of the project so that maximum dissemination of project materials to food and agricultural sciences faculty can be achieved.

## **5. Conclusions and Recommendations**

This manuscript highlights the social science research and evaluation tools to assess project

outcomes for a USDA funded project. The evaluation plans and resulting data collection phases require extensive qualitative and quantitative measures over time. International experiences can be documented and disseminated as a research and teaching tool. Implementation of the evaluation plans can result in “lessons learned” in the form of case studies and learning objects. Reusable learning objects will be accessible to faculty and students after the project is complete to further instill the value of global competence.

The authors believe that social science research and evaluation tools enhance accountable and impact measures of funded projects. Many funding agencies require a social science component. Agricultural and extension educators are well equipped to provide this expertise. The development and incorporation of contextually-rich, multidisciplinary RLOs into food and agricultural science classes can strengthen and improve undergraduate teaching, improve attitudes about global academic activities, and provide vicarious experiences applied in a culturally-rich setting. The integration of RLOs into food and agricultural science classes will appeal to students who prefer technologically-rich learning. Authentic case studies will engage learners in problem solving and critical thinking to help them become more globally competent citizens.

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