

An Examination of the Use of Reusable Learning Objects to Alter Agricultural Students' Attitudes and Opinions Regarding International Settings¹

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Abstract

Understanding students' attitudes, opinions and perceptions is a critical component of the educational process. This understanding becomes even more critical when one considers the need to encourage global awareness as instructors strive to identify ways to positively impact student perceptions related to international settings. The purpose of this study was to measure the impact of reusable learning objects (RLOs) that were created related to the culture of Trinidad and Tobago on undergraduate agricultural students' attitudes about the country. There were three phases to the study: creation of the Thurstone scale, administration of the pre-assessment and administration of the post-assessment. The population of the study consisted of four classes containing a total of 103 students in a College of Agriculture. Findings revealed that engaging in the RLO process had an impact on students' attitudes toward the culture of Trinidad and Tobago. Implications exist for the creation and delivery of vicarious learning tools such as RLOs and for the globalization of students.

Introduction

Understanding students' attitudes, opinions and perceptions is a critical component of the educational process. This understanding becomes even more critical when one considers the need to encourage global awareness as instructors strive to identify ways to positively impact student perceptions related to international settings.

Attitudes can be defined as "a learned predisposition to respond in a consistently favorable or unfavorable manner with respect to a given object" (Fishbein and Ajzen, 1975, p. 6). In accordance with this definition,

attitudes can directly impact a student's willingness to learn and be open to new information. One goal of undergraduate education is to create "thoughtful professionals and better informed citizens" (Walter and Reisner, 1992, p. 20) who can participate in educated conversations about agricultural related topics. Hobbs and Chernotsky (2007) stated "[t]o be productive citizens in the 21st century, students need to understand the challenges facing the world today" (p. 2). Regardless of the setting, negative attitudes toward international locations indirectly impact a student's global perspective. Wingenbach et al. (2003) reported that agricultural education students had less than desirable knowledge of global issues and that there was a need to provide opportunities to increase this knowledge.

As shared by Knight (1994), "Curriculum is the backbone of the internationalization process" (p. 6). Colleges of Agriculture strive to provide a global perspective in the classroom. In fact, study abroad and international internships are excellent ways to impact attitude – but these are not always possible or even pursued by agriculture students. In the 2009/2010 academic year, 1.3% of students from the United States (approximately 3,500) that studied abroad were from the field of agriculture (Institute of International Education, 2011).

Studies have been conducted that have confirmed the benefit of direct exposure to international settings through travel such as study abroad, organized international tours and international internships. Bruening et al. (2002) wrote that students who participated in an extended field trip to Puerto Rico "indicated that the experience was important, valuable and meaningful

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to them and their professional and personal lives" (p. 73). Stephens and Little (2008) found that student teachers "enhanced their self-confidence, leadership abilities and global awareness by participating in an international experience" (p. 54). Boyd et al. (2001) reported that participation in an international youth exchange generated interest in global issues and influenced participants to be more culturally sensitive. However, while these activities might be the most impactful methods of exposure to international settings, there are many limitations. Expense and access are very real limitations for undergraduate students enrolled in Colleges of Agriculture. Wingenbach et al. (2006) reported that students indicated barriers to participation in international experiences as including "personal safety, language and financial barriers and missing their family" (p. 79) while Irani et al. (2006) confirmed these barriers and noted them as "concern about financial costs and overall time involved" (p. 27).

While interest in participating in international experiences has been documented (Briers et al., 2010), the reality of actual participation is another matter. Briers et al. reported that greater than 70% of students "felt that participating in a study abroad program would improve their competitiveness in the global marketplace" (p. 17) while at the same time a 2008/2009 report of participation in study abroad at Texas A&M University was only 2.69% of the approximately 6,200 students in the College of Agriculture (Study Abroad Programs Office, 2009).

One potential means of exposing students to international topics without leaving the classroom is through vicarious learning which has been defined as knowledge acquisition through the observation of behaviors of individuals or forms of media (Bandura, 1977; Schunk, 2004). In the context of training, "[p]reliminary research seems to indicate that vicarious learning has significant advantages over more traditional methods" (Manz and Sims, 1981, p. 112). Schunk (2004) also indicated that vicarious learning may be a more efficient method of learning because the individual is not required to perform all of the behaviors to learn a task.

Boyd et al. (2004) found that "it is feasible to provide agricultural students with a realistic international experience using an asynchronous simulation" (p. 67); the students were able to learn international agricultural concepts, such as small-farmer decision consequences, via media observations. The advantages of vicarious learning as it relates to international experience also include the convenience of not having to travel and also the potential for substantial cost savings – addressing the limitations shared by previous researchers regarding barriers to student participation in study abroad opportunities. These advantages extend to safety issues and an expanded reach as we consider international experiences for students.

Creating methods to address the need for global awareness is important. Agricultural educators have continuously sought new and better ways to provide

education for students in ways that can have a positive impact. Use of the Internet in the broad sense (Molnar and Fields, 2004), the use of audio/video technology (Miller and Honeyman, 1993; Siciliano et al., 2011), online lessons (Mamo et al., 2004) and online course platforms and technologies (Murphrey et al., 2012; Strong et al., 2012) are just a few examples of ways that agricultural instructors have sought to improve instruction in the classroom. In fact, Boyd et al. (2004) reported that an online international simulation was found to increase undergraduate student understanding of international development. Creative ways to expose students to international settings are needed and these methods should be tested for impact on altering student attitudes because attitude ultimately begets action.

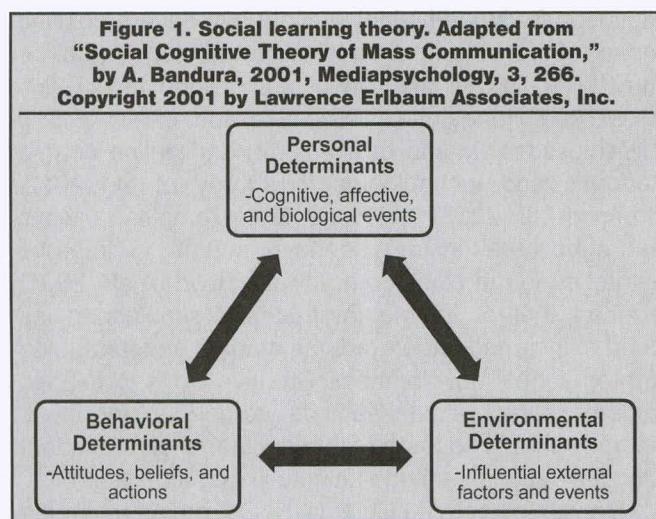
Reusable Learning Objects (RLOs) are an emerging method for both online and classroom application that could meet this need. The use of the term "learning object" (Farha, 2009; Hodgins, 2004; IEEE, 2002) can be seen in publications that relate to the use of educational technology, while the concept of "reusability" has been addressed in the context of distance learning (Sicilia and Garcia, 2003) and digital information (Polsani, 2003). "RLOs are units of content and educational structure divided into reusable objects and modules" (Tate and Hoshek, 2009, p. 51). Reusable Learning Objects are further described as "digital, self-contained, reusable entit[ies] with a clear learning aim that contains at least three internal changing components: content, instructional activities and context elements" (Laverde et al., 2007, p. 675). Reusable Learning Objects created by faculty who have visited a foreign country have the potential to provide students an in-classroom experience that would otherwise require international travel to obtain. In addition, RLOs can allow an expanded reach of faculty beyond the faculty who had the opportunity to travel abroad. The creation of RLOs by faculty has been implemented as a means of enhancing classroom experiences in relation to international experience. However, it was not known whether or not this method was an effective tool in altering student attitudes and opinions about the international location.

Theoretical Framework

The theoretical framework of this study was based on Bandura's (1977) social learning theory. Social learning theory was originally developed as a behavioral modeling theory but has evolved to also include attitudes and emotional reactions and is now a model that describes observation, imitation and modeling as a means of learning (see Figure 1); it is also known as social cognitive learning (Bandura, 1977). The social learning theory indicates that the combination of personal, behavioral and environmental determinates leads to learning.

Bandura (1977) described personal determinates as events in an individual's life that have molded their thinking, feeling and physical traits. These

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characteristics are indicated to be innate, or internal, to an individual. Behavioral determinants represent the patterns of an individual's actions, attitudes and beliefs (Bandura, 1977). These determinants are a combination of the values, ethics and morals that an individual holds and the outward expression of these factors. Environmental determinants are a compilation of external factors that influence the holistic individual (Bandura, 1977).

Study Context

Providing students with an opportunity to gain an understanding of global issues and international settings is critical. The researchers believe that achieving this goal could be accomplished through the use of RLOs to create opportunities for vicarious learning which could, in turn, impact attitudes and opinions regarding international settings. Each faculty member that participated in the Trinidad and Tobago Faculty Abroad experience with the Department of Agricultural Leadership, Education and Communications at Texas A&M University in 2011 created a reusable learning object (RLO) that addressed a topic in their field of expertise in relation to the culture of Trinidad and Tobago. Each RLO was a digital file that included a learning objective, a lesson and an assessment. The lesson content and presentation was unique to each RLO; some used video recorded interviews, others used photographs, etc. The RLOs may be accessed at www.globaleducationlab.org. In this study, students experienced one of the created RLOs as a cognitive event in an effort to change their attitudes toward the culture of Trinidad and Tobago. Due to the reciprocal causation nature of Bandura's (1977) social learning theory, if there is an impact on students' attitudes, there will also be an effect on their affective characteristics, beliefs and attitudes and their willingness to experience other environmental experiences, such as a study abroad or international travel.

Purpose and Objectives

The purpose of this study was to measure the impact of reusable learning objects (RLOs) that were

created related to the culture of Trinidad and Tobago on undergraduate agricultural students' attitudes about the country. It is important to note the individual RLOs and their content were not being assessed, rather the impact of the RLOs on student attitudes of an international location. The following objectives guided the study: (1) create a Thurstone scale to measure student attitude change based on exposure to RLOs focused on the culture of Trinidad and Tobago, (2) identify students' attitudes of the culture of Trinidad and Tobago before and after the use of an RLO during class and (3) compare pre and post student attitudes and identify changes. Institutional Review Board approval was received for this study.

Methods

Instrument Development

Objective one of the study was to create a Thurstone scale to measure student attitude change regarding the culture of Trinidad and Tobago. The Thurstone scale is designed to measure a participant's "attitude as expressed by the acceptance or rejection of opinions" (Thurstone, 1928, p. 533). Thurstone (1928) also noted that a participant's attitude may change "*due to unknown causes or to the presence of some known persuasive factor such as the reading of a discourse on the issue in question*" (p. 533). For this study, the persuasive factor was the RLO. In accordance with Trochim and Donnelly (2007), the researchers developed a Thurstone scale by: developing the focus, generating potential scale items, rating the scale items, computing scale score values for each item, selecting the final scale items and administering the scale. Ultimately, a Thurstone scale results in a single score from multiple items that represents participants' attitude toward a given topic; it is a single summated score.

An instrument should be developed with a well-defined focus for the scale and the description of the focus and what the researcher is measuring should be clear for the respondents (Trochim and Donnelly, 2007). The researchers in this study defined the focus for the scale by creating the following focus command for participants to respond to: Generate statements that describe specific attitudes that people might have about the culture of Trinidad and Tobago. The students were not given additional information about the country; the goal of this prompt was to gain general statements about the culture of Trinidad and Tobago from the perspective of individuals who had similar experiences and education with the topic.

The researchers generated potential scale items by obtaining a large set of statements (Trochim and Donnelly, 2007). Two classes of approximately 60 students each were given note cards, asked to write one statement per note card and to generate as many statements as possible in response to the focus command. These students were not members of the population who engaged in the RLOs; they were used to

obtain general statements about the culture of Trinidad and Tobago as representatives of the larger student peer group. A total of 320 statements were generated. The researchers sorted the cards into themes so that representative statements could be easily chosen; 17 themes were identified and a total of 32 representative statements were selected.

To rate the scale items, the 32 statements were placed on an instrument with an 11-point scale, with one being least favorable to the concept and 11 being most favorable to the concept (Trochim and Donnelly, 2007). The same two classes of students were asked to indicate how favorable, on a scale of 1-11, each statement was about the culture of Trinidad and Tobago (i.e., "Trinidad and Tobago has beautiful beaches." is a favorable statement and "Trinidad and Tobago is a dangerous place." is not a favorable statement).

The scale score values for each item were computed using SPSS to determine the median and the interquartile range. Two statements were initially chosen from each of the 11 median values. The two statements within each median value were chosen because they had the smallest interquartile range values and, therefore, the least amount of variability across the responses (Trochim and Donnelly, 2007).

Each statement was then assessed by the researchers to ensure clarity and one from each median value was chosen to represent the final scale (Trochim and Donnelly, 2007). The median value (1-11) became the scale value for the corresponding statement. A final, pre and post instrument was created with the 11 statements; the response options were agree and disagree for each statement. Agree was assigned the scale score (i.e., 1-11), disagree was assigned a value of zero (Trochim and Donnelly, 2007). The same 11 statements were included on both the pre and post assessments; Table 1 shows these items and their corresponding scale score.

Study Population and Instrument Administration

The population of the study consisted of four classes containing a total of 103 students. The students were enrolled in a course in a College of Agriculture that was under the instruction of a faculty member who created an RLO related to their specific content area and culture

in Trinidad and Tobago. Each RLO contained a learning objective, media-rich content and a learning assessment. The students engaged in the RLO components that were created by their instructor. Data were collected during the 2012 Spring and Summer semesters. Prior to RLO use, students were asked to complete the pre-assessment. The faculty members conducted class using the components of their RLO and then the students were asked to complete the post-assessment. There were 100 usable instruments collected; three were not included because they were not fully completed.

The instruments were scored by the researchers. To calculate a student's total scale score, the researchers averaged the scale scores of the items that the student agreed with; responses of "disagree," a zero value, were not calculated into the average (Trochim and Donnelly, 2007). This process determined the student's location on the scale; the same was done for the post responses. If a student's response location on the scale increased in value from the pre to the post assessment, their attitude toward the culture of Trinidad and Tobago was considered to have moved in a favorable direction. If a student's response location on the scale decreased in value from the pre to the post assessment, their attitude toward the culture of Trinidad and Tobago was considered to have moved in an unfavorable direction (Trochim and Donnelly, 2007). This study was deemed exempt by the Texas A&M University Institutional Review Board.

Findings

Objective two of the study was to identify students' attitudes of the culture of Trinidad and Tobago before and after an RLO presentation. Descriptive statistics of both the pre and post data were calculated to determine the response frequencies for each survey item. Table 1 shows the statement, the corresponding scale score (favorability rating) and the frequencies of response for both Agree and Disagree on the pre-test and the post-test. The mean scores of the population's attitude toward the culture of Trinidad and Tobago for both the pre-test and post-test data sets (see Table 2) were calculated by multiplying the number of Agree responses by the favorability score for each statement. The resulting numbers were averaged by adding them together and

Table 1. Pre and Post-test Response Frequency for Each of the Eleven Statements (N=100)

Statement	Favorability Score	f		f	
		Pre-test	Post-test	Agree	Disagree
Trinidad and Tobago is a dangerous place.	2	41	59	12	88
Trinidad and Tobago is considered a low income country.	2	83	17	68	32
Hurricanes cause a lot of damage in Trinidad and Tobago.	3	72	28	54	46
The people of Trinidad and Tobago do not speak English.	4	22	78	19	81
The country of Trinidad and Tobago is densely populated.	5	52	48	43	57
The people of Trinidad and Tobago live in small communities.	6	85	15	85	15
The people of Trinidad and Tobago eat a lot of seafood.	7	79	21	83	17
The people of Trinidad and Tobago are skilled in producing crafts.	8	95	5	84	16
The culture of Trinidad and Tobago is friendly.	9	93	7	99	1
Trinidad and Tobago has unique celebrations that attract tourists.	9	87	13	85	15
Trinidad and Tobago has beautiful beaches.	10	92	8	97	3

Note: Items are listed in ascending order of favorableness.

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Table 2. Means With Standard Deviations of Students' Attitudes Toward Trinidad and Tobago Pre and Post Reusable Learning Object Presentation (N=100)

Assessment	M	SD
Pre-test	6.46	0.63
Post-test	6.97	0.69

Note: The Mean (*M*) was calculated by multiplying the number of Agree responses by the favorability score for each statement and then the resulting numbers were averaged by adding them together and dividing by the total Agree frequency count.
Scale: 1=least favorable, 11=most favorable

dividing by the total Agree frequency count. The overall pre ($M=6.49$, $SD=0.63$) and post ($M=6.97$, $SD=0.69$) RLO attitudes of the students toward the culture of Trinidad and Tobago were identified.

Objective three of the study was to compare student attitudes toward the culture of the international setting based on the pre and post assessments and identify any changes that may have resulted. The attitudes of the population, in relation to the scale scores (1=least favorable, 11=most favorable), were found to be positive in both assessments. The means were entered into a paired samples t-test to compare the difference between the mean of the students' attitudes toward the culture of Trinidad and Tobago before engagement in the RLO process ($M=6.49$, $SD=0.63$) and after the RLO process ($M=6.97$, $SD=0.69$); the difference was found to be significant ($t=5.27$, $df=99$, $p<0.01$).

Conclusions and Discussion

Objective one was a methodological objective. The objective was achieved through the creation of an instrument following guidelines articulated by Trochim and Donnelly (2007). It was concluded that the creation of the instrument using the Thurstone scale was an effective method of measuring change in attitude.

Objective two identified students' attitudes of the culture of Trinidad and Tobago before and after an RLO was used to present content and assess learning in a classroom. Based on findings, it was concluded that students' attitudes toward the culture of Trinidad and Tobago were changed as a result of being exposed to the contents of the RLO. It was further concluded that after viewing the media-rich content and completing the assessment of the RLO, many students chose to agree with more positive statements and disagree with more negative statements on the post assessment (see Table 1). These findings are consistent with social learning theory (Bandura, 1977) in that the students personal determinates had an effect on their behavioral determinates (see Figure 1).

Objective three measured the change in students' pre-assessment to post-assessment attitudes of the culture of Trinidad and Tobago. Given the finding that students' attitude score was significantly different between the pretest and the posttest, it was concluded that the RLO impacted students' attitudes. Because the mean moved in a positive direction on the Thurstone scale (see Table 2), the students' attitudes toward the culture of Trinidad and Tobago were found to have

become more favorable after viewing the contents of the RLO. In accordance with the social learning theory (Bandura, 1977), students in this study were exposed to a cognitive event in a learning environment and were able to learn vicariously. Similar to the findings of Boyd et al. (2004) that indicated asynchronous simulation as a viable means of providing agricultural students an international experience, agricultural students in this study learned cultural lessons through the use of reusable learning objects and, as a result, changed their attitudes toward the culture of Trinidad and Tobago.

This study provided evidence that RLOs have the potential to impact change in student attitude toward international settings. It is recognized that limitations to the study do exist. As with any educational activity, characteristics of the RLO such as length, media use, content and structure along with the way the RLO is developed and delivered can directly impact the results of that activity. However, this study provides a first-step in documenting impact. Documentation of impact is critical in order to garner support to further the development and promotion of RLO use. Additional study is required to document best practices and also factors that determine success and impact. Further research is also needed to determine if the use of RLOs is more or less effective than other teaching methods within college of agriculture classrooms.

Implications and Recommendations

Technology continues to provide opportunities to enable faculty to impact students with new and creative methods. The conclusion that the use of RLOs in the classroom significantly impacted students' attitudes implies that the use of RLOs in the classroom has potential in regard to influencing students' attitudes toward international settings. This impact could, in turn, influence a student's decision to participate in activities such as study abroad programs. This impact is in accordance with Bandura's (1977) social learning theory in that the altering of attitudes can lead to changes in environmental determinates; students may become more comfortable with the idea of participating in study abroad programs, international internships, international field trips and societal participation, as a whole. The documentation of the significant impact of RLO use in the classroom implies that resources spent on the development of these RLOs would be well spent, especially given that the process can enable one faculty member to reach many students. The implications for broader reach are notable as the reusable nature of the learning objects allow for open-access to the materials by educators at all levels if appropriate. In this case, it allows for access to content specific, culturally rich information about agricultural topics.

The intent of this study was not to identify ways to replace international activities such as study abroad, international internships, or international field trips, but rather to identify a means to engage

students and encourage these students to participate in additional activities through the altering of attitudes toward international settings. As shared earlier, only a small percentage of students actually participate in international activities that require travel outside of the United States.

Based on the findings and conclusions of this study, it is recommended that faculty members use vicarious learning methods, as described by Bandura (1977) and Schunk (2004), to incorporate context-specific, international concepts into their curriculum. The nature of vicarious learning suggests that learners may not experience many of the usual steps and nuances that a learner may experience while learning in a traditional method (Schunk, 2004). Considering this, it is imperative that the creators of vicarious learning materials take extra care in accurately representing content and context in their RLOs.

Further study is recommended to document the value and impact of RLO use in regard to their effect on attitude toward international settings. In fact, it is recommended that follow-up studies be conducted with students who participated in the original study to see if these students have a higher likelihood of deciding to participate in an international activity that requires travel outside the United States. In addition, further study could determine if the impact of the RLO is diminished if a faculty member other than the one who created it actually administers it in the classroom. If it can be documented that the impact of RLO use maintains significance regardless of who administers the RLO, the potential for impact is great and the potential for expanded reach is notable.

Perceptions hold the key to reality in regard to student interest and engagement in international program participation. Scholars have noted the importance of engaging undergraduate students in international issues and thus, creating "thoughtful professionals and better informed citizens" (Walter and Reisner, 1992, p. 20). This study documented one method of working toward that goal.

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