A Brain–Based, Experiential Learning Framework to Guide International Experiences

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Abstract
The purpose of this article is to create a theoretically–based experiential framework for international experiences based on cognitive science. Such a framework will help agricultural and extension educators facilitate learning activities before, during, and after an international experience that have positive cognitive and affective impacts on students. The framework was developed through content analysis and synthesis of learning theory and cognitive science literature. It was concluded that cognitive science and contemporary learning theory provide a solid framework to help agricultural and extension educators facilitate learning before, during, and after an international experience. A model was developed to guide educators through his process. Before an experience, it was concluded that educators should focus on prereflection. The authors also concluded that during an experience educators should implement activities for learner reflection. Finally, it was concluded that after an international experience educators should also facilitate reflection activities.

Keywords: cognitive science; experiential learning; international experiences; reflection;
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 (Brooks, Frick, & Bruening, 2006). A recent examination of international activities at United States universities (Green, Luu, & Burris, 2008) revealed two key findings: (a) “The majority of students and faculty expressed support for international activities, but failed to participate in these activities” (p. viii) and (b) “While the number of participants had increased, only a small portion of undergraduates participated in academic programs abroad and many of those that did had short–term experiences” (p. viii).

Numerous researchers in agricultural and extension education have provided pragmatic insight into creating meaningful learning experiences, largely based on personal experiences of the faculty and students (Brooks et al., 2006; Irani, Place, & Friedel, 2006; McGowan, 2007; Tritz & Martin, 1997; Wingenbach, Chmielewski, Smith, Piña, & Hamilton, 2006). Although helpful, such inquiries may not fully integrate our emerging knowledge of how the brain works.

Knowledge of how people learn, based on advances in an understanding of how the brain works, has grown exponentially over the last few decades (Branford, Brown, and Cocking, 2000; Zull, 2002). Learning can now be understood from psychological, biological, and physiological perspectives, providing insight into the development of impactful learning experiences. Applying this knowledge has been called brain-based learning (Caine & Caine, 1994). The extent to which international agricultural and extension educators understand and apply brain-based learning principles is unknown.

Purpose and Methods

The purpose of this article is to create a theoretically–based experiential framework for international experiences based on cognitive science. Such a framework will help agricultural and extension educators facilitate learning activities before, during, and after an international experience that have positive cognitive and affective impacts on students. The framework was developed through content analysis and synthesis of learning theory and cognitive science literature.

Philosophical Themes

Before an Experience

The period of time before an international experience could appropriately be called preflection (Jones & Bjelland, 2004). This time period is best used as a time for preparing students for learning. The importance of preparing learners for learning has been supported by learning theory for a considerable amount of time (Newcomb, McCracken, Warmbod, & Whittington, 2003). Preparation for learning is also important from a brain physiology standpoint. Learning occurs as the brain process information received through the five senses and integrates the new knowledge into existing synaptic networks (Bransford et al., 2000; Zull, 2002). By their very nature, international experiences are sensory rich. By preparing learners in advance, they can be better prepared to interpret the plethora of data and focus on aspects most important for their learning. Additionally, preparing learners in advance can begin to build synaptic networks that can provide the framework for learning throughout the experience.
An important consideration at this time is the emotional state of the learner. Cognitive science has revealed the crucial role that emotions play in learning (Zull, 2002). Accordingly, educators should make sure students have sufficient details about the experience and its potential application to reduce anxiety and stress while at the same time increasing excitement and focus. An international experience can elicit positive and negative emotions in learners, particularly if learners perceive potential danger (Wingenbach et al., 2006). These strong emotions, particularly worries about safety, should not be ignored. Advances in the understanding of brain processing have revealed that perceptions of threat can inhibit learning, as the brain shifts to a fight or flight focus (Caine & Caine, 1994; Zull, 2002). Concuringly, learning theory, in the form of Maslow’s hierarchy of needs (Maslow, 1943) has long supported that people will focus on survival until that need is satisfied.

Another important factor to consider before an experience is the learner’s existing knowledge. Experiential learning theory and cognitive science recognize that all new knowledge builds off of exiting knowledge (Bransford et al., 2000; Dewey, 1938; Kolb, 1984; Zull, 2002). Therefore, educators should conduct activities to learn about a student’s previous experiences and existing stereotypes. Then, educators and learners can jointly develop goals for the experience that build from previous knowledge and appropriately stretch the learner (Vygotsky, 1978). Successful preflection will allow learners to cognitively and affectively rehearse an experience and thus enhance their potential for learning from the experience.

**During an Experience**

Experiential learning theory contends that learning occurs by transform experience through reflection (Dewey, 1938; Kolb, 1984; Roberts, 2006). A key feature of these theories is that learning is a cyclical process by where new experiences build from previous experiences. Roberts (2006) proposed the model in Figure 1 to show the experiential learning process. Cognitive science also recognizes that learning is a continuous process of forming new synapses and then building and breaking synaptic connections between existing neurons (Bransford et al., 2000; Zull, 2002).

![Figure 1. A model of the experiential learning process (Roberts, 2006).](image-url)
The importance of reflecting on experiences (Kolb, 1984; Roberts, 2006) is widely accepted. However, with an overabundance of culturally and cognitively complex situations that occur in an international experience, learners (especially novices) may need guided reflection. Goldstone and Wilensky (2008) purported that learners can make sense of complex systems through guided interpretation of elements of the phenomena. However, Meade, Nokes, and Morrow (2009) discovered that experts found collaborative debriefing beneficial, while novices found it distracting. Accordingly, educators should provide multiple opportunities for individual and group reflection with sufficient guidance to allow learners to reflect on aspects of the experience that are relevant to the goals they established during prelection.

The time during an international experience is characterized by a plethora of rich experiences. In such a stimulating learning environment, it is important to recognize that the brain consciously and unconsciously processes copious amounts of information received through the senses (Zull, 2002). However, Cognitive Load theory (Sweller, 1988) cautions that too much information can actually overload working memory and thus impede learning. Fortunately, educators can help facilitate learning in these situations. In addition to preparing learners before an experience, educators can help learners focus on key aspects of the experience that are most relevant to achieving learning objectives.

Depending on the structure of an international experience, learners may be given greater responsibility for their learning, allowing learners to construct their own meaning from the experience. However, as self-regulated learning theory (Schunk & Zimmerman, 1994; 1998) suggests, taking responsibility for one’s own learning is a skill that must be developed. Cognitive theory supports that humans are naturally driven to learn, but that novice learners differ from expert learners in the way that they learn (Caine & Caine, 1994; Bransford et al., 2000; Zull, 2002).

An additional strategy to enhance learning during an international experience is to facilitate inductive activities that require learners to use inquiry and problem-solving skills. Such an approach is consistent with the brain’s natural search for patterns and schema development (Caine & Caine, 1994; Bransford et al., 2000; Gureckis & Goldstone, 2008; Zull, 2002). This strategy will also foster learner responsibility for acquisition and application of knowledge, which is consistent with Self–Regulated Learning (Schunk & Zimmerman, 1994).

After an Experience

Learning should continue after an international experience by giving learners further opportunities for reflection (Kolb, 1984; Roberts, 2006) that connect back to the goals established during prelection. Cognitive science has discovered that reflecting on an experience is in fact itself a vicarious experience (Zull, 2002). Thus reflecting about an international experience can prolong the learning by focusing the learner’s attention on the experience for a greater amount of time.

Anecdotal evidence would suggest that agricultural and extension educators have widely embraced the importance of reflection after an experience. However, educators can further enhance learning by guiding learners to generalize (Kolb, 1984; Roberts, 2006) their new knowledge by reflecting on the applications and implications of their newfound knowledge. An intense learning activity, like an international experience, can serve as a motivating factor for further learning (Pintrich & Schunk, 1996).
Conclusions

It was concluded that cognitive science and contemporary learning theory provide a solid framework to help agricultural and extension educators facilitate learning before, during, and after an international experience. A model was developed to guide educators through his process (Figure 2).

Before an experience, it was concluded that educators should focus on preflection (Jones & Bjelland, 2004). Educators should facilitate activities that focus on preparing learners for the experience. These activities should take into account the emotional state of the learner and focus on establishing a safe and non-threatening expectation. Educators should also take time to assess the learners’ preexisting knowledge and plan to connect the new experiences with that knowledge. Finally, educators and learners should work together to establish goals for the experience.

The authors also concluded that during an experience educators should implement activities for learner reflection. Further, with novice and inexperienced learners this reflection will need to be more guided, whereas experienced learners with some expertise may not require guidance. However, even for experienced learners, an international experience is sensory-rich, which may lead to cognitive overload. Educators should remember that learning is a process and will be on-going throughout the experience. Additionally, inductive and problem-solving activities may be used to enhance learning. Where possible, educators should seek to foster self-regulated learners.

Finally, it was concluded that after an international experience educators should also facilitate reflection activities. These post-experience activities should be tied back to the preflective activities, including an assessment of progress to the shared goals. Finally, an international experience can serve as a motivation for continued learning, so educators should help learners identify strategies for advancing their knowledge.
Figure 2. A model for facilitating an international experience.

Recommendations and Implications

It is recommended that educators utilize this framework while facilitating international experiences, paying close attention to the suggestions for activities before, during, and after an experience. Implementing this framework should enhance learning and thus make graduates better prepared for a global society. To determine the efficacy of the model, data should be collected from educators and students from a variety of international experiences. The model should be periodically evaluated using this data and modified if needed. Additionally, as knowledge of brain functioning continues to advance, this model should be reevaluated to determine if it is consistent with the latest findings.
References