

## TEACHING HANDS-ON ALGEBRA

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The purpose of my project was to develop algebra lesson plans, provide education manipulatives, and provide basic algebra instruction to professionals teaching grades four through nine in Cambodia. As well as providing a service to these teachers, I hoped to discover more about education in an underdeveloped region of the world, better understand the special needs of my own students, and learn how to differentiate instructional methods based on the needs of the learners and the availability of resources.

### REVIEW OF THE LITERATURE

There are many countries where the educational system struggles against enormous odds. As reported by the CIA World Factbook, the world's literacy rate lingers around 82%; however, there are also 785 million illiterate adults in the world. In Cambodia alone, there are 10,636,887 (or 1.3%) of these 785 million illiterate people.

The Cambodian education system struggles, in part, because most teachers were exterminated during the genocidal reign of the Khmer Rouge led by Pol Pot only thirty years ago. Yet education is critical to the development of the nation. Hean Sokom (2004) states, "In spite of cultural, political, structural and economic factors hindering educational development in Cambodia, everyone recognizes that education has a key role in the development process" (p. 137). Cambodians realize the need for education and have been unrelenting in their fight to maintain an educational system. Sokom points out, "Schools reopened 9 months after the Khmer Rouge government ended. This quick response to set up an entire national education program shows the strong commitment that the Cambodian people have to educating their children" (2004, p. 141). Nonetheless, the Cambodian educational system is still termed a "crisis" to some (Ayres, 2000).

During the reign of the Khmer Rouge during the 1970s, two million Cambodian individuals were killed. David Ayres emphasized, "If thinking about Cambodia evokes a sense of 'tragedy', then thinking about Cambodian education evokes a sense of 'crisis'" (Ayres, 2000, p. 441). However, Cambodian educators appear to be willing to do what it takes to improve the education system. The 2008 McMaster Cambodian Learning Community has found that training teachers is the most direct way to help improve the education system in the country.

Teaching low-literate adults is challenging. Donita Massengill (2004) suggests that it is best to guide adult students through their learning process by supplementing them with visual representations. My project to teach basic algebra to teachers would have to incorporate clear visual aids. My challenge was to figure out how to teach abstract concepts through a concrete method. One of the easiest methods for students of any age to learn mathematics is to make the language understandable for them (Tanner and Hale, 2007). Math can be easily misunderstood because the vocabulary can be difficult to understand. I decided that approaching these lessons by providing a hands-on learning environment, interactive learning situations, and guidance through the learning process would be the most effective instructional methods.

I developed twenty simple lesson plans that included both pre-algebra and algebra concepts. With each lesson I prepared both guided practice and instructional practice problems along with the answers and calculations for each problem. The interactive activities that I selected ranged from fraction-estimation circles to probability, graphing and properties with buttons to Hands-On Equation Sets.

### **PROJECT AND RESULTS**

After traveling by boat for forty-five minutes to the rural area where I was scheduled to teach, I began my instruction with introductions. I then asked



the assembled Cambodian teachers and administrators to form five small groups. I then introduced a graphing activity that followed a specific lesson in my translation set and then followed with the section on algebra. Each group was assisted by a Defiance College student, but it was my job to make the abstract ideas concrete so my students would better understand. One sign of success occurred when, at the end of my session, four men volunteered to show the rest how the system worked.

The primary result of my project was that approximately thirty Cambodian teachers and administrators have a better understanding of basic algebraic concepts than they previously had. The teachers and administrators appeared interested in my workshop and were willing to share their thoughts about the learning experience.

### REFLECTION

While in Cambodia I learned that life is not always what one plans and not everything happens as scheduled or as hoped. I also learned that one cannot be concerned with minor details. I learned much about myself, a great deal about another culture and country.

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