

1. **Cultural mismatch: the Pacific's search for a useful mathematics pedagogy**
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6. **Abstract:**

Cultural practices in countries of the Pacific are communal and cooperative rather than competitive. Pedagogy, on the other hand, often tends to model historic western educational training with a focus on individual strengths and practices. This research in progress seeks to identify areas of cultural mismatch in teaching practices and identify potential foci for teacher education programs which prepare teachers from and for the Pacific.

## **Cultural mismatch: the Pacific's search for a useful mathematics pedagogy**

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### **Problem**

The remnants of colonization in the Pacific include still, methods based upon western models previously taught and practiced principally by England and its commonwealth partners. For instance, under the framework of the commonwealth, and more recently as inter-government aid programs to independent nations, teachers were taught to practice western pedagogy in the classrooms of the Pacific. As the winds of independence now blow stronger across the Pacific however, leaders call for a greater distancing of their indigenous pedagogy from the imposed practices because of a cultural mismatch (Bastolander, 1992; Fujita, 2001). Education, in particular, is one system where the “old way” is often still “the way”, and though, even in the colonizing countries, education has moved on to new and more effective approaches, the Pacific, through lack of contact and limited resources, still practices the pedagogy of the past, including a strong focus on rote learning and lecture.

In America, the National Council of Teachers of Mathematics (NCTM) has recently developed standards for the teaching of mathematics which have broken away from the traditional approaches used in the past (NCTM, 2000). New emphases on student talk, concrete learning tools, and student participation using constructivist methods seek to move the mathematical experience of students into a practical realm where mathematics makes everyday common sense. Recognizing deficiencies in problems regarding suitability of the past education pedagogy, searches for better multicultural methods are now underpinned by the motto “no child left behind”. The “once were” colonies also now need to discover for themselves an appropriate and matching pedagogy which complements their cultural practices in their mission to educate their children effectively.

Multicultural education, a recent phenomenon in the western world, seeks to find answers to differences in achievement in schools between students of different cultures. Generally, ideas presented suggest that there is a mismatch between pedagogy and culture, i.e., that a change in teacher attitude and pedagogy will make a difference in achievement.

Improving student achievement by making pedagogical changes based on the cultural backgrounds of students (Zeigahn, 2001) has been suggested by educators for Afro-americans (Hollins, 1982; Hilliard, 1997; Malloy & Malloy, 1998), Alaskan natives and American Indians (Grubis, 1982; Hanks, 1996; Jacobs & Reyhner, 2002; More, 1993; Pewewardy, 1998; Swisher & Deyhle, 1987; Yamauchi & Tharp, 1995), Hawaiians (Kawakami & Aton, 2001), Asians (Chiang, 2000; Stapleton, 2000), and Mexican-americans (Losey, 1995). More specifically, the issue can be most clearly stated - what are effective teaching practices in one cultural context may not be necessarily effective in another (Portes, Cuentas, & Zady, 2000).

Sleeter (1997) reviews effectively the development of the multicultural education thought and connects it to the teaching of mathematics in four themes which are relevant to the Pacific, namely:

- a. using students cultural background as a teaching resource,
- b. setting higher student expectations than existed in the past in the culture,
- c. creating an international mathematics perspective and practice, and
- fourthly,
- d. connecting mathematics to the social issues in the student's lives.

Perhaps it is conceivable that well-defined principles for effective teaching may generalize across diverse cultural groups. The following three researchers propose some practices upon which these principles could be defined. Weist (2001) recommends multicultural changes for mathematics instruction including portraying cultural groups in the instructional materials of a mathematics course, considering the formal and informal mathematics of several cultures, teaching math history as it has developed across many cultures, and studying current social events and phenomena using the tools of mathematics. These ideas are based in the philosophy of constructivism, where student's construct meaning by their own involvement in learning.

Hanks (1996) agrees that constructivist-based teacher practices will complement the cultural context from which a student comes. Such

practices include the teacher becoming the facilitator, the establishment of a clear priority on learner-developed understanding, the incorporating of a problem-based instruction method where problems are based in the student's culture and lived experiences, the implementation of cooperative learning strategies, and the curriculum "cover-rate" being based on the students learning rate, rather than the district demands or the number of pages in the text.

Each of these previous authors includes excellent practices which all teachers should consider. Bailey (2002) feels strongly that a consideration of the development of a humane learning society in the classroom (Gibbs, 2002), variety in teaching strategies based on the ideas of multiple intelligences (Gardner, 1983), and student team cooperative learning (Kagan & Kagan, 1998) are three unifying principles or themes under which many practices can be created. Each principle recognizes the humanity of the education experience and builds on it in different dimensions, ie, the class, the teacher, the students. Certainly some suggestions from this literature ought to be of value in the Pacific's search for a useful pedagogy. While multicultural innovations will be useful in moving towards meeting the Pacific need for a matching pedagogy, by themselves these innovations will not replace the need for culturally responsive pedagogical content practices in mathematics that truly fit the students in these island nations.

## **Method**

In this study, the authors focused on six teachers in four Pacific island countries, Tonga, Samoa, Fiji and Kiribati, who kindly agreed to be observed, having been recommended by their building principals as examples of successful teachers. Observations were made comparing their teaching methods to the norms of the culture and the standards of NCTM in discourse and pedagogy. Each of these countries is a past colony of the British Commonwealth, and their teachers were/are generally trained either in New Zealand or Australia or by professors from those countries where the British teaching tradition of lecture and Socratic discussion method is still strong. Much univocal discourse, or concept introduction, and some dialogic discourse, concept discovery talk (Lotman, 1998) were evidenced in the classrooms, but between the teacher and student only. Interactive student discourse was rarely fostered as a teaching method, and manipulatives to aid in the discourse were similarly scarce. While classroom management was not a real concern, depth of multicultural teacher pedagogy was.

These observations were somewhat in contrast to the cultural practices of these Pacific peoples, who are community focused, community discourse oriented, and survival based. What we saw in these classrooms was more individualistic than communal, with little evidence of a sense of classroom community. The setting could have been some other country rather than the local context, and there is the potential for “number numbness” from sterile abstract symbolic manipulation rather than real-life authentic math connectedness appeared ever-present. The emphasis on procedures and correct answers encouraged little student exploration of concepts and discussion of mathematical ideas. Opportunities for making connections to the real lives of the students in these classrooms appeared not to be a consideration in the planning and implementation of the lessons observed.

### **Conclusions**

Conclusions for education in the Pacific, and particularly mathematics education, from the observation of the six teachers across four ex-commonwealth countries, must include having a closer look at the programs of teacher education in the Pacific. While *teacher inservicing* for currently practicing teachers can be done (Bailey, Mitchell & Winstead, 2002), the resources to carry out such a program are scarce. Alternatively, the planners for *preservice education* programs might consider the work done in the United States which has focused on these issues of cultural mismatch. Indeed, the need for the horizons of preservice teacher attitudes toward cultural diversity to be expanded has been clearly established (Cockrell, Placier, Cockrell, & Middleton, 1999; Shultz, Neyhart & Reck, 1996; Smith, Moallem, & Sherrill, 1997). As a response, researchers (Cadray & McAllister, 1998; Carpenter, 2000; Morales, 2000; Taylor, 2001; Ukpokodu, 2002) report the beneficial effects of a required course dedicated to the study of cultural diversity. On a broader scale, the states of Alaska (Guidelines, 1999) and California (Torrez, 1999) have responded by incorporating guidelines and programs to increase teacher cultural responsiveness. Efforts to help preservice and inservice teachers become knowledgeable of cultural diversity, although essential, are not likely to be sufficient to meet the needs of the Pacific in mathematics education. The *Principles and Standards for School Mathematics* (NCTM, 2000) may well serve as a foundational document to guide Pacific educators toward an appropriate content pedagogy. Perhaps the governments of Pacific island nations may prescribe for their education systems, as do states in the US, teacher certification requirements unique to their needs. Similarly, teacher education program

planners may design a customized pedagogy for their preservice candidates which parallels the cultural context in which they live. Because of the scarcity of research in this area, this would indeed be an exciting work to be involved in – a Pacific pedagogy which is a perfect match!

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