

# Constructivist Teaching and Traditional Cultures

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In an earlier paper (Muke, 1998) I described how a community's cultural values can be different from those in the school, and how curriculum reform may help schools overcome their tendency to undermine values considered important in traditional societies. One suggested reform in mathematics education is a change from transmission teaching to constructivist teaching. My experience suggests that this is not a straightforward process. In this paper I wish to examine the chances of being, or becoming, a constructivist teacher when working with students from a traditional culture such as that of the Highlands of Papua New Guinea, or of the Maori or Pacific Island communities in New Zealand.

## A Constructivist Approach

Constructivist learning theory is summarised in Biddulph and Carr (in this volume). It recognises that learners actively construct their own ideas rather than simply absorbing or copying them from others. Acceptance of this view implies a change in the teacher's role. It is a change from the traditional view of the teacher trying to convey or transfer knowledge from his/her head into the heads of the children, to one in which the teacher acts as a facilitator of learning. As a facilitator of learning the teacher's role is to provide children with learning experiences involving, for example, collaborative mathematical problem solving in small groups, and opportunities to discuss, explain and justify their solutions (Britt, Irwin, Ellis and Ritchie, 1993). These four Auckland researchers pointed out that the document *Mathematics in the New Zealand Curriculum* (Ministry of Education,

1992) is constructivist in nature, and that the challenge is to have New Zealand teachers teach in this student-centred way.

## An Attempt to Introduce a Constructivist Approach in Papua New Guinea

While I was teaching in community schools (now called primary schools) and high-schools in different locations in the Western Highlands Province of Papua New Guinea, I believed that my mathematics teaching could be effective if I made my teaching student-centred. This is similar to a constructivist view. I knew that if children could actually participate in doing, discussing, arguing, justifying, and inventing for themselves during my lessons then they would be more likely to learn effectively. They would understand more and be creative in their thinking in solving other challenging mathematical problems. Therefore, I always prepared my lessons so that I was clearly focussing on the child as an active learner.

However, my lessons hardly ever turned out that way. I felt that I never succeeded in teaching in a constructivist manner. I would end up talking most of the time, doing almost half of the problems for the children and would always be guiding them closely to get them doing problems correctly in the time available. At the end of the lesson, I would have mixed feelings - happy that I had done the tasks that I intended for the lesson, but seriously wondering if the children had learnt anything. They tended to use the skills that I suggested, rather than the ones they understood best. It seemed that the children viewed what I, as teacher, said and



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suggested was the only right way to do mathematics problems, and did not use their own ways that may have made greater sense to them.

I was always concerned about this but I never had time to sit down and think about what could be the likely cause of this problem and identify helping measures.

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One of the reasons was that I was always too busy being involved in lesson preparation, teaching, assessment and various other affairs of my class and the school. It was not until I came to Waikato University in New Zealand in 1997 that I found time to reflect on my past teaching. During my reflection, I began to see that one of the many factors involved was the cultural background of myself and the children that redirected my teaching from child to teacher-centred. I explore this ‘cultural difference’ below because it may also apply to Maori and Pacific Island children in New Zealand.

### **A Possible Explanation for the Difficulties I Encountered**

I think that my lack of success at being a constructivist teacher in Papua New Guinean schools may be the result of four things, namely:

- a cultural view of knowledge and learning that is different from that assumed in constructivism,
- the power of existing cultural practices,
- difficulties associated with learning in a second language,
- the influence of teacher beliefs.

I discuss each of these in turn by reference to my own culture, the Whagian in the Western Highlands of Papua New Guinea. This is one of approximately 850 cultures in the country.

### **1. Cultural View of Knowledge and Learning**

The formal notion of teaching and learning introduced from the western world into Papua New Guinea sits alongside, and has never displaced, Whagian ideas about the nature of knowledge and learning.

Knowledge in Whagian culture is that required for survival in everyday life, while learning is mostly a process of observing, imitating, recalling, participating and practising in the context of home and community life.

When not at school children use these techniques to learn about gardening, house building, making fences, singing and dancing at ceremonies, attending food exchange and bride-price ceremonies, hunting, telling poems at night, visiting and praying to spirits, keeping records of generations, tribes and land ownership agreements, and some trading.

In all these there is an emphasis on memorisation because the oral tradition is still very strong. It is the means by which both valuable cultural knowledge needed for survival is preserved, and important social and spiritual traditions are kept alive.

There is also an emphasis on real contexts rather than the abstract. Needless to say, the deep experience that children have of memorisation as an integral part of learning in their culture, is not something that they leave at the door as they enter the classroom. On the contrary, they use it as a ‘natural’ learning process in everything they do.

In contrast, constructivism is largely concerned with the development of understanding. However, Knight (1997) made a strong case for mathematics education research to investigate the link between memory and cognition, something he considered was probably very close.

It may be that children’s cultural preference for memorisation as a learning method can be channelled toward developing their understanding.

### **2. Existing Practices**

Related to the point above is the powerful practice of adults such as parents, chiefs, elders and other respected tribal members being regarded as the ones with the valuable knowledge and wisdom - gained, of course, from their life experiences. Children learn that

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they have to do what adults say because the adults know what knowledge is needed for successful living. This practice promotes the notion in children’s minds that adults are always right in what they say and do. At the same time the children’s confidence in their own ideas about the world they live in is lessened. They learn not to trust their own views. In this way, parental authority becomes connected to children’s ideas about knowledge and learning. In school this translates to children hardly participating publicly in class because they fear that what they do or say might be wrong, and they do not want to be embarrassed in front of the teacher and other children. They mostly do not feel free to discuss, justify or explain their ideas.

This cultural moulding through everyday practice does not fit well with constructivism which places considerable emphasis on the development of ideas in interaction with others. In other words, constructivism requires much sharing of ideas and discussion, not passive participation.

On the other hand, Whagian children do like to work together among themselves with children they prefer to be with, for example, dramatizing adult activity in the absence of adults, so there is the possibility that constructivism could take root in mathematics classrooms through co-operative group work -

provided the teacher made him/herself fairly invisible in the classroom at first

### 3. Learning in a Second Language

English is the language that is supposed to be used in middle and upper primary classes at all times both by teacher and children. Almost all children in the class are speakers of their own Whagian language before coming to school. English is therefore a new language to be learned at school. In mathematics lessons two things happen at the same time; children try to learn and understand the language, and they try to learn and understand the mathematics. Consequently the learners have to take in the messages in English, translate them into their own language, try to understand them, and then translate from their language to English to respond and participate in the class. Constructivism's requirement that children actively participate and create mathematics is doubly difficult with such a language policy in place. As mentioned above, the children fear making mistakes and this policy means that they have two chances of making mistakes, one in giving a wrong mathematical answer and one in saying the English language wrongly. It is obviously a real challenge to get children in Papua New Guinean classrooms to discuss, explain and justify their mathematical solutions publicly in groups and in class.

### 4. Teacher Beliefs

The teachers (as well as the children) in the Western Highlands of Papua New Guinea bring the same cultural values with them to school as they hold in the villages. The traditional form of teaching that they practice fits well with these cultural attitudes and beliefs. This would be no problem if the children were succeeding in mathematics, but mostly they are not. Unlike the memorising that children do in their meaningful out-of-school life, the memorisation expected of them in school mathematics is of abstract symbols and concepts.

Constructivism may help teachers begin to see that memorisation associated with mathematics should also be meaningful.

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### Conclusion

It is clear that if Whagian children are to succeed in mathematics then changes in teaching are needed. Despite my initial lack of success, I believe that constructivism may have something to contribute in this respect. The difficulty is that existing beliefs, practices and values form a powerful web of cultural connections into which constructivism cannot easily be introduced. Constructivism requires a change from traditional teaching approaches, but to expect teachers to make a big change in their teaching in a short time is unrealistic. What is needed is indepth research that takes account of present cultural values, beliefs and practices, and tries to find a feasible way forward. Perhaps such research could begin by investigating, in an action-research way, the potential of co-operative group work to enhance the children's mathematics learning. It may also be worthwhile to identify the mathematics that exists in everyday Whagian culture as this could provide an authentic 'bridge' between the traditional and a constructivist approach. It is possible that much mathematics exists within and can be developed from familiar community contexts, and that much can be learnt, at least initially, from reflecting on meaningful hands-on experiences, as Kinavai and Biddulph (1998) suggest.

These suggestions may also be relevant for the mathematics education of Maori and Pacific Islands children in New Zealand. As Clark (1998) noted, Maori and Pacific Islands students' performance in mathematics tends to be much lower than that of their pakeha counterparts. Behaviours which she thinks may contribute to this are cultural in nature, namely a reluctance to speak in class, a hesitancy to approach teachers, and a tendency to sit near the back of the room. These behaviours demonstrate respect for authority, including not speaking unless specifically questioned. They are very similar to the way children learn to behave in the Whagian culture.



### References

- Britt, S. M., Irwin, C. K., Ellis, J. and Ritchie, G. (1993) *Teachers Raising Achievement in Mathematics. A report to the Research Division of the Ministry of Education.* Auckland: Center for Mathematics Education, Auckland College of Education.
- Clark, M. (1998) *Maori and Pacific Island Student Performance in Mathematics.* Mathematics Education Research Seminar. Ministry of Education, Wellington.
- Kinavai, E. and Biddulph, F. (1998) 'Community' mathematics. *Teachers and Curriculum, Vol.2, 59-61.* Hamilton: University of Waikato, Leaders Press.
- Knight, G. (1997) ...I do and I understand, and then I forget: The role of memory in mathematics education. In F.Biddulph and K.Carr (Eds) *People in mathematics education.* Mathematics Education Research Group of Australia Incorporated: Conference Proceedings, Volume 1, Rotorua.
- Muke, C. (1998) Curriculum and cultural values: Lessons from Papua New Guinea - mathematics. *Teachers and Curriculum, Vol.2, 29-32.* Hamilton: University of Waikato, Leaders Press.

### Acknowledgement

I wish to thank Fred Biddulph for suggestions in the writing of this paper

