

Are Students' World Views Permeable to Their School Views in a Non-Western Developing Country?

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A Paper presented at the Annual Conference of the
Australian Association for Research in Education

A version of this manuscript has been submitted for publication
in the Journal of Research in Science Teaching

Abstract

This ethnographic-interpretive study builds on recent cross-cultural research by examining the permeability of non-Western students' world views to the official Western school view. The study involved interview and case study techniques with three village elders and 15 high school students in a developing South Pacific country, and focussed on the relevance of school science to students' future lives. The results suggest strongly that in developing countries: (1) the process of enculturation into a Western school view involves an implicit devaluation of students' traditional world views which govern their village lifestyles; and (2) a Western school view is of limited viability in relation to traditional values and practices. The results of the study are of significance for non-Western developing countries which import Western-style science curricula.

While working in a developing country, a professor of geology from the local university once informed me that he believed in both evolution and special creation as viable explanations of origins. When I suggested that there was a disparity between these two explanations, he explained that he believed in evolution when he was at work and in special creation at church. After some discussion, he saw no disparity between the two viewpoints. We believe that this example typifies the assertion that many learners hold simultaneously two different viewpoints that provide disparate explanations of naturally occurring phenomena: a 'world view' and a 'school view'.

In relation to science education, we define 'school view' as the canonical scientific conceptions and methods of inquiry that science teachers endeavour to enable students to develop in order to understand the physical world. Cobern (1991, p.7) defines 'world view' as the foundational beliefs about the world that support both commonsense and scientific theories. We have adopted a restricted version of Cobern's definition, namely, that the 'world view' refers to the totality of experiences and explanations that have been built up prior to any experience of school instruction and that comprise students' preconceptions of natural phenomena. We are concerned that a disparity exists between students' world views and the official school view, especially in school science where Western explanations of natural phenomena can be very different from traditional explanations. In our experience of science teaching in developing countries, many teachers try to enforce the school view while failing to recognise the existence of students' world views. In cases where major disparities exist between students' world views and school views, we believe that students' learning becomes fragmented and lacks cohesiveness and personal meaningfulness. An examination of this disparity was one of the goals of the study reported in this paper.

In many developing countries, the official school view is a product of Western culture inasmuch as the local education system remains tied to

its original source (Kahn, 1990). In particular, science programs often are taken directly, with little or no adaptation, from Western nations' science programs (Ingle & Turner, 1981; Ogawa, 1986). In developing countries, curriculum developers often fail to recognise that both students and teachers are part of a local culture that, while undergoing significant change, persists in cherishing certain traditions and practices (Kay, 1975). They do not take into account the important cultural milieu into which the curriculum is to be placed.

We believe that, in developing countries, school science instruction

that is based faithfully on imported curricula is likely to result in a disparity between students' world views and their school views. In these contexts, culture and traditions tend to be largely 'people-based', whereas science is based largely on 'things' (Ogunniyi, 1988). When learning science, this difference in emphasis can produce tensions which result in students developing two different sets of values and attitudes (Kay, 1975) leading to a conflict concerning which set of values and attitudes should be adopted. A consequence of this conflict is 'compartmentalisation', that is, students adopt two, sometimes conflicting, explanations of a particular phenomenon. One of these explanations is based on traditional village explanations or experiences and the other is based on what is taught in school.

We feel that it is important to examine the relationship between students' world views and school views because, as Gilbert, Watts and Osborne (1982) argue, the "dominance of the students' prior understanding . . . [can] often lead to quite unintended interpretations of what is being taught". The epistemological framework of Gilbert et al. concerning 'prior understanding' was based on Schutz and Luckmann's (1973) foundational theory which argues that the learner tends to typify experiences in order to create meaning structure. Assimilation of these typical experiences forms a 'life-world knowledge' that is both acceptable and persistent. Berger and Luckmann (1966) argue that this intuitive life-world knowledge is constructed during students' early childhood socialisation and enculturation by 'significant others' (e.g., parents and peers). However, in the context of science education, the secondary socialisation process of school science involves less subjective inevitability, and may be experienced as being less compelling (Solomon, 1987). As Banks (1993) argues, "the ethnic and cultural experiences of the knower are also epistemologically significant because these factors also influence knowledge construction, use, and interpretation" (p.6).

The cultural background of the learner may have a greater effect on education than does the subject content, especially in relation to students making observations in science classes (Jegede & Okebukola, 1991; Okebukola, 1986). Based on experience, however, we believe that while students may be somewhat selective about making observations, the

real issue is that students are selective about the relationships between their observations, rather than the observations per se. This assertion reflects the contention of Falgout and Levin (1992) that, for developing country students, the importance of knowledge lies in its application, results and products, whereas Western schools tend to regard as a virtue the learning of knowledge for knowledge sake. From an epistemological perspective, therefore, it is important that teachers have an "understanding of traditional modes of belief about the natural world" (Ingle & Turner, 1981, p. 362). We argue, that unless students can relate the school view of the natural world to their own well-established world views then teaching strategies are likely to be less than effective in enhancing the permeability of students' world views to their school views.

Purpose of the Study

In an integrative review of research on the effect of culture on the learning of science in non-Western countries, Baker and Taylor (in press) concluded that attempts to nationalise Western science curricula are likely to be ineffective because of the disconnectedness of students' world views and school views. Whereas that study focussed on the influence on learning school science of students' cultural backgrounds, including their language and traditional beliefs, this study reversed the focus and examined the prospects of school science making a significant contribution to local cultural practices. We set

out to examine empirically the permeability of the world views of students of school science in a developing country in relation to their school views.

Design and Procedures

Because of the extensive first-hand experiences of the first author within a range of Melanesian cultures, we planned to conduct an interpretive-ethnographic study (Erickson, 1986; Hammersley & Martin, 1983) that involved field work in a developing Melanesian country. We chose an island located in a small South Pacific Melanesian country that we call 'Kantri' (a pseudonym is used because of the political sensitivity of the study). Because the first author had previously lived and worked in Melanesia for 10 years he was well-known and, therefore, was readily able to gain access to key people both within the school system and at a local level.

By means of interviews conducted over a two-week period, we had planned to learn about: (1) traditional world view explanations of selected natural phenomena held by local Melanesian school students and their parents; (2) students' school view explanations of these phenomena; and (3) students' and parents' perceptions of the viability of the school view within the context of their daily lives. On the basis of this understanding, we hoped to be able to determine the extent to which traditional world views are influenced by school views. In keeping with

the interpretive-ethnographic tradition, as we became more sensitive to the local culture we learned that our research design needed to be modified. Within a short time after arrival in Kantri, field work enabled us to learn more about the nature of the local Melanesian culture and, consequently, we refocussed our research questions.

We had intended to seek explanations of a range of natural phenomena which, from our experience, form an important focus for traditional stories in many Melanesian cultures. However, the distinctiveness of the local culture of Kantri caused us to reconsider the focus of our questions. Some expressions describing natural phenomena had no local equivalent translation and some phenomena did not have a place in the local lore and traditions.

Village Elders

Parents of students were not interviewed as initially planned because the villagers desired to show respect by making available village elders for interview. Village elders are perceived to be the source of all wisdom and are the recognised authority on tribal knowledge. Contact with three elders was made through a respected local high school principal who was related to two of them, Laki and Karsoon, who viewed themselves primarily as fishermen. A third elder, Lapun, is known throughout the island for his knowledge of folklore, and was recommended by the national cultural heritage curator. This elder viewed himself primarily as a gardener.

Each of the three elders was interviewed separately by the first author in a local dialect, Pijin, except in the case of the gardener, Karsoon, who felt more comfortable using a mixture of Pijin and a very localised dialect that was quite dissimilar to Pijin. Whenever Pijin was not used a fellow villager served as a translator. During the interview a large gathering of villagers served as an attentive audience. Because Karsoon was somewhat blind and partially deaf, it was necessary to repeat some parts of the interview.

In order to ensure that the elders perceived the interview process as meaningful, initial questions focussed on the context of their chief

occupations, that is, the ocean or land environment. Each elder was asked to explain how they would know when it was the best time for fishing or how they knew when or where they could plant their gardens. As the interviews progressed, explanations of specific natural phenomena were sought. It soon became apparent that explanations about the moon changing its shape and the earth revolving around the Sun did not form part of the elders' traditional folklore. However, waves, lightning and thunder did have explanations. Finally, the elders were asked for their views on the extent to which schooling helps students to understand better the gardening or fishing process that was

practised in their villages.

Each of the elders seemed to be genuinely interested in participating in the 'interviews' to an extent that, at times, they asked whether they had answered satisfactorily the questions. A local high school principal who was present during the interviews claimed that the elders were frank and candid. Their critical attitudes towards the value of schooling bears testimony to their frankness.

Local Students

Within Kantri, less than 10% of students are given the opportunity to receive further education after completing high school. Consequently, most students return to their villages while the privileged few obtain employment in some of the few towns. The majority of the islands within Kantri have no towns, but each has a small store that sells trade goods such as salt, clothing material, fishing or gardening tools, and fuel. Nevertheless, most students envisage themselves as obtaining well-paid employment when they graduate from high school.

In this study, we interviewed a group of Melanesian students who were attending a local high school on one of the main islands. This particular school was chosen because of its accessibility. The first author had taught previously some of these students and was well known to many of the teaching staff. Because there are very few high schools in Kantri, each high school contains a student population that is fairly representative of students across the whole country. This school was particularly so as it was a boarding school and housed students from a number of remote and rural villages.

In this school, the science curriculum had been imported directly from a nearby Western country. Its classroom implementation had been observed by the first author during a recent study of South Pacific science teachers (Giddings & Waldrip, 1993). That study reported that, in general, South Pacific science teachers have very didactic approaches to teaching which allow very little variation in approaches to learning science beyond passive reception and rote recall. Evidence from other studies supports our contention that South Pacific teachers implement curricula with very little adaptation to the local cultural contexts (Thaman, 1993).

There are twice as many male students as there are female students in the high schools of Kantri. This is due to the patriarchal nature of the culture that places a high value on school education for male adolescents and a high value on traditional domestic education for female adolescents. In this study, we interviewed 11 male and 4 female students, most of whom were aged in their mid to late teens (see Table 1).

Students were interviewed in English by the first author. The

interviews were recorded on audio-tape and transcribed for analysis. It was explained that their responses would be treated confidentially and

that their identities would remain anonymous. Nevertheless, we soon found that most students could not, or would not, provide traditional explanations of natural phenomena that had been discussed successfully with the village elders. All students, except two, seemed to feel that the village stories were foolish and, when pressed for an explanation of natural phenomena, tended to laugh and claim not to know them.

Table 1 Interviewed Students

Because this line of questioning proved to be relatively fruitless, we decided to focus on students' explanations of traditional methods of gardening or fishing in which they participated when living in their villages. We asked them for their parents' explanations about gardening or fishing practices and asked how they perceived their parents' explanations. The students were asked about the usefulness of what they learn at school for village life. They were asked how well schooling prepared them for village life. They were asked questions concerning what would happen if they tried to implement what they had learnt at school within their village lifestyles. Finally, they were asked for their opinion as to which type of learning ñ school subjects or village lore ñ best prepared them for life in the village.

Revised Research Focus

Our revised research focus sought to establish the extent to which the school view was perceived, in a general sense, as being relevant to important traditional village lifestyle practices. The focus of our study shifted from an examination of the influence of the school view on traditional explanations of natural phenomena to an examination of perceptions of the usefulness of the school view in the context of key aspects of daily life in the village.

Assertions

We present the results of the study in the form of two assertions, a practice that is characteristic of the interpretive-ethnographic research tradition (Erickson, 1986; Glaser & Strauss, 1967). Assertions constitute emergent theory that is grounded in the data of a case study. Their plausibility rests on the quality of their evidentiary warrants. In this study, we attempted to enhance the quality of our evidentiary warrants in two ways. First, by 'immersion in the field' we were able to draw on our rich personal experiences to understand key features of the meaning-perspectives of village elders and school students. Second, in order to 'triangulate the data' we used the perceptions of village elders to structure the student interviews,

thereby seeking points of convergence (i.e., confirming evidence) and divergence (i.e., disconfirming evidence). We believe that these strategies enabled us to generate a plausible account of salient aspects of the local culture and to proffer adequately warranted assertions about the permeability of students' world views to their school views. Our intention in writing this paper is to invite other researchers who are interested in the issues that we raise to participate in further theory building by testing the viability of our assertions in other developing country contexts.

Results and Discussion

Assertion 1 In a developing country context, enculturation into a Western school view has a deleterious effect on the perceived status of students' traditional world views.

Lack of Traditional Knowledge. One of the unexpected outcomes of the

study was the apparent lack of traditional knowledge amongst the students, especially the younger teenagers. During interviews that sought to explicate students' traditional knowledge, a common response from nearly all students was "I don't know". Perhaps lack of traditional knowledge was due to the students being isolated from their village lifestyles for long periods of time spent living in the boarding school. Many of these children do not see their parents for their entire high school careers and, therefore, miss out on a significant amount of enculturation into village life, including both its practices and stories, during their formative adolescent years. By comparison, mature aged students who have more traditional contact bring a stronger cultural identity with them that is based on extensive personal experience of traditional practices. In this study, we found that these students were a richer source of traditional knowledge and were able to provide insightful accounts of traditional practices and stories based on personal experience.

Cultural Cringe. Perhaps, also, schooling had taught the students implicitly to devalue their traditional world views and to attribute a higher value to the Western school view. Whilst living within the school culture, students' school views would be legitimated on a daily basis while their traditional world views were being ignored and, by implication, were being delegitimized. As a result, the students may have been motivated to disown their parents' traditional explanations and, therefore, to have claimed not to remember them. If, as we believe based on previous studies, a 'scientific' culture exists in the school, that is, a culture that attributes to Western science a privileged status, then it seems likely that the students' enculturation into the Western school view had resulted in a sense of 'cultural cringe' towards their traditional world views. One of the hallmarks of a cultural cringe amongst students would be an attitude of superiority in relation to their school views when considering their

parents' seemingly primitive traditional world views, especially when interviewed within the sanctity of the school environment. In this study, nearly all of the students seemed to ridicule the notion of traditional world views and attributed ownership to their parents, rather than to themselves.

The village elders confirmed the lack of traditional knowledge amongst their young people and attributed this to a devaluing by young people of traditional world views:

Laki[The younger generation] did not know the old ways. They see them as foolishness. They think that they know better.

LapunThe young people think that the old ways are rubbish.

The elders complained that the young people wished to be seen as more knowledgeable than their elders.

Traditional vs Scientific Rationality. However, not all students who we interviewed lacked traditional knowledge or were unwilling to disclose it. For example, one mature age student valued traditional gardening practices:

When I tried [the traditional methods] I proved that [they worked]. I have no idea why but there must be some [explanation]. I think that it is so because I believe that we must respond to our beliefs.

Although this student didn't understand the reasons behind some of the traditional methods that he had practised, he had found them to be quite successful. But understanding why they were successful was

another matter. The search for understanding is the self-proclaimed *raison d'être* of Western scientific inquiry which, however, is based on a rationality quite different from that of the traditional world view of Melanesian villagers. Scientific rationality is analytical and reductionist and seeks causal explanations of relationships between sets of isolated variables in idealised (often mathematical) models that purport to represent, albeit simplistically, physical reality. The scientific rationality may be quite disparate from the rationality of a Melanesian villager who adopts successful cultural practices on the basis of a rationality that values, amongst other things, faithful reproduction of established mores and respect for elders.

One of the elders described his traditional method of gardening. His explanation illustrates an interesting ecological interconnectedness between gardening practice and the local physical environment, as well as a rationality that includes a sense of causation that is counter-intuitive to many Western science educators (except for those with an interest in modern quantum theory where effects may precede

causes):

LapunSo when the tarcutta nut comes on the trees and the young kids try and knock them down, we say [strong wind] comes, donit cause the strong winds to start.

Traditionally, it is believed that eating certain fruits or disturbing certain trees can cause the start of the cyclone season. As well, thunder and lightning are believed to be caused by someone disturbing the sacred place that is occupied by the 'star god'. It is said that when the god is disturbed, he becomes angry and thunder and lightning result. In fact, each major practice has its own particular god. These stories serve a number of important purposes, including the discouragement of youngsters from interfering with important sources of food while the fruit is ripening. One of the mature aged students who we interviewed provided a similar explanation:

We have special type of places. There are places where it is forbidden to go. If you go and cut one of the trees in that area, the strong winds will start to blow. If you start to shoot all the fruit from these trees, then there will be a strong wind. So when a child starts eating or shooting these fruits, we say donit touch them or the strong winds will start to blow.

Assertion 2In a developing country context, a Western school view is of limited practical viability in relation to traditional values and practices.

This assertion is argued on the grounds that schooling is perceived as being imposed on traditional culture and conflicts with established practices.

Cultural Conflict. We found that there is a widespread view that what is learnt at school does not form a meaningful part of the village lifestyle. Indeed, the practice of schooling is perceived by elders as largely in conflict with traditional village values and practices. The village elders who we interviewed claimed that they had an initial curiosity to learn new methods from the early European educators, but what they learnt was not viable within the context of their village lives:

KarsoonI like Melanesian ways. I wanted to learn Western ways and so when mission came, I went to school [so that I could] learn their ways. I thought I would learn new ways. I use school ways no more.

Lapun The white man didn't want us to learn about his ways but only about his religion.

Almost all students commented that their parents had negative perceptions of the value of schooling because schooling is perceived as a cause of the break down of traditional family values and as contributing to the breakup of traditional village society. This perception was dominant in a number of student interviews:

[My father] said that school is not good because "I have seen a lot of other children going to school and then they leave their mum and dad. Some of them go for good. Sometimes they never return. They go and work somewhere and they forget about mum and dad". My father said that school is just like sending my children away from home.

Some students when they go back to the village, they just do sorts of things that village people don't like.

Some students claimed that they no longer felt that they understand village traditions and tended not to participate in certain aspects of village life. Schooling is regarded as being responsible for teaching students to behave in ways that are contrary to accepted village practices. Lapun argued that schooling teaches the students to devalue their traditional ways:

LapunThe young people think that the old ways are rubbish. Education teaches them this, but I find the old ways work.

Conflicting Practices. Schooling is not regarded as a means of improving life in the village. Students and elders failed to see how the 'new Western ideas' directly improved village life. The new ways are not regarded as being more productive or as leading to improvement in the quality of living. Indeed, schooling is viewed largely as being either irrelevant to or in conflict with what traditionally makes sense:

LapunThe time when new Western ideas about agriculture come, agriculture [prepares the] ground and looks at soil but [replants] again on [the] old garden [beds]. We old people don't call our methods 'agriculture' because agriculture is white man's methods. So we old people still use the old ways.

We didn't learn anything to help us. We didn't learn about gardening but we already knew how to garden. The agriculture came and they taught us to keep gardening in the same place but we knew you had to change the place where we gardened. When we go to another place, we had to cut down and build the new garden.

Karsoon: School helped me to [learn] farming but now I find the village ways are better.

These elders reflected on their own experiences of schooling, and explained that Western methods of agriculture instructed them to

prepare and plant crops in a manner that was very different from the methods that they utilised traditionally. They felt that their years of experience in planting tropical crops were ignored.

Today, little seems to have changed. Students perceive that the agricultural methods they learn in school are not superior to traditional methods. For example, a student described how at school he was taught to grow coconuts in a nursery and to place them a certain

distance apart when it came time for planting. Although this practice was quite different to the village technique, its results were not superior:

There is not much difference that I can see because those who plant [the way they were taught in school] and those who plant like in the village, they both get good fruit.

Another student remarked that traditional ways help you to survive in the village whereas schooling does not enable this to happen. He explained that schooling is of limited usefulness:

Because school only helps in the village if you have money. If you don't have money, traditional skills and knowledge are far more important. Because you can do things, all the resources are there. If you don't know how to handle them, and say build house with local bush materials and all this, it would be quite hard for you to survive in the village.

A village teenager with almost no schooling commented:

I feel that village ways are more relevant to my life. I don't need the new ways to live but I do need to know my traditional ways.

After just a few months of attending school, this student left as he felt that schooling had nothing to offer him in relation to skills that are needed for daily living. He felt that he would be better equipped for life if he learnt from the village elders.

Another student said that the village people would laugh if he tried to do within the village setting what he had learnt in school. Furthermore, schooling is perceived to be in conflict with traditional methods of learning. For example, at school the copying of other students' material is forbidden, whereas in the village much of the learning is based on imitation:

Interviewer Are there somethings that you are allowed to do in the village that makes it hard for you to learn at school?

Student Oh yes, like copying others' work. In the village, everything is, you can choose certain things to follow.

Interviewer In the village, is it good for you to copy?

Student Yes, that is the way we learn. In school we must do our own.

Market Value of Schooling. Although schooling attracted strong criticism for its cultural irrelevance and its harmful effects on the cultural development of the young people, it did have a perceived value in relation to improving the quality of life in the village.

The elders felt that some students should be educated in school for the purpose of learning to read and write and to make money which is then shared with the rest of the family:

Lapun Some [children] need to go to school and learn white man's ways. Not all [children] should stay at home.

Laki Some [children] need to go to school so that they can earn money and look after us when we are old.

Students also accepted the view that they needed to go to school so that life in the village could become less arduous. In this regard, it was clear that many students felt the weight of their parents' expectations:

[Education] is important because we can get a good job and make life much more [comfortable]. [My father] thinks that I will give him money [after I get a job].

If I don't get a job after I have finished school, they think I am a failure. If I pass and don't get a job, they think I am wasting my time.

Only if you are earning money, you are doing alright.

The village people expect me to get a job when I finish school. They expect me to send them money.

There is a widespread perception amongst students that gaining a job leads to making money. In this society, having more money than others is one way that a person can gain prestige (Whiteman, 1986). Those who have prestige are regarded as important and expect to be shown respect. Consequently, education is not regarded as a valuable experience unless students obtain a job and repay all monies spent by their parents on their education. A failure to obtain well-paid employment is regarded as an unsuccessful investment and as a failure to contribute to the wealth of the village. Of course, the availability in Kantri of well-paid jobs is very limited, and few students are likely to attain this cherished goal.

However, not all students value this relatively unattainable goal; a few voiced a more pragmatic attitude that is in keeping with the reality of their future village lifestyles:

The new ideas require you to work hard and have money but before if you worked hard, you had plenty to eat. The new ideas try to make people lazy. I follow the old way, the custom way. The old ways are better.

Conclusion

When we designed this study, we were concerned about the role of school science in shaping the future lives of peoples of non-Western cultures. Our experience of living and teaching in largely non-Western countries suggested that science curricula that are imported directly from Western industrialised countries might be less than relevant to the traditional world views held by members of the local culture. We were aware of research that indicated that the cultural background of the non-Western learner has a strong influence on their learning of school science, and we wondered whether the reverse might also be true. That is, we wanted to investigate the extent to which the school view of science permeates the world views of students in non-Western cultures.

We conducted an interpretive-ethnographic study that investigated the relationship between the world view and school view of a group of high school students in a Melanesian culture. The students had left temporarily their traditional village lifestyles while they attended a residential high school in a rural area where they were studying a Western-oriented school science curriculum. We were able to gain insights into the traditional world views of villagers by interviewing several respected elders who told stories about their traditional ways of gardening and about their early experiences of Western schooling. We focussed our investigation on the perceived influence of school views on traditional village beliefs and practices.

Although very few of the students were able (or willing?) to provide traditional explanations of local natural phenomena, which was one of our chief interests, all claimed to follow traditional practices when

they returned to village life. Because of the limited employment prospects on the island, most students would resume village life on completion of high school. It seemed obvious to us that the science education they were receiving at school should serve an important role in their future lives, whether they sought employment in towns or returned to their villages.

We were disappointed to learn, however, that schooling currently disconnects young people from their own cultural beliefs and practices, and attempts to enculturate them into a largely irrelevant Western school view. At school, a preoccupation with teaching with high fidelity an imported Western-oriented curriculum seems to have blinded

teachers to their unwitting promotion of a cultural cringe amongst their students. At school, students embrace the legitimised rationality of school science while developing negative attitudes toward their traditional world views. Back in the village, however, young high school graduates experience difficulties fitting back in to a world view that they have learned to eschew.

Generally speaking, the village elders and high school students who we interviewed did not perceive the school view as useful for improving the knowledge and skills needed for survival in the village. For example, school science was regarded as providing methods of agriculture that were either inferior to or no better than traditional agricultural practices. Indeed, there was a general perception that the school view conflicted with traditional values and practices, and served to undermine young people's respect for traditional lifestyles. The main perceived benefit of formal education for young people was its improvement of their prospects of earning a monetary income that could be shared with their extended families if they were able to obtain scarce employment in a town.

In this brief study of traditional Melanesian culture, we obtained disturbingly little evidence of the positive influence of the school view of science on young people's traditional world views. We were left with the distinct impression that much of what goes on in the high school science classroom in rural Kantri is of little relevance to the future lives of most young Melanesians. Of course, we did not observe the science classes attended by students in this study and, therefore, cannot judge the extent to which the teachers were attempting to adapt their Western science curricula to local needs. Nevertheless, whatever may be going in these classes (and other research indicates that very little adaptation to local needs is occurring), the outcome is less than impressive from the points of view of local people.

We believe that the educational challenge for developing countries such as Kantri, which currently import science curricula from Western countries, is one of curriculum adaptation to the local culture. This can be achieved only through a rich understanding of the prevailing (albeit changing) cultural values and practices of the local people. Above all else, it is imperative to avoid a neo-colonialist policy that legitimises young people's relinquishment of their cultural heritage in favour of an inappropriate Western scientific school view that creates a false dawn of expectations for the 'well-qualified' high school graduate. Further research needs to be conducted in Kantri, and in other non-Western cultures, to document the world views of local indigenous people and to suggest ways that the power of Western science may be harnessed in their interests.

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