

## Permeability of Students' Worldviews to Their School Views in a Non-Western Developing Country

Bruce G. Waldrup,<sup>1</sup> Peter Charles Taylor<sup>2</sup>

<sup>1</sup>*Faculty of Education and Creative Arts, Central Queensland University,  
Mackay, Queensland, Australia*

<sup>2</sup>*National Key Centre for School Science and Mathematics, Curtin University  
of Technology, GPO Box U1987, Perth 6845, Australia*

**Abstract:** This ethnographic-interpretive study builds on recent cross-cultural research by examining the permeability of non-Western students' worldviews to the official Western school view. The study involved interview and case study techniques with 3 village elders and 15 high school students in a developing South Pacific country, and focused on the relevance of school science to students' future lives. The results suggest strongly that in developing countries (a) the process of enculturation into a Western school view involves an implicit devaluation of students' traditional worldviews which govern their village lifestyles; and (b) 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. © 1999 John Wiley & Sons, Inc. *J Res Sci Teach* 36: 289–303, 1999

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 *worldview* 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 endeavor to enable students to develop to understand the physical world. Cobern (1991) defined "worldview" 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 "worldview" 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' worldviews 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

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Correspondence to: P. C. Taylor

to enforce the school view while failing to recognize the existence of students' worldviews. In cases where major disparities exist between students' worldviews and school views, we believe that students' learning becomes fragmented and lacks cohesiveness and personal meaningfulness. Examining this disparity was one of the goals of this study.

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). Curriculum developers often fail to recognize 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). The important cultural milieu into which the curriculum is to be placed is often ignored.

School science instruction that is based on imported curricula is likely to result in a disparity between students' worldviews 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). 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 compartmentalization—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' worldviews and school views because, as Gilbert, Watts, and Osborne (1982) argued, the dominance of students' prior understanding often leads 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 to create meaning structure. Assimilation of these typical experiences forms a "life-world" knowledge that is both acceptable and persistent. Berger and Luckmann (1966) argued that this intuitive life-world knowledge is constructed during students' early childhood socialization and enculturation by significant others (e.g., parents and peers). However, in the context of science education, the secondary socialization process of school science involves less subjective inevitability and may be experienced as being less compelling (Solomon, 1987). As Banks (1993) argued, "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 (Jegade & 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 the sake of knowledge. 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). Unless students can relate the school view of the natural world to their own well-established worldviews, teaching strategies are likely to be less than effective in enhancing the permeability of students' worldviews 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 (1995) concluded that attempts to nationalize Western science curricula are likely to be ineffective because of the disconnectedness of students' worldviews and school views. Whereas that study focused 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 worldviews of students of school science in a developing country in relation to their school views.

### Context, Design, and Procedures

#### *The South Pacific Island of Kantri*

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 & Atkinson, 1983) that involved fieldwork in a developing Melanesian country. We chose an island located in a small South Pacific 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.

In the South Pacific, most if not all local curriculum development is funded through outside sources. Donors approve the project, train locals in their own countries, and pay the salaries of expatriate and local officials who develop the curriculum. If a country wants assistance with educational projects but does not have the financial resources and is already dependent on overseas aid, then it must accept the terms and conditions of the visiting experts who usually have never worked in the school system of that country. Because these countries have little control over the conditions of the overseas aid package, and because they believe that they cannot afford to reject it, the conditions are ripe for these countries to suffer a neocolonial form of disempowerment as their cultural priorities are subordinated to those of donor countries.

Kantri receives frequent overseas educational aid in the form of equipment, inservice programs, and development of teacher education programs. Its personnel receive further education in overseas countries such as Australia and New Zealand. These countries are gradually replacing the former colonial power which has been a major contributor of overseas aid.

#### *The High School*

In this study, we interviewed a group of Melanesian students who were in residence at a local high school on one of the main islands. We chose this school because of its accessibility to us. 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 one 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.

The majority of teachers in Kantri's schools are nationals—that is, they are native to Kantri. A few schools have expatriate teachers, usually missionaries or overseas service volunteers

sponsored by their country of origin. In Kantri, it is not necessary to have formal teaching qualifications to teach at the elementary level of schooling. At the high school that we visited in this study, most of the teachers and all of the administrators were nationals who had gained their teaching qualification from either a local government teachers' college or from a university/teachers' college located in a neighboring South Pacific country. In our experience, these teachers seem to value education largely as a means of securing well-paying government jobs. The main purpose of their teaching, then, is to enable their students to be successful in government-mandated external examinations held at the conclusion of each of the main stages of education. In this school, the science curriculum had been imported directly from a nearby Western country. Its classroom implementation had been observed during a study of South Pacific science teachers (Giddings & Waldrup, 1993). In general, that study revealed South Pacific science teachers using didactic approaches to teaching which allowed 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).

### *Initial Research Focus*

By means of interviews conducted over a 2-week period, we planned to learn about (a) traditional worldview explanations of selected natural phenomena held by local Melanesian school students and their parents, (b) students' school view explanations of these phenomena, and (c) 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 worldviews 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, fieldwork enabled us to learn more about the nature of the local Melanesian culture, and consequently, we refocused 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. We wanted to record stories about, for example, why the sun goes down at night and why the moon changes shape, and what causes the ocean waves and the wind. However, the distinctiveness of the local culture of Kantri caused us to reconsider the focus of our inquiry. Although we found that some expressions describing natural phenomena had no local equivalent translation and some phenomena did not have a place in the local lore and traditions, we were able to record a number of traditional stories, especially when we interviewed village elders. However, we found that a more serious obstacle to our planned inquiry occurred when we attempted to elicit traditional stories from school students.

### *Village Elders*

Parents of students were not interviewed as planned because the villagers wished to show respect by making available for interview their village elders. Village elders are perceived to be the source of all wisdom and are the recognized 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 localized 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.

To ensure that the elders perceived the interview process as meaningful, initial questions focused on the context of their chief occupations—that is, the ocean or land environment. Each elder was asked to explain how he would know when it was the best time for fishing or how he knew when or where he could plant his garden. 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 practiced 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 question. A local high school principal who was present during the interviews claimed that the elders were frank and candid. Their critical attitudes toward the value of schooling bears testimony to their frankness.

### *Local Students*

In Kantri, most Melanesian students do not have an opportunity to complete their schooling. Less than 10% of each age cohort completes 10 years of schooling and only about 1% becomes qualified to enter a university. On completion of schooling, most students in Kantri 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 aspire to obtaining well-paid employment, mostly with the government, when they graduate from high school.

There are about 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 ones. In this study, we interviewed 11 male students (Cain, Joseph, Paul, Aso, Pita, Willessie, Oksenne, Talonga, Tanabose, Miseah, and Dedily) and 4 female students (Ella, Baenmary, Kisacow, and Jemalyn), most of whom were in their mid to late teens. Students were interviewed in English by the first author. The interviews were recorded on audiotape and transcribed for analysis. It was explained that their responses would be treated confidentially and that their identities would remain anonymous. Initially, we sought students' explanations of traditional methods of gardening or fishing in which they participated when living in their villages. We also asked about their parents' explanations of gardening or fishing practices and how they perceived their parents' explanations. However, we soon found that most students could not or would not provide traditional explanations of natural phenomena that we had 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.

### *Revised Research Focus*

Because this line of questioning proved to be relatively fruitless, we decided to focus on students' perceptions of the usefulness for village life of what they learn at school, particularly in school science. We asked how well schooling prepared them for village life and what would happen if they tried to implement what they had learned at school within their village lifestyles.

Finally, we asked for their opinion as to which type of learning—school subjects or village lore—best prepared them for life in the village, a place where most are destined to live out their lives. Our revised research focus sought, therefore, 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.

### *Warranted Assertions*

We present the results of the study in the form of two assertions (Erickson, 1986; Glaser & Strauss, 1967). Assertions constitute emergent theory grounded in the data of a case study. Plausibility rests on the quality of evidentiary warrants. 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, 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' worldviews to their school views. Our intention here is to invite other researchers interested in the issues we raise to participate in further theory building by testing the viability of our assertions in other developing country contexts.

## Results and Discussion

Two assertions about the impact of schooling, and in particular of school science, on the worldviews of adolescents attending government-controlled secondary schools, are offered.

### *Assertion 1*

In the context of this developing country, enculturation into a Western school view has a deleterious effect on the perceived status of students' traditional worldviews.

*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 their traditional knowledge, a response from nearly all students was "I don't know." There are a number of possible explanations for this common response. The first is the stranger phenomenon: The researcher was not known personally to the students, was from a foreign culture, and appeared in an unfamiliar role legitimated only by the school authorities. The students might have been reluctant to reveal their traditional knowledge to a stranger for fear of breaking taboos that regulated the possession of important cultural be-

liefs. The female adolescents might have been especially reluctant to engage in a personal conversation because of a social taboo that strictly regulates their contact with members of the opposite sex.

Perhaps the students did lack traditional knowledge largely because of their long-term social isolation from their villages. Because these children spend a considerable amount of their formative adolescent years in boarding school, they are likely to miss out on a significant amount of enculturation into village life, including both its practices and stories. By contrast, we found Cain, a mature-aged male student, to be a richer source of traditional knowledge. His insightful accounts of traditional practices and stories indicate a greater immersion in village life.

To what extent, then, does the school undermine the traditional culture by becoming the primary source of young people's socialization at a time when they are constructing their cultural identities? Our previous research found no evidence in the work of the science teachers at this school that education was or should be working toward the goal of celebrating or strengthening the local culture (Giddings & Waldrip, 1993). Except for the occasional traditional display organized for visiting dignitaries, the school does very little to support traditional worldviews. The main social values promoted by the school relate to the work ethic, the importance of punctuality, and the importance of honesty.

*Cultural Cringe.* During our attempts to interview the students, we found that nearly all seemed to ridicule the notion of traditional worldviews and attributed ownership to their parents rather than to themselves. Their body language was indicative of a mixture of denial and embarrassment at being associated with traditional ways of viewing the world.

The village elders confirmed the lack of traditional knowledge among their young people and attributed this to a devaluing by young people of traditional worldviews. The elders complained that the young people wished to be seen as more knowledgeable than them:

Laki: [The younger generation] did not know the old ways. They see them as foolishness.

They think that they know better.

Lapun: The young people think that the old ways are rubbish.

If a scientific culture exists in the school—a culture that attributes to Western science a privileged status—then it seems likely that the students' enculturation into the Western school view has resulted in a sense of cultural cringe away from traditional worldviews. We believe that the students' implied attitude of superiority in favor of their school views, combined with an embarrassed denial of the value of their parents' (and their own) seemingly primitive worldviews, is indicative of the beginnings of a deep sense of cultural alienation and negation that can disenfranchise them from membership in the local communities to which most inevitably will return. Eyford (1993) argued that a similar outcome has occurred in another developing country with a non-Western cultural heritage:

More often than not education provided in Papua, New Guinea, has sought to replace the traditional culture instead of blend with it or build upon it. Given the key function of culture in organizing the world, in establishing identity, and given its resilience to change, the result has been cultural alienation. (p. 13)

Schooling seems to have taught the Kantrian Melanesian students in our study to devalue their traditional worldviews and to attribute a privileged value to the Western school view.

While living within the school culture, students' school views have been legitimated on a daily basis while their traditional worldviews have been largely ignored and, by implication, delegitimized. Not surprisingly, then, the students seek to disown their cultural heritage.

Is this normal rebelliousness of adolescents that is common in the West, or is it a sign of deep-seated alienation from traditional culture, an alienation fueled by disrespect for tradition and a cloying commitment to Western-oriented values? If it is normal rebelliousness, then why is it not directed toward the authority of the school, at least in the form of resistance to learning? Perhaps the young people transfer their loyalty from the authority figures of their villages (i.e., parents, elders) to those of the school, and they harbor a fatalistic attitude that disempowers them from considering that they might have an agency in directing their own lives. Perhaps, also, schooling is valued for its promise of revealing the secret of success. Because most of the male students seem to have accepted the power of money as a benchmark of eventual social success in the adult world, they have learned to value schooling as a means of attaining this desired but largely illusory goal (see Assertion 2).

*Traditional versus Scientific Rationality.* Not all students we interviewed, however, lacked traditional knowledge or were unwilling to disclose it. For example, Cain, a mature-aged student who left school at an early age to work in his village and returned to further his education, 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 Cain did not understand the reasons behind some of the traditional gardening methods that he had practiced, he claimed that he had found them to be quite successful. But understanding why they were successful was another matter. The search for explanation and prediction is the *raison d'être* of Western scientific inquiry, an inquiry that, in many respects, is based on a rationality quite different from that of the traditional worldview of Melanesian villagers. Scientific rationality is analytical and reductionist and seeks causal explanations of relationships between sets of isolated variables in idealized (often mathematical) models that purport to represent, albeit simplistically, physical reality. Scientific rationality seems to be very different from the rationality of a Melanesian villager who adopts successful cultural practices because he has learned the practical value of reproducing faithfully established social mores and of holding the conventional wisdom of the elders (and ancestors) in deep respect.

One of the elders, Lapun, described to us 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 counterintuitive to many Western science educators (except for those with an interest in modern quantum theory where effects may precede causes):

Lapun: So when the tarcutta nut comes on the trees and the young kids try and knock them down, we say [strong wind] comes, don't 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 dis-



couragement of youngsters from interfering with important sources of food while the fruit is ripening. Cain 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 don't touch them or the strong winds will start to blow.

For the South Pacific Island of Kantri, we are left with the distinct impression of a traditional culture that is poorly served by an imported school science curriculum. Not only does schooling remove children from the nurturing influence of their own local communities, it also teaches them (perhaps unintentionally) to deny the value of their own cultural beliefs in favor of Western ways of viewing their world. What, then, is the viability of a Western worldview in the local community of Kantri? We focused the second part of our inquiry on this question and were very disappointed with our finding.

### *Assertion 2*

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

*Cultural Conflict.* We found a widespread view that what is learned 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 practices. The village elders we interviewed claimed they had an initial curiosity to learn new methods from the early European educators, but what they learned was not viable within the context of their village lives:

Karsoon: I 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.

In the early days of European settlement, the governing colonial power did not offer schooling to local people. It was the missionaries whose humanistic spirit caused them to offer education as a means of countering the exploitation of the local villagers by the expatriate landowners and traders. They felt that better educated locals would be converted more readily to Christianity, and this process would be expedited by a perception that Western educated locals had an advantage over other villagers. However, for the most part, mission schooling was restricted to the basic skills of reading and writing (Waldrup, 1994).

It is clear from talking with the elders that they perceived the early European settlers as having revealed only a part of their knowledge, but not the real knowledge that leads to power. In local values, the person who possesses important knowledge is given power and respect, and in the process is enriched. Hence, when the local villagers were not enriched as a result of being educated by the early missionaries, they perceived they were not being told the truth. And, because they did not attain the material wealth of Westerners, they perceived the early missionaries had not told them everything they needed to know. But to what extent is this a perception that is fueled only by historic events, with little relevance today?

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

Pita: [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.

Talonga: They think that we come to school, we won’t do the work that some village people do.

[They think that] we are lazy. Because when we come to school like this and spend most of our time here, when we get back to the village, we don’t get used to do some of the former things like making gardens, go fishing and something like that.

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

Jemalyn: [The villagers get angry] because they say that our family wants to live in a Western style.

Some students claimed they no longer understand village traditions and tend not to participate in certain aspects of village life. Schooling is regarded as being responsible for teaching students to behave in ways contrary to accepted village practices. The village elder, Lapun, argued that schooling teaches the students to devalue their traditional ways. We were left with the distinct impression that the elders and parents felt betrayed by a school education system that historically had ignored their cultural needs and was continuing to do so today, to an extent that many young people were graduating from high school and returning to their villages as socially dysfunctional members of the community.

*Conflicting Practices.* What about the practicalities of daily village life? Despite the problem of conflicting cultural values, would a high school education provide young people with valuable skills that complement or enrich the existing village practices of, for example, cooking, gardening, and fishing? We were disappointed to witness both students and village elders voicing an almost unanimous criticism of the relevance of new Western ideas for the daily life of the village. 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:

Lapun: The 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 village elders reflected on their own, now distant, 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 utilized traditionally. They felt that their years of experience in planting tropical crops was ignored and what they were taught proved to be of little subsequent value. Students perceive that the agricultural science methods they learn in school are not superior to traditional methods. For example, a student described how he was taught at school to grow coconuts in a nursery and to place them a certain distance apart when it came time for planting:

Pita: 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 by using local resources, whereas schooling is of limited usefulness in this regard:

Aso: 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 [a] house with local bush materials and all this, it would be quite hard for you to survive in the village.

A village teenager with little prior schooling commented:

Dedily: 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 dropped out because he felt schooling had nothing to offer him in relation to skills that are needed for daily living. He felt he would be better equipped for life if he learned from the village elders. Another student said the village people would laugh if he tried to do within the village setting what he had learned in school.

It seems that the problem of the perceived irrelevance of schooling extends beyond the content of the science curriculum to include the actual process of learning. The method of learning valued by the school might be in partial conflict with traditional methods of learning. For example, at school, copying other students' material is forbidden, whereas much of the learning in the village is based on imitation:

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

Wilessie: 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?

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

The disturbing irony here is that although students might not be permitted to copy the work of their fellow students, the commonly employed didactic teaching approaches observed in this school require students to copy unquestioningly the work of the teacher, thereby minimizing the opportunity for students to share control of their own learning or to call on their village experiences to contextualize their school learning.

*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 was perceived to be valuable for village life in one important respect: its economic benefit. The elders felt that some students should be educated in school for the purposes 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 attend school so life in the village could become less arduous. In this regard, it was clear that many students felt the weight of their parents' expectations of them as future income earners:

Oksenne: [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].

Ella: 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.

Paul: Only if you are earning money, you are doing all right.

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

Miseah: [He wants me to] become an employee and earn some money and I can help them at home. He wants me to help him at home [by providing money].

We found a widespread perception among students that gaining a job leads to making money. In this society, having more money than others is one way a person can gain prestige (Whiteman, 1986). Those who have prestige are regarded as important and expect to be shown respect. More than this, money can be used to purchase basic necessities such as food and medicine, and so improve the quality of people's daily lives. Consequently, education is not widely regarded as a valuable experience unless students subsequently 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, we found that not all students value this relatively unattainable goal; a few voiced a more pragmatic attitude in keeping with the reality of their future village lifestyles:

Joseph: 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.

### Conclusions

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 imported directly from Western industrialized countries might be less than relevant to the traditional worldviews held by

members of the local culture. We were aware of research indicating the cultural background of the non-Western learner has a strong influence on learning school science, and we wondered whether the reverse might also be true. We wanted to investigate the extent to which the school view of science permeates the worldviews of students in non-Western cultures.

We were able to gain insights into the traditional worldviews 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 focused 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 among their students. At school, students embrace the legitimized rationality of school science while developing negative attitudes toward their traditional worldviews. Back in the village, however, young high school graduates experience difficulties fitting back into a worldview that they have learned to eschew.

Generally speaking, the village elders and high school students did not perceive the school view as useful for improving the knowledge and skills for survival in the village. 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 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.

We obtained disturbingly little evidence of the positive influence of the school view of science on young people's traditional worldviews. 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 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.

Consequently, we feel compelled to question the appropriateness of a system of schooling that purports to prepare the indigenous youth of Kantri for their future lives by inculcating almost exclusively a Western worldview through a process that legitimizes young people's relinquishment of their cultural heritage in favor of an inappropriate Western scientific school view. It seems to us that there is sufficient evidence to conclude that the current practice of science education is aiming to serve only one of the government's expressed curriculum goals.

Science education in Kantri serves a dual function. The first main thrust of the science syllabus is to develop in all students science understanding and skills that will be appli-

cable to their lives whether they live in the village, town, or city. The second main thrust of the science syllabus is to provide a sound base for further study that could lead to tertiary studies. (Personal communication with an officer of the Curriculum Development Centre, Kantri, 1992)

We feel that the educational challenge for developing countries such as Kantri is one of struggling to include the conflicting interests and aspirations of all stakeholders, especially those who are currently disempowered in the face of the seemingly irresistible global forces accompanying the infusion of Western worldviews and practices. The majority of people who lead village lifestyles need the school science curriculum to empower them so that they can control the nature and pace of cultural change. There is an outstanding need, therefore, for curriculum adaptation. Perhaps an appropriate starting point is to generate an insightful understanding of the prevailing (albeit hanging and conflicting) cultural values and practices of the local communities. To be truly authentic, this process must establish coparticipation among government agencies, schools, and local communities. The political mechanics of this process are for the people of Kantri to decide, as they ask themselves the critical question: How do we move forward from here?

#### Future Research

This study has left us with many unanswered questions that have emerged<sup>1</sup> as we have continued to learn about the politics of curriculum transfer from the West to developing countries such as Kantri. What is the political context in which curriculum decisions are made? What legacy of colonialism or oppression is involved? In whose interests do schools exist? What kind of science education might enable local people to have better control of their own destiny? How can science education validate young people's cultural ways of knowing and enable them to establish their own educational goals? What kind of teacher education is needed for science teachers in developing countries? We intend to seek permission from the government of Kantri to conduct further research into the worldviews of local village people in an attempt to understand better how school science might be adapted so that the power of Western science can be harnessed in their interests. We have been challenged also to consider the question of the relevance of the results of our study for minority cultural interests within Western countries.

#### Note

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