IDENTITY LEARNING, CULTURE SHOCK AND BORDER CROSSING INTO EFFECTIVE TEACHING IN INDIGENOUS SCIENCE EDUCATION

Michael Michie

University of Waikato (New Zealand) and Batchelor Institute of Indigenous Tertiary Education (Australia)

mmichie@ozemail.com.au

I acknowledge the Kaurna people as the traditional owners of the lands around Adelaide and the Larrakia people as the traditional owners from around Darwin.

Teachers of science, particularly those who teach indigenous students, often find themselves teaching across two cultural borders (Aikenhead, 1996, 1997): a border between school science and everyday life which indigenous students may share with their non-indigenous peers, and a border between western science and their indigenous knowledge and worldviews. This paper focuses on the ability of teachers to also cross these borders to enable them to educate their indigenous students. It makes use of a theory of identity learning developed by Geijsel and Meijers (2005) and supported by others such as Pillsbury and Shields (1999) which focus on teachers working in border situations, particularly at the western/indigenous border. It considers the identity learning through culture shock experienced by teachers living and working in indigenous communities and how this translates to them becoming border workers.

Identity learning

Geijsel and Meijers (2005) understand identity as "the ever-changing configuration of interpretations that individuals attach to themselves, as related to the activities they participate in" (p.423). They argue that learning by teachers is a process both of social construction and of individual sense-making. Identity as a learning process is constructed culturally with intellectual and emotional inputs, and the emotional input can be more significant than currently considered in other identity-forming learning processes. Geijsel and Meijers (2005) suggest that identity learning starts when an individual has a boundary experience where they reach a limit of their self-concept. According to Geijsel and Meijers (2005), resolution of the conflict requires two interactive types of inputs:

1. *discursive meaning giving,* looking for concepts that give "an explanation that is logically and emotionally satisfactory for all who are involved ... [resulting in] ... mutual understanding and shared values" (p.425). This is mainly cognitive learning preceding emotional learning.
2. *intuitive sense giving,* a reflective process of making sense on a personal emotional level for the individual so that they are motivated and able to act. Put another way, the experience needs to make sense in their life story.

However the two inputs proceed at different paces and time and space need to be allowed for personal sense-making.

There are two possible outcomes regarding identity construction (Geijsel & Meijers, 2005). Although they suggest that sometimes the outcome can be an enhancing experience with

associated development and growth, they also suggest that it is more likely to be "an experience of conflict, shortcoming or inability, and of uncertainty, which is coupled with negative emotions" (p.424). The outcomes are not only cognitive, such as not having the required knowledge and skills, but also emotional, as the current identity configuration does not fit the situation. In the first scenario, identity is enhanced when new elements are given a place and are related to previous experience. On the other hand, the new ideas cannot be related to previous experience and are not personalised, so they do not become part of the identity configuration.

Culture shock

I suggest that the Geijsel and Meijers' model can be used to explain the main responses to culture shock, particularly by teachers working in indigenous communities. The term 'culture shock' applies to any social situation where an individual has to adjust to an unfamiliar social system where previous learning informing identity no longer applies (Pedersen, 1995), and is particularly used where individuals go into a different culture. Referred to as 'sojourners', they are distinguished from migrants and refugees on the one hand, and tourists on the other, because of the length of their stay and their motives for geographic movement (Weissman & Furnham, 1987, p.313). Although some earlier researchers saw culture shock as an illness, more recently it has been considered to be more about learning and personal growth (Heyward, 2002; Pedersen, 1995), caused by difficulty in justifying the reality of community life in contrast with the sojourners' previously-held conceptions.

Pedersen (1995) conceptualises culture shock as being a learning process, conceding that the stress a sojourner can go through might cause disease-type symptoms. His model of culture shock incorporates five stages: honeymoon stage (detachment); disintegration (self-blame); reintegration (hostility); autonomy (synthesis); and interdependence (bicultural identity). Petersen sees the third, reintegration stage as being the point at which the sojourner either regresses or progresses. He suggests that rejection of the host culture leads to the sojourner's regression to the more superficial honeymoon phase rather than progression to the fourth stage where the conflict is resolved. He also sees that identity is being modified through both cognitive and emotional experiences with the new culture.

Heyward (2002) uses the term 'intercultural literacy' rather than culture shock although he indicates that his model is derived from previous culture shock models and aspires to the same outcome, intercultural literacy. He suggests that without intercultural literacy, sojourners "living and working in international settings risk misunderstandings and intercultural blunders that can be extremely costly to both individuals and organizations" (p.11); this sentiment applies also to people working cross-culturally with indigenous people. Heyward develops a multidimensional framework for the development of intercultural literacy also with five stages: monocultural level 1: limited awareness – unconsciously incompetent; monocultural level 2: naive awareness – unconsciously incompetent; monocultural level 3: engagement-distancing – consciously incompetent; cross-cultural level: emerging intercultural literacy – consciously competent; and intercultural level: bicultural or transcultural – unconsciously competent. He suggests that the final stage, intercultural literacy, may not achievable by all sojourners and he refers to culture shock itself only as an event in monoculture level 3.

Petersen's (1995) and Heyward's (2002) models are overall fairly compatible as they relate to personal growth. An important similarity is that in both models the sojourner may not necessarily reach the final stages and it is from the third stage in both models that further

development may not proceed. Heyward's monocultural level 3 is identified by characteristics which are shared with the disintegration stage in Petersen's culture shock model and the subsequent cultural antagonism (stages 2 and 3). Whereas Heyward (2002) suggests that an individual may remain at level 3, consciously culturally incompetent and 'living alongside' rather than 'living with' the host culture, Petersen (1995) considers they revert to his stage 1. It is probable that by this phase most sojourners have reverted to, if they had ever passed, an essentialist modernist perspective of culture, accentuating the '*we*-and-*they*' dichotomy suggested by Pillsbury and Shields (1999). Moving beyond this phase may lead to a more-inclusive understanding of culture. On the other hand, if there is no further development then individuals will remain as cultural essentialists and maintain their western cultural hegemony.

Identity learning and culture shock

Geijsel and Meijers (2005) consider that identity learning takes place where there is identity enhancement, which is consistent particularly with Heyward (2002). There are two possible outcomes of identity learning (Geijsel & Meijers, 2005) which I suggest explain the two main responses to culture shock.

- In the first, identity is enhanced when new elements are given a place and are related to previous experience (Geijsel & Meijers, 2005). In this case, the response to culture shock is positive, matches the individual's life experience and they can move on to Heyward's (2002) cross-cultural level of emerging cultural competence or Petersen's (1995) autonomous stage.

- On the other hand, the new ideas cannot be related to previous experience and are not personalised, so they do not become part of the identity configuration (Geijsel & Meijers, 2005). In this option the individual's response to culture shock is negative, their ideas and attitudes remain static and they remain at Heyward's (2002) monocultural level 3 or apparently revert to Petersen's (1995) stage 1.

Heyward and Petersen discuss changes in the sojourner's identity as part of the learning process. Heyward (2002) suggests at monocultural levels 1 and 2 that cultural identity is firstly unformed then characterised by stereotypic comparisons with other cultures, similar to the '*we*-and-*they*' notion of Pillsbury and Shields (1999). Heyward's model continues with culture shock affecting people during the monocultural level 3, particularly causing them to re-examine their identities. If the sojourner passes this level, Heyward (2002) suggests they become aware of multiple cultural identities at the crosscultural level and consciously shift between them at the intercultural level. On the other hand, Petersen (1995) considers that at the reintegration stage, "The rejection of host culture patterns becomes the foundation for a new identity based on cognitive and emotional experiences with the new culture" (p.134). Pillsbury and Shields (1999) also consider that what they called 'precipitating events' could lead to the creation of either more flexible or more rigid boundaries, in much the same way as described above in Geijsel and Meijers' model. Each of the models discussed suggest that a positive response leads to identity learning whereas the consequence of a negative response is for the individual's identity to remain static.

Impacts on westerners living in indigenous communities

There is evidence that generally westerners who go to live in indigenous communities, including teachers, suffer from culture shock or some adjustment to the other culture[1]. This is

similar to when people go overseas to work for an extended time (Heyward, 2002; Loman, 2005; Pedersen, 1995; Richards, 1996; Ryan, 2008) and it seems to be most severe when the perceived difference between the cultures is considerable. On the other hand as Trudgen (2000) suggests, culture shock is scarcely acknowledged in the domestic situation, especially with relation to indigenous communities, but its description in international settings, particularly regarding teachers, also seems to be limited in the literature. Positive responses to culture shock by people, mainly teachers, living and working in indigenous communities can lead to them becoming border crossers. It is not my intention to analyse culture shock but rather to document and analyse insights the literature provides into its impact on westerners living in indigenous communities and its effect on schooling. The literature I refer to is skewed towards teachers but actually it seems to be limited in scope for other groups or individuals.

Moskowitz and Whitmore (1997) list a number of professional and personal challenges facing teachers new to the Northern Territory (Australia). Some of these challenges are common to all non-indigenous newcomers and are caused by "physical and cultural isolation and multicultural living" (p.51), while others are explicitly linked with teaching. The newcomers are often isolated from their natural support group of family and friends. They may be living in a community with different social mores (culture) where the people may also speak a different language. The accommodation which is provided is variable and they may have to share with strangers (but usually not the indigenous residents). New teachers spend a lot of time developing lesson plans and teaching materials, teaching and in meetings with other school staff. They may have unrealistic expectations on their students, as well as inadequate and inappropriate classroom management skills. Their students probably grew up speaking another language, so their command of English is not good, and often the teacher has not had any training in teaching English as a second language.

These challenges are in common with other regions in the settler states[2], particularly northern Canada (Brody, 1975; Harper, 2000; Stonebanks, 2008; Taylor, 1995; Tompkins, 1998; Wolcott, 1967) and reservation schools in the USA (Kincheloe & Staley, 1983). Some of the challenges are confirmed by the principal of the school in Queensland visited by Hickling-Hudson and Ahlquist (2003, 2004), where he said:

> "In their first six months here, the new teachers are in shock. There is culture shock; they are in the desert, it's hot, dry, dusty, they are isolated away from their own culture in a strange community, plus the fact that they are still learning to teach – most are first year out. It's not until maybe the second year that they settle down to teach." (Principal, in Hickling-Hudson & Ahlquist, 2004, p.69)

Similarly Loman (2005), who went to Papua New Guinea with no prior experience as a teacher, considers that she suffered in two ways. Culture shock combined with crises in classroom management made it impossible for her to focus on her teaching until after several months. McAlpine and Crago (1995) also describe the experiences of 'Nellie' in her first year as a teacher in a small Canadian Aboriginal community. Her experiences are described in terms which although not using culture shock *per se* as a mechanism, are recognisably similar. 'Nellie' referred to her early positive time as 'the honeymoon period', the term also used by Petersen (1995) and Heyward (2002). Furthermore, Stonebanks (2008) describes his experiences in a northern Canadian community in terms of culture shock, structuring it on Pedersen's five-stage model (1995).

Green (1983) considers that he and his family suffered from culture shock shortly after their arrival in an Australian Aboriginal community in 1966. Sickness, delays to their supplies and luggage, and "missing the familiar cues of city life" (Green, 1983, p.46) are given as reasons. Similar circumstances are reported by Gallagher and Gallagher (2004). Green (1983) also bemoans his ineffectual teaching, even though he had four years of prior experience teaching in mainstream schools:

> What was wrong with my teaching? I was more than puzzled – I was frustrated and dismayed. Had I arrived at Warburton direct from college, the children's failure to respond – and I saw it then as the children's failure – would have totally crushed my confidence. ... I was losing. I was getting nowhere and becoming both culturally and psychologically disorientated. (Green, 1983, p.42)

For teachers in particular, the impacts come from both the community and the classroom, as well as missing the necessities of urban life and maybe family. As an experienced teacher, Green was able to reflect on what he was doing: "... to analyse my failures; ... apply teaching strategies that were more appropriate to children in a desert school" (Green, 1983, p.43). This signals that culture shock can impact on experienced teachers as much as on inexperienced ones.

When westerners initially go to indigenous communities their early contact with the indigenous culture may be a naive awareness or honeymoon period, where they are aware of the different nature of the other culture. Considered from Heyward's perspective of learning and personal development (Heyward, 2002), they are learning new things about the people and the community. Once the euphoria wears off and the honeymoon period ends after a few weeks, the individual becomes aware of the cultural differences and they start to see different aspects of the indigenous culture, and the realisation that there is some sort of conflict between their previously-held beliefs and their new learning. It is this conflict that constitutes culture shock. This time can be described as a 'make-or-break' period when the newcomer can decide on a course of action.

In particular, physical conditions in some communities can lead teachers, especially younger teachers, to feel as if they are on the defensive (Moskowitz & Whitmore, 1997). Green (1983)[3] describes the presence of two-metre-high mesh fences topped with barbed wire as "developing a siege mentality" and ultimately causing "the physical and mental stress that such an environment imposes" (p.123). Structures such as these have been installed because facilities such as schools and teachers' housing are vandalised, particularly during vacations (Folds, 1987; Green, 1983; Heslop, 2003; Shaw, 2009) and the incursions of intruders at night (Green, 1983; Jordan, 2005). It has been suggested that these facilities are often not regarded by community members as belonging to them or under their control (Folds, 1987; Wax, Wax & Dumont, 1964). Negative images created by these situations contribute to the overall feeling of culture shock that is experienced.

My own experience of culture shock when working in an Aboriginal community caught me unawares. I had worked with Aboriginal people in the past although I had not lived in a community for any length of time. After living there for five of six weeks I found the tensions building and I started to wonder whether I should be there at all. It was not just the community; I was having troubles at work, both in the classroom and as the principal. Being teaching principal was a major problem and I was also missing family, friends and the normalcy of life back in Darwin, similar to Green (1983). At one stage I went as far as writing a letter of resignation which eventually I never submitted but I choose not to renew

my contract. Subsequently reading the literature allowed me to identify with other people's experiences.

One aspect I did not anticipate was how I would relate to the Aboriginal people in the community. I had worked with Aboriginal people for a number of years and written about aboriginal education from what I considered a postmodern or even postcolonial perspective. Yet I experienced feelings much as Pedersen (1995) describes as the disintegration and reintegration stages as I went through the culture shock experience. I started to think of the locals in terms of the 'we and they' of the modernist dichotomy. Although I chose not to stay, by the time I left I was becoming more relaxed with the host culture, apparently moving into the autonomy stage and away from the 'we and they' dichotomy but not reaching the interdependent stage as an endpoint (Pedersen, 1995).

Responses to culture shock: Courses of action

The literature on westerners working in indigenous communities indicates that they generally experience some form of culture shock (not always identified as such) early during their community experience but there are differences in their medium to long term experience. In this section I am going to look at how people respond to culture shock by considering the courses of action they take. Personal narratives about culture shock are limited; negative responses tend to be personal and not documented, whereas positive responses to moving to a new culture often do not necessarily mention the notion of culture shock. I have used the literature to devise four categories which are characterised by the people's courses of action.

1. The cross-cultural group. People in the cross-cultural group respond to the culture shock in a positive way. They indicate a need to understand the culture of their indigenous hosts in more depth and so they develop deeper understandings and a greater respect for the other culture. They are making the transition to becoming culturally competent and are engaged in border crossing. As Heslop (2003) suggests:

> Non-Aboriginal teachers should be mindful of the complexity of Aboriginal society and respectful of the opportunities given by community members to establish relationships. (Heslop, 2003, p.231)

This is the time at which people start making forays into the other culture. They may start to learn the local language spoken in the community and take part in the social activities (Chudleigh, 1969; Heyward, 2002; Mitchell, 1969; Taylor, 1995) such as joining sporting teams (Harper, 2000). Tompkins (1998) suggests that these people have a good sense of themselves which enabled them "to reach out, to ask questions, to check out situations, and to start to explore the community and the culture and find its differences and richness" (p.103), so that they found living and teaching in the community rewarding. A number of such cases have been referred to above. These people are 'living with' rather than 'living alongside' the community and eventually they may be 'living in' the community (Heyward, 2002). They become integrated with the indigenous culture through the removal of social barriers, usually a slow process, while still retaining their own cultural identity (Cooper & Cooper, 1990). Kincheloe and Staley (1983) suggest that the "successful reservation teachers have become aware of the traditions and how they make an impact on the educational setting" (p.19).

Members of this group understand that their earlier perceptions of their roles in the community may have been patronising and placed the indigenous people in a subordinate

power position. For example Jordan (2005) reflects on her changing perceptions in her first six months after a newcomer arrives:

> I had changed. Now I thought that our good intentions were patronising, and that our underlying assumptions about Aboriginal people reinforced their passive position and our right to make decisions on their behalf. ... Speaking to Jodie [the newcomer] reminded me that in my first six months, my illusions had disappeared as I had struggled to make sense of the reality of community life. (Jordan, 2005, p.149)

Green (1983) became a cross-culturalist through a significant event, what some would call an epiphany and others a critical incident (Sikes, Measor & Woods, 1985; Tripp, 1994). He took his students swimming at a flooded billabong, a significant event in itself in a desert community, which created a situation where:

> It was a sharing of experiences that recognised the knowledge that each of us brought to a new situation, and I wondered how I could apply this principle to my classroom teaching. (Green, 1983, p.50)

Here is recognition that the children's culture had something of value which was later utilised appropriately in his classroom. After this, Green was invited to observe some special men's ceremonies, a recognition of his acceptance into the community.

2. The expatriate group. The expatriate group find life in the indigenous community is incompatible with their belief systems (Brody, 1975; Heyward, 2002) but decide often for ulterior reasons to stay in the community. They may isolate themselves from the community except when they do their jobs, and they may leave the community on weekends and usually do so at holiday times (Brody, 1975; Green, 1983; Hickling-Hudson & Ahlquist, 2004; Taylor, 1995). They often form or become part of a western community within the indigenous community, an expatriate community 'living alongside' (to use Heyward's term) the indigenous one within their own country. They are encapsulated within their own 'cultural bubble' (Cooper & Cooper, 1990), and Brody (1975) finds the 'White sub-community' in northern Canada to be quite structured, with unwritten rules for the behaviour of the Whites/westerners and strong potential for ostracism (being 'bushed') for breaking the rules.

The expatriate group often live in a western enclave in much the same way as some sojourners often do when working overseas, reflecting qualities attributed to many international expatriates in the literature. Richards (1996) examines the behaviour of expatriate workers in international situations and one of his respondents who had worked in Ghana and Nigeria identifies two types of expatriate response. He describes one group which operated in a fortress or enclave mentality, referred to host country citizens as 'them', had no local citizens as real friends and socialised with like-minded expatriates[4]. Ryan (2008) describes expatriate behaviours in Port Moresby as demanding "exclusive and guarded enclaves [which] contribute to obvious segregation between the haves and have nots" (p.11). Ryan considers that there was neither a real relationship between the expatriates and the Papua New Guineans nor a sense of ongoing obligation, responsibility or renewal, and these are consistent with neocolonial attitudes. These attributes are shared by members of the expatriate group living and working in indigenous communities in their own countries; there is a sense of irony in using the term 'expatriate' to describe groups of westerners living in their own countries.

Members of the expatriate group often have ulterior or mercenary motives for teaching or working in indigenous communities. Working in remote communities often attracts financial benefits including allowances, subsidised accommodation and the possibility of extra tutoring which, when combined with not being able to spend their wages, offers a situation that facilitates saving (Harper, 2000; Heslop, 2003; Hickling-Hudson & Ahlquist, 2004; Taylor, 1995). Teachers can use periods of service in community schools to facilitate a more favourable placement subsequently (Martinez, 1994; Taylor, 1995) and often principals find themselves taking their first principalship in a community school for the same reason (Heslop, 2003; Hickling-Hudson & Ahlquist, 2004).

Other than working in the community school, most of the expatriate group's interactions are with each other (Folds, 1987; Hickling-Hudson & Ahlquist, 2004; Jordan, 2005; Martinez, 1994; Taylor, 1995). In the Aboriginal community they visited in Queensland, Hickling-Hudson and Ahlquist (2004) observed that:

> The teachers socialised among themselves, made few or no friends at a level of equality in the community, did not socialise with the local adults, and left the community every Friday to spend the weekend in the nearest urban centre, four or five hours drive distant. They were clearly outsiders who, feeling isolated, strange and uncomfortable, had no intention of staying. (p.69)

Often young, inexperienced teachers are attracted to this group as it offers them professional as well as social support. Taylor (1995) identifies a white group who formed a supper club where the participants "had a chance to maintain their universe – they could reminisce about home and the way things 'should be'" (p.229).

Members of the expatriate group do their work, probably without consideration of the culture of their clients and are often critical of them because of the perceived differences. They do not consider the values in the indigenous culture apart from the superficial, and their work is based on assimilationist practices. Often they express beliefs that the indigenous cultures are dying out (Green, 1983; Hickling-Hudson & Ahlquist, 2004) which conform to their assimilationist attitudes.

Group members typically have negative views of their indigenous hosts – stereotypical, prejudicial and discriminatory (Heyward, 2002; Tompkins, 1998). Martinez (1994) refers to a teacher, 'Brian', making denigrating comments about the Aboriginal people. Brody (1975) suggests that the criticism comes about because the westerners hold a stereotypical view of the identity of the indigenous people as the 'noble savage' but what the westerners observe does not match the stereotype. Wolcott (1967) includes extracts from letters from past teachers which are negative towards the native community and students. Tompkins (1998) suggests that they also resent other white workers who did not socialise with them, levelling the accusation that they had 'gone native' or were 'bushed'. Stonebanks (2008) describes a colleague who made comments about the resident Cree, referring to them paternalistically as *"nos enfants"* (French, meaning "our children", p.111). Stonebanks and his wife also chose to no longer go to dinner with some of the other western teachers because of racist comments that were made at a dinner they attended; this can be seen as them breaking away from a group of expatriate teachers.

Expatriate teachers disapprove of fraternisation between themselves and the indigenous community (Martinez, 1994) although there is evidence that this is the case for the wider community or at least for educational authorities. Taylor (1995) recalls that when he was

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teaching in one reserve school (in Canada), the superintendent suggested he was getting too involved with the community and questioned his friendships with indigenous individuals and families. Goulet (2001) describes an instance where advice was given by the superintendent not to mix with the indigenous people being given to a group of teachers, including paradoxically to 'Roxanne', an indigenous Dene[5] woman teaching in her home community. Recent reports from Canada now recommend that teachers should reach out to and have open relationships with the Aboriginal community (Bell *et al*, 2004; McBride & McKee, 2001).

Another feature of teachers in the expatriate group is their negative attitudes toward their indigenous students as well as the community and they often complain about what's happening, usually to other like-minded people[6]. Hickling-Hudson and Ahlquist (2003, 2004) report on negative comments and attitudes of some more experienced teachers in the school, and they also report on the lack of an Aboriginal focus in the curriculum and in how the school was decorated.

3. The short-term stayers. For a small minority the impact of the culture shock experience causes them to leave shortly after their arrival or in some cases, to retreat into a world of their own. For some, the impact of culture shock is so severe that the individuals cannot live in the host culture (Oberg, n.d.; Pedersen, 1995). Heslop (2003) considers that some teachers became so frustrated they left the community "with low regard for their [own] teaching skills and holding negative attitudes towards Aboriginal people" (p.210). Georgina (in Daniels, 2007) suggests that "the experience of living in a community can be so confronting that the average stay of teachers is ... six weeks" (paragraph 6). Collins and Lea (1999) also find the duration for many teachers to be short but there appears to be no official statistics.

As many of the teachers going to indigenous communities were also in their first year of teaching, leaving the community may affect their feelings of competence as teachers and they may be lost from the profession (Heslop, 2003). Green (1983) suggests that if he had been a neophyte teacher rather than having several years of experience, his confidence would have been totally crushed (above); even so, he found his first weeks in the community school difficult. A positive experience with his students gave him the confidence to stay on.

Some short-term stayers display some characteristics of the 'escapists', a term used by Cooper and Cooper (1990) and Taylor (1995), who either escape by leaving the community or by retreating into the confines of their own world. This is a group of people for whom the reality of the community is too contradictory to their world view. Their usual course of action is to leave the community because they cannot reconcile between their old ideas and the new environment.

4. The nonconformist group. At the other extreme, there is a small group of people who may try to assimilate into the indigenous culture. Such an action may be premeditated by the westerner but it may not be acceptable to the indigenous hosts (Waldrip, Timothy & Wilikai, 2007). Some may come because of desperation (Haig-Brown, 1990), whom she describes as misfits in their own world. On the other hand Price and Price (1998) feel that 'misfits', some of whom would fit into this group, were accepted at least by some Aboriginal people although they did not explain why. Schwimmer (1958) considers as 'dissenters' the group of Europeans who lived among the Maori. The nonconformists may be considered to be inclusive of the transculturites (Hallowell, 1963), the beachcombers or *Pakeha Maori* (Bentley, 1999; Milcairns, 2006; Nicholson, 2006) as they are not strong in their own culture and perhaps believe that 'white man got no culture'[7]. The nonconformists have not developed any cross-cultural competence but are probably incompetent in their own culture as well.

It is important to distinguish this group from those people who have extended careers in indigenous communities and who are cross-culturalists. 'Misfits' is one of the categories ascribed to an inauthentic classification[8] and Townley (2001) explains the term 'misfits' as a self-ascribed label used by some professionals with extensive experience and influence and status in Aboriginal communities, but they are not nonconformists. Intermarriage with an indigenous person does not necessarily imply that a person automatically becomes a nonconformist but rather doing so can result in establishing influence and status. There is also concern expressed about westerners being in a community for an extended period of time and 'going native' as if one implied the other (Harper, 2000, 2004). In reality the concern would seem to be about the Canadian north 'getting into one's blood' and then not being able to resettle in the urban south, a feature of reverse culture shock (in stage 5 of Heyward, 2002). Tompkins (1998) identifies that 'going native' is used also as a pejorative by teachers who excluded themselves from the community (i.e. expatriates) regarding others who have better relationships with the indigenous people (i.e. cross-culturalists).

Identity learning and border crossing

Of these four groups it is the cross-culturalists who become part of the indigenous community, living with the indigenous people and taking part in their social and cultural activities. They understand that there is something of value about the other culture and as they develop a deeper understanding of the indigenous culture they also develop respect for it and the people. Those who are teachers develop an understanding of the needs of their students both within their community and within the world at large and they strive to help fulfil those needs. It is this group that I continue to focus on in the following section.

Culture shock can be seen as having an impact on an individual's identity (Geijsel & Meijers, 2005; Heyward, 2002; Pillsbury & Shields, 1999). For instance, Heyward (2002) considers that prior to a culture shock experience, individuals have unformed or stereotypical notions of culture. I consider that these would be consistent with the '*we*-and-*they*' or 'us-other' binaries related to the modernist perspective. As noted in the Geijsel and Meijer's model (2005), a positive response would typically lead to enhanced cultural identity. I suggest that subsequently there would also be an associated change away from the modernist dichotomy towards a postmodernist or postcolonialist perspective.

Similarly there has been some criticism of border crossing being based on an essentialist (i.e. modernist) perspective (Malcolm, 2007). Certainly it would seem that the expatriate group maintain a modernist perspective as their behaviours indicate a dichotomy between indigenous people and them. Border crossing implies enhanced identity learning suggesting movement away from the modernist perspective.

Here I want to make use of the border crossing metaphor and extend it to bring some of these ideas together. I interpret the literature to suggest that there are at least four, perhaps five, groups that can be identified by the characteristics which have been discussed previously. I refer to the four groups as border flee-ers, border liners, border crossers and border workers; I propose there is a fifth group, border mergers, with limited evidence from the literature.

Border flee-ers. Earlier I described a group of short-term stayers who have a negative response to culture shock and identity learning, and choose to either leave or become isolated within a community. In terms of the border they are fleeing from the border, intent upon locating themselves away from the cultural interface.

Border liners. I also suggested that some westerners form a group I call the expatriate group who choose not to engage with the indigenous communities in which they work but rather form enclaves of westerners in which they associate with like-minded people. According to the Geijsel and Meijers' model (2005) they demonstrate no identity enhancement to the boundary events. In Heyward's (2002) model of intercultural literacy, they remain monocultural and do not make the transition to become cross-cultural, let alone intercultural (or bicultural). In some ways their behaviours are similar to those displayed by many expatriates working overseas who remain monocultural, distance themselves from their hosts and display stereotypical and chauvinistic attitudes.

In general these people may be strong in their own western culture, some may have assimilationist views and some consider that the indigenous culture is dying out but generally they have only superficial and deficit understandings of the other culture. There are a number of reasons advanced as to why people have been willing to occupy this border line position. Pillsbury and Shields (1999) consider loyalty to and overidentification with their own group and perceptions of correct social posture cause individuals to erect barriers at borders. Often they are mercenary reasons – financial or for advancement within the teaching profession.

I refer to this as the border line position relative to the cultural interface. The incumbents are westerners who work alongside (rather than with) indigenous people without crossing the border (Heyward, 2002).

Border crossers. Border crossers include the cross-cultural workers who have a positive response to the culture shock event and want to find out more about the indigenous culture. They (as well as members of the next two groups) have had identity learning enhancement to the boundary events (Geijsel & Meijers, 2005). Border crossers see value in the indigenous culture and attempt to reconcile the two cultures, usually to promote an understanding of the western culture by the indigenous people. They start by crossing borders more-or-less on a needs basis, making forays across the border.

Border workers. These people use their understandings of both cultures to assist the indigenous people; they have undergone enhanced identity learning (Geijsel & Meijers, 2005). Border workers chose, like Haig-Brown (1992), to remain metaphorically in the border world. They work as allies to the indigenous people, giving advice, and are invited by them to take part in the project rather than setting the agenda.

The transition from border crosser to border worker seems to suggest a number of changes. As border workers they take into account the wishes of the indigenous community and they have the support of the community they are working with, although this is not necessarily formal but may be tacit approval by the community. Using Heyward's terminology (2002), border crossers would be living with, and possibly living in, the community, although in some cases this may be metaphorically rather than a physical reality.

It would seem from the literature that teachers of indigenous students in indigenous and mainstream schools who are border crossers and border workers are also effective teachers. This means primarily that the teachers are warm toward their students, that they demonstrate understanding and respect for their students' culture. The literature suggests that they should also be demanding on their students academically.

Border mergers. Although there is little in the literature to support this situation, I propose it to include those people who have moved beyond border crossing and find the notion of

borders to be untenable or impractical, such as post-culturalists (McConaghy, 2000; Michie, 2011).

Contribution to the teaching and learning of science

Border crossing can enhance the personal and professional identity of western teachers of indigenous students in science. Some teachers learn that the indigenous culture is different, is of value and respect it. They learn more about the local indigenous knowledge and can apply it in the classroom. They also learn more about the indigenous people, particularly their students, and learn to treat them with warmth which may develop into respect for the indigenous people as individuals. Border crossers are identified in a number of ways, as border crossers, cross-culturalists, effective teachers and access-enhancing teachers (Michie, 2011). Border crossing influences both the cognitive and affective domains and it is through learning in these two complementary domains which leads to identity learning enhancement (Geijsel & Meijers, 2005). For other teachers, going to live and work in an indigenous community can be a border crossing experience which is often difficult, if not hazardous or impossible.

Culture shock is used to explain these individuals' reactions to the experience, whether they are successful in crossing the border or not. The response to culture shock can be seen as an example of identity learning, using Geijsel and Meijers' (2005) model. The model suggests that identity learning enhancement takes place as a response to both cognitive and affective changes in the individual's environment. It can also be used to explain a lack of identity enhancement as a response to culture shock which affects those who have difficult, hazardous and impossible experiences.

Teachers should realise that they need to negotiate the power relations in their classroom rather than expect or exploit it because of their position. Teachers of science need to be aware that science can be viewed as another culture and many of their students, particularly indigenous students, need to be guided across cultural borders. This realisation may well be the teacher's own border crossing. The science they learn should be a local science which incorporates local knowledge as well as the western scientific version.

1. This literature includes Bell *et al*, 2004; Brody, 1975; Chudleigh, 1969; Clarke, 2000; Crawford, 1989; Green, 1983; Harper, 2000; Henwood, 1969; Heslop, 1996, 2003; Hickling-Hudson & Ahlquist, 2003, 2004; Mahan & Smith, 1979; Mahar, 2004; McAlpine & Crago, 1995; Mitchell, 1969; Moskowitz & Whitmore, 1997; Stonebanks, 2008; Taylor, 1995; Trudgen, 2000; Wyatt, 1978-79; Zapf, 1993.
2. The settler countries are those which have been relatively recently colonised and have indigenous as well as migrant-descendent populations and include Australia, New Zealand, Canada and the USA.
3. Green (1983) describes two separate sets of experiences, firstly as a teacher in Warburton in 1966, then later as a teacher education lecturer whose travels took him into many other remote indigenous communities.
4. A second group consists of those who tried to take part in the local culture "to learn about other lifeways that would have made their stays in those countries far more pleasant and interesting" (p.566). Richards (1996) suggests that this response is less likely to occur because it is more difficult. Using my classification I suggest that this group is the same as the cross-cultural group.
5. The Dene people are First Nations people from the North West Territories of Canada.
6. The third, reintegration phase of Pederson's model of culture shock (1995) is exemplified by anger directed at the host community. I suggest that the expatriate group do not develop beyond this phase of culture shock and their negative attitudes towards their hosts are a modification of an earlier anger at the community.
7. Stanner (1979) is titled *White man got no dreaming,* which seems to parallel this trope occasionally heard in Australia and sometimes used by westerners. Its origin seems to be uncertain.
8. "Mercenaries, missionaries and misfits" is an alternative classification of workers in indigenous communities. It is basically pejorative in nature and as such is not considered authentic (Michie, 2011).

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