Research Article

COLLATERAL LEARNING:
A THEORY TO EXPLAIN LEARNING FROM
AN ANTHROPOMORPHIC WORLDVIEW

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ABSTRACT

The literature shows that the cultural background and the worldview presupposition of a learner can have a great influence on achievement in education. When students base their reasoning on a non-Western worldview, they tend to be inhibited from constructing concepts. This further alienates learners, from indigenous or minority groups who must fit within the world of the majority, whose success at learning must be measured from a Western framework. This paper discusses the cultural borders learners from a non-Western/indigenous background have to cross daily to acquire education within a modern day context. It also discusses the theory of collateral learning, a progression that appears to move from anthropological instruction to autonomous acculturation, to explain the coping mechanism which goes on in the schema of the non-Western learner in order to cross borders from a hazardous (symbolically violent) to a secured learning environment.

Key words: collateral learning, cultural boaders learning theory, cultured backgrounds

INTRODUCTION

Almost every culture is and should be interested in how knowledge is generated and used because it underlies the transmission of cultural heritage to succeeding generations. Alexander & Dochy (1995) define knowledge as factual information that comes about as a result of learning. It represents all that a person knows or believes to be true, whether or not it is verified as true. There is however a difference between knowledge acquired within traditional non-Western cultures and those acquired within Western cultures often seen as mechanistic. Within the former environment, knowledge and values are acquired mainly through experience, observation, from the land or from spiritual teachings, and handed down from one generation to another mostly by oral means. However within Western cultures knowledge is generated mainly through empirical means and most be verifiable and repeatable to be considered a universal. There is therefore a duality in the way the world looks at knowledge. This duality has essentially being dictated by the two major types of world views. This means that the traditional way the Japanese looks at nature, for instance, is different from the way the European looks
at nature.

Indeed cognitive research to date has shown that: (i) context is important to understanding what is learned; (ii) learning is not automatically transferred to new settings; (iii) passive learning is negative to developing cognitive and metacognitive skills; and higher order learning is not a change in behaviour but the construction of meaning from experiences (see Thomas, 1992). As succinctly elaborated by Resnick (1989), learning is a process of knowledge construction, not of knowledge recording or absorption. Learning is knowledge dependent and people use current knowledge to construct new knowledge.

Contemporary literature has shown that recognising the social context of learning as well as the effect of the learner's socio-cultural background teaching and learning is of primary importance if a strong basic foundation is to be established for successful student achievement and affect outcomes (Cobern, 1994; Driver, 1979; Jegede, 1995; Ogawa, 1986; Oginniyi, 1988; Solomon, 1989). Empirical studies (see Jegede, 1995) have supported the influence of some cultural variables on concept attainment. Ghuman (1978), and Okebukola and Jegede (1990), found that cultural traditions and beliefs in a given society influence learners' responses to what is learnt in the classroom. Some of the studies have confirmed that cultural factors such as authoritarianism, traditional worldview, goal structure, and societal expectation, affect learning, and in many cases lead to under-achievement. Unfortunately however, researchers and teachers alike hardly pay particular attention to the important aspect of utilizing the cultural background and prior knowledge acquired from the cultural environment brought into the class for further knowledge construction. If science education is to be effective in a particular culture, the culture represented in the classroom must be taken into account in teaching and learning. It must emphasise the peculiarity of that socio-cultural environment and use that culture's rationalities to solve problems.

WORLDVIEW AND DUALITY OF CULTURES

The cultural context of education has two main ecologies. The first is conceptual ecology which pertains to how individuals within a particular ecological environment cognise knowledge. The second type is social ecology which refers to the larger society in which the individual lives and interacts with others to socially negotiate knowledge, amongst other things. These ecologies which have been referred to as eco-culture (Okebukola and Jegede, 1990) and conceptual ecoculture (Jegede, 1995) and have been the foci of most of the studies under socio-cultural factors, are all subsumed under worldview. Cobern (1994) defines worldview as "culturally-dependent, generally subconscious, fundamental organisation of the mind which manifests itself as a set of presuppositions that predispose one to feel, think and act in predictable patterns" (p.58). What Cobern definition implies is that worldview presuppositions are antecedents to, and form the cognitive background for both Western education and indigenous knowledge concepts; but that the different types of conceptual systems (Western and non-Western) are grounded in different worldviews.

HEGEMONY AND SYMBOLIC VIOLENCE

What often occurs in classroom situations in most parts of the world is that the Western type of education is imposed on everyone irrespective of the cultural diversities within the classroom and it is
used as a hegemonic icon of cultural conquest. Instead of listening to all shades of opinions and using the different cultural backgrounds or worldviews to teach in Western classrooms, Western education creates symbolic violence to marginalised and oppressed students who are often from non-Western/indigenous backgrounds.

Acquiring education seen through the culture of the Western world demands that the learner also acquires the culture of the West. In effect, an indigenous/non-Western learner is forced, as it were, to cope with two worldviews.

The Western type of education is erroneously seen as the only correct path to knowledge acquisition in the popular Western culture. Instead of attempting to convert students so that they shed their indigenous ‘primitive’ worldview in favour of more scientific explanations, the school should recognise the situations in which they are useful and those which may also, or instead, be approached through worldviews. This evangelistic mission of Western education in Non-western communities meant that it was used, not to promote the healthy coexistence of the Western and the indigenous cultures, but as a sanitising and civilising medium. As noted by Dart and Pradham (1967), “the attitude and often the intent of Western education has been that a ‘primitive’ or ‘decadent’ civilisation is to be replaced with a more ‘modern’ and ‘better’ one . . . . It tends to be particularly strong in science teaching, for science teaching is taken to be the one really unique and powerful offering of the western world” (p.655). This has resulted in a number of events which include: the imposition of one culture (Western) over another (indigenous/non-Western), cultural genocide; and cognitive dissonance as the non-Westerner learns (Ogawa, 1986; Jegede, 1995, 1996; Jegede & Fraser, 1990; Jegede & Okebukola, 1993).

More importantly, the imposition of Western style learning and ideas on the indigenous learner as mentioned above results in symbolic violence. Symbolic violence, according to Tobin (1996) is unintentional in that an individual who feels misplaced within a community, feels a sense of devalue for his/her cultural artifacts. Symbolic violence discourages co-participation in learning, engenders a feeling of not belonging, and a feeling of difference and marginalisation. Learners become sufficiently alienated resulting in a decision to opt out of school.

Aikenhead (1996) has summarised from the literature the differences between aboriginal/indigenous/non-western knowledge of nature and Western knowledge about nature, and they support in part some of the issues I have raised above. A student from an indigenous/non-Western background within an environment which uses the Western education mode comes into the classroom with all the characteristics of his/her indigenous background. More often that not, to learn effectively from the Western perspective and within a Western culture s/he will be expected to erase from his/her mind the prior knowledge brought into the classroom from the indigenous background as pre-requisite to learning Western based knowledge. However, in real situations what results is that the students need to cross borders from the everyday subcultures of peers, family, ethnic orientation into the subculture of school, classroom and subject matter. Just through imagination, crossing from one subculture to another will be exceedingly difficult and sometimes impossible for students who hold dual worldviews while expected to learn in another. However, according to Aikenhead (1996) border crossings need not always be problematic, if the learner intuitively and subconsciously alter certain beliefs, expectations, and conventions as s/he negotiate the cultural borders between indigenous knowledge and school knowledge. This also depends on the type of multiple worlds explored by the student in learning. Using both Phelan et al.’s (1991) model and Costa’s (1995) linkage. Aikenhead has shown that “there are four types of transitions in border crossing: congruent worlds support smooth transitions, different worlds
require transitions to be managed, diverse worlds lead to hazardous transitions, and highly discordant worlds cause students to resist transitions which therefore become virtually impossible." (p.5).

An instructional event or activity is considered educational (ie useful and meaningful) only when learners understand and apply what has been learned to solve current problems or transfer what has been learned to future situations (Knapp, 1992). Knowledge cannot be assured or established till it is demonstrated. It cannot be demonstrated unless it is understood or learned within a specific context. It cannot be learned until cultural border crossing occurs. Collateral learning might be a viable explanation of how border crossing takes place within the classroom.

**COLLATERAL LEARNING**

What becomes very significant and needs to be resolved is how learning takes place within the schema of a student who requires to cross cultural borders in his/her day to day learning. How does a learner resolve the state of cognitive dissonance in crossing borders in order to learn? Or how do multiple mental states co-exist or supplant each other in the learning process when a student uses one worldview as framework for another?

It may well be that contrary to explanations provided by studies into cognitive change through alternative conception or misconception theory, we should now begin to look at ways in which non-Western learners cope with the dilemma of learning in an environment somewhat hostile to the indigenous knowledge they bring into the Western classroom. The thesis of this paper is that the duality of thought and actions created in the schema of non-Western learners within a resilient indigenous knowledge framework results in collateral learning.

Collateral learning represents the process whereby a learner in a non-Western classroom constructs, side by side and with minimal interference and interaction, Western and traditional meanings of a simple concept. Collateral knowledge therefore is the declarative knowledge of a concept which such a learner stores up in the long term memory with a capability for strategic use in either the Western or traditional environment. A simple but practical example which I have enjoyed working with is 'rainbow making'. Western science teaches students that a rainbow is caused by the refraction of a beam of light by droplets of water. A common activity usually performed in the laboratory to explain or confirm this is passing a source of light through soap bubbles or merely raising the bubbles towards natural sunlight. The joy of scientific discovery shows very clearly and instantly through the excitement students often display during this experiment. On the other hand, traditional thought explains the appearance of the rainbow as a python crossing a river or a sign indicating the passing away of an important traditional chief. There are several other explanations from other cultures. Although explaining or confirming this phenomenon is most difficult if not impossible, a non-Western student nevertheless holds this as a dogma. Such a student may not offer this explanation in a science class beyond mentioning that this is what is believed traditionally, but in the local community s/he holds the traditional explanation as gospel. However, what s/he has learnt about rainbow making in the science class remains intact and only drawn upon during examination period if needed.

**ONTGENY OF COLLATERAL LEARNING**

Collateral learning has its roots in two major historical developments. First, the use of education,
especially science, to defend Western rationality and therefore a justification for Western expansion (Pyenson, 1993). With the development of science, ‘Western Europe became the crucible for nineteenth-century expansion, the notion of the West emerged as an expression for all societies that imitated European fashions and operated economies based on European technologies’ (Pyenson, 1993; p.330). The European way of thinking became associated with the phenomenal success recorded through the use of science and technology in warfare and industrial revolution. The tradition of Western education therefore became a civilizing medium for the world.

The second historical development is related to the first and has to do with the consequences of colonialism for countries and their citizens, especially those of Africa. Through education, the colonialists extended the use of science as a civilizing subject to be taught in schools in order to rid the savages of the magical view attached to reality. Sogolo (1994) in discussing the crisis of identity as the consequence of the malaise of colonial mentality says that:

> It is a historical fact that Africans accepted colonialism as a vehicle of economic and social transformation. Yet, their traditional ways of life continued to have a grip on them. In quite a number of cases, the imported items of culture were structurally disruptive of the core elements of African culture such that it was possible for them to mesh or co-exist with those already in place. The attitude was either one of hostile reaction against the new order or a powerful tendency to retain the status quo. It gave rise to the mixed feelings in which the troubled sense of acceptance was pitted against that of rejection (p.3).

Lending credence to collaterality arising through colonialism, Wiredu (1980) said colonialism resulted in:

> the phenomenon of belonging at once to two worlds, namely the world of the modern urban industrial centre and that of the traditional home...a new dualism... that causes a kind of ethnic schizophrenia in some spheres of conduct (p.23).

Translated into the classroom, it is not too difficult to imagine how the indigenous child learns collaterally and the learner’s acceptance of this state as an every day occurrence. Coupled with the way most school books and teachers portray Western worldview as the only legitimate way of understanding nature, the cognitive processes which occur in a learner’s schema becomes a complex array of dilemmas, conflicts and continual attempts to wrestle with a situation central to how concepts are learned.

Four types of collateral learning are discernible. They are parallel, simultaneous, dependent and secured. Each is briefly discussed below with respect to learning concepts in one worldview supposition while using the other as framework, as an attempt to cross cultural borders in a classroom environment.

(a) **Parallel collateral learning**

The learner acquires and maintains in the long term memory opposing schema about an idea or concept when learning new concepts. The learner experiences no visible disequilibrium, that is, no confusion or surprise (Gorsky & Finegold, 1994) except perhaps to readjust memory to accommodate the differing view as presented in the classroom. The existing schemata shows no interactions with or displays any incompatibility with day to day experience. Parallel learning often characterises a situation when the learner first comes in contact with school knowledge and allows the new information to coexist in his/her schemata while still trying to understand what they all mean.

(b) **Simultaneous collateral learning**
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For a concept to become embedded in the long term memory, a learner must have processed the information over a period. In most cases learners in the non-Western environment bombarded with concepts and ideas about nature from the indigenous background require some moment to comprehend what is to be learned. A situation therefore arises when ideas from two world views about a particular concept are learned at the same. Depending on the knowledge base of the learner, a number of interacting elements such as the current problem state, problem solving techniques, and differences or similarities between the ideas from two different world views are simultaneously assessed.

(c) Dependent collateral learning

This occurs when a schema from a world view is presented to challenge another from a different world view to an extent that the declarative and strategic knowledge permits a learner to modify existing schemata. Although no radical restructuring of the existing knowledge base occurs, the learning of an idea (change of an existing schema) depends on the use of one as a trigger. This means that a currently held belief (indigenous or otherwise) is held tentatively to be altered by the construction of new knowledge from the new schema or the rejection of a current one. The process of learning here is similar to the Prosser’s (1982) accommodation-assimilation model of information processing and Sweller’s (1994) explanation of a means-ends strategy involving an attempt to extract differences between each problem state encountered and the goal state and consequently finding problem solving operators that can be used to eliminate these differences.

(d) Secured collateral learning

Knowledge or intellectual skill, as we now know, occurs through gradual and incremental acquisition instead of the all-in-one fashion as has been thought (see Sweller, 1994). To do this effectively, a learner encounters and resolves what is usually called cognitive conflict, mental perturbation or dissonance in the knowledge base held in the long term memory. For the non-Western learner, understanding the concept being learned would involve resolving the conflict it has created with the indigenous knowledge base brought into the classroom. The learner attempts to clarify situations by questioning the validity of statements like ‘How do we know that’... ‘How can we confirm that...’, ‘What evidence do we have to support this...’, etc. A situation of reinforcing the schema learned in one worldview by a similar one from another begins to occur. The learner evaluates seemingly conflicting worldviews or explanatory frameworks and draws from them a convergence towards commonality. This strengthens the learning process and secures the ‘new conception’ in the long term memory.

The different types of collateral learning are not necessarily separate from each other. They are not to be viewed as discrete but rather as a continuum within the purview of learning concepts in a socio-cultural framework. It should also be seen that a learner could be guided to progress from parallel through simultaneous and dependent to secured.

CONCLUSION

What has obtained in educating non-Western learners is that very little emphasis is placed on the indigenous knowledge base which a learner brings into the class. While there is evidence in the literature demonstrating the theories which underlie instructional strategies and learning outcomes,
there is a dearth of information about the cognitive processes which take place when a learner is confronted with a worldview interpretation of a concept different from his/her indigenous worldview. The argument in this paper is that if multicultural education is seen as an interdisciplinary field of inquiry that emphasizes cultural diversity, then it must be assumed that marginalised voices and their way of knowing need to be recognised so that the philosophy and pedagogy appropriate to their educational needs are applied. The literature show that the cultural background and the worldview presupposition of a learner can have a great influence on achievement in education. When students base their reasoning on a non-Western worldview, they tend to be inhibited from constructing concepts. This further alienates learners, from indigenous or minority groups who must fit within the world of the majority, whose success at learning must be measured from a Western framework. The paper has also pointed to collateral learning, as a very significant factor in looking at how such cognitive processing takes place while attempting to cross cultural borders to fulfill educational goals of a Non-Western learner within a Western environment. Four types of collateral learning were identified and discussed and a view has been expressed that the four types are within a continuum and learning may progress from parallel to the secured collateral learning. A major implication of the issues discussed above is the need to re-examine the curriculum and instruction models being used to teach non-Western learners as a way of preparing them to enter into the Western world. Until we listen to their silent cognitive problems with a view to meeting their cultural needs, the road to continued ‘failure’ as measured by Western parameters is paved.

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