

IT'S ALL IN THE MIND

*AN INTEGRATIVE APPROACH TO
TEACHING AND LEARNING*

By Kistensamy Marimuthoo Govender

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Abstract

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In this dissertation the researcher uses cognitive science and communication science to develop an integrative motivational learning framework for teaching intermediate phase learners to solve problems in the subject domains of mathematical literacy, language literacy, natural science, economic and management sciences, social sciences, technology, arts and culture and life orientation within the South African Outcomes-based Education curriculum.

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Chapter 1

STATEMENT OF PROBLEMS AND RESEARCH PROCEDURE

Preview

In this chapter the researcher will identify a number of problems with regard to following in integrative approach to learning in Outcomes-Based Education in the intermediate phase. Thereafter he will state the aims of his research, and will indicate what research methodology he will use to find solutions to these problems in order to meet the aims of his research.

Statement of problems to be analysed

This dissertation focuses on the use of integrative studies to teach language communication, numeracy, geography and social studies to first and second language learners in the intermediate phase of the Outcomes-Based Education framework that is being implemented in most countries of the Western World. Three major problems can be identified around an integrative approach to learning in OBE.

Problem 1: The existence of an integrated, trans-disciplinary approach to teaching and learning

This problem relates to the fact that, from the point of view of knowledge construction, all knowledge is integrated into a comprehensive conceptual framework in the minds of learners. If all knowledge exists as a single nexus in our minds, a coherent approach needs to be identified, or developed, that can account for this unity of knowledge. On this approach, domains of knowledge form the conceptual boundaries between disciplines, while the

curricular distinctions between subjects are necessary fictions because human cognitive limitations require of us to concentrate on one thing at a time, and to take the historical traditions on which disciplines are based as point of departure.

Because all learning however, is interrelated, this means that interpreting texts will require knowledge that transcends subject boundaries. A learner may for instance, need knowledge of language structure, geographical knowledge, social customs as well as numerical skills to understand a particular text. This means that learning procedures and strategies should be devised and developed to enable learners to understand literacy texts, and comprehension in such an integrated fashion.

Problem 2: The forms of communication required to facilitate the individual construction of meaning and the social construction of meaning in an integrated multidisciplinary learning framework

This problem relates to the fact that learners as well as educators need to be in command of a range of expressive (communicative) skills in order to present their understanding of knowledge. Anecdotal information obtained from educators, as well as presentations given at educator workshops reveals that there is no real understanding of the specific range of oral and written communication skills that are required of both educators and learners in Outcomes-Based Education settings.

Problem 3: The availability of appropriate prescribed texts and learning materials that are sensitive to the trans-disciplinary nature of human thinking and learning

This problem relates to the non-availability of appropriate prescribed texts and learning materials to facilitate trans-disciplinary learning in the intermediate phase.

Aims

In the course of this dissertation the researcher will show that the above-mentioned three problems have the following three solutions:

Aim 1: To assess the viability of an integrated, multidisciplinary approach to teaching and learning

Outcomes-Based Education in principle makes it possible to follow an integrative approach to learning. Formalising such an integrative approach in OBE will provide a holistic, coherent conceptual framework for lifelong learning. Such an approach best suits the future oriented requirements of transformational OBE — the form of OBE that South Africa has embarked on. An integrative approach to learning implies that there is integration across disciplines and across all 8 learning areas in all of the educational activities when new facets of knowledge are explored. The result of this form of integration will be a profound transferability of knowledge in real life as required by transformational OBE.

Aim 2: To document the forms of communication required to facilitate the individual construction of meaning and the social construction of meaning in an integrated multidisciplinary learning framework

All humans unconsciously use language in variety of ways to communicate with one another. Human communication in principle can be of a cooperative or a confrontational nature. Transformational OBE requires that knowledge gained during formal learning should empower the learner to solve both immediate and long-term problems encountered in everyday life. In the course of this dissertation the researcher will show that the discipline of Communication Science provides us with cooperative forms of communication that will

develop the communication skills, which learners need for formal learning and to help them resolve problems that they encounter in their every-day lives.

Aim 3: Using the same prescribed texts and learning support material for teaching across the curriculum.

One of the reservations that educators constantly express about the learning and teaching of the curriculum is that there are few appropriate prescribed texts and learning support material available. In this dissertation the researcher will show, that by following an integrative approach to learning and teaching, how the same materials can be used in the intermediate phase to teach across the curriculum.

Research methodology in brief

This dissertation is of an analytic-descriptive nature, which entails the following:

- o A literature review pertaining to the cognitive basis of learning
- o The role of a number of communication strategies in teaching an learning will be explained
- o The nature of an integrative approach to learning will be explained
- o A critical analysis will be made of integrative studies versus subject orientated studies
- o The nature of Cognitive Rhetoric (CR) will be outlined, and it will be motivated why CR forms a proper framework for an integrative approach to learning.
- o Proposals will be made about use of an integrative approach in the intermediate phase, by using specific communication strategies to teach across the curriculum within the general framework of CR.

Conclusion

In this chapter the researcher stated three problems with regard to following in integrative approach to learning in Outcomes-Based Education in the intermediate phase. The three problems are (1) determining a coherent approach to trans-disciplinary learning, (2) determining the role of communication in trans-disciplinary teaching and learning, and (3) determining the availability of appropriate prescribed texts and learning materials for trans-disciplinary teaching and learning

After he discussed the there above-mentioned problems he formulated three aims in order to resolve the problems that he identified. Finally, he indicated what research methodology he used to find solutions to these problems in order to meet the aims of his research. He indicated that he would begin his research by means of literature surveys of the following areas: the cognitive basis of learning, the general principles of OBE, the concept “curriculum” in OBE, the communication strategies that needed to form part of an integrative approach to learning, the nature of an integrative approach to leaning in OBE, and an analysis of studies versus subject orientated studies. In the chapter that follows he will outline the theoretical framework that informs this study.

THEORETICAL FRAMEWORK

Theories of cognition

There are many theories of learning. There will be a brief discussion of Green's connectionist theory, the theory of socialisation, and Fauconnier and Turner's theory of conceptual blending as a framework for the cognitive basis of learning.

The connectionist theory of cognition

Are connectionist models of cognition considered to be scientific theories of the cognitive domain? <http://psycprints.ecs.soton.ac.uk/archive/00000553/>

It is argued that in traditional scientific theories, there is a fairly close connection between the theoretical (unobservable) entities postulated and the empirical observations accounted for. In connectionist models, however, hundreds of theoretical terms are postulated – viz., nodes and connections – that are far removed from the observable phenomena. As a result, many of the features of any given connectionist models are relatively optional.

Green starts by examining the question of what it is to be a scientific theory. Secondly, he describes in precisely what sense traditional computational models of cognition can be said to perform this role. Thirdly, he examines whether or not connectionist models can be said to do the same. His conclusion is that connectionist models could, under a certain interpretation of

what it is they model, be considered to be theories, but that this interpretation can be unacceptable to many connectionists.

According to Green (2002) the typical complex scientific theory contains both empirical and theoretical terms. The empirical terms refer to observable entities and the theoretical terms refer to unobservable entities that improve the predictive power of the theory as a whole.

He begins with a relatively uncontroversial theory from outside psychology – Mendelian genetics. In the Mendelian scheme, entities called “genes” were said to be responsible for the propagation of traits from one generation of organisms to another. Mendel was unable to observe anything corresponding to “genes,” but their invocation made it possible for him to predict correctly the proportions in which succeeding generations of organisms would express a variety of traits. The gene is a classic example of a theoretical entity. For present purposes, it is important to note that each such theoretical gene, though unobservable, was hypothesized to correspond to an individual trait. That is, in addition to the predictive value each theoretical gene provided, each also justified its existence by being responsible for a particular phenomenon. There were no genes in the system that was not directly tied to the expression of a trait. Although some genes were said not to be expressed in the phenotype (viz.; recessive genes in heterozygous individuals), all were said to be directly involved in the calculation of the expression of a specific trait. Specifically, their inclusion in the theory was justified in part by the *specificity* of the role they were said to play. It is worth noting that the actual existence of genes remained controversial until the discovery of their molecular basis – viz., DNA – and our understanding of them changed considerably with that discovery.

As a psychological example of theoretical entities, the model of memory proposed by Atkinson and Shiffrin (1971, 1982-1990). It is a classic “box-and-arrow” theory. Information is fed from the sensory register into a holding space called Short Term Store (STS). If continuously rehearsed, a limited number of items can be stored there indefinitely. If the number of items exceeds the capacity of the store, some are lost. If rehearsal continues for an unspecified duration, it is claimed that some or all of these items are transferred to another holding space called Long Term Store (LTS). The capacity of LTS is effectively unlimited and items in LTS need not be continuously rehearsed, but it is said to be kept in effectively permanent storage. STS and LTS are, like genes, theoretical entities. They cannot be directly observed, but their postulation enables the psychologist to predict correctly a number of memory phenomena. In each such phenomenon, the activity of each store is carefully specified. The accuracy of this specification seems to be at least part of the reason that scientists are willing to accept them.

Over the last 30 years the Atkinson and Shiffrin model has been elaborated and refined. As a result, the number of memory systems hypothesized to exist has grown tremendously.

Baddeley, (1992: 556-559) has developed STS into a series of slave systems responsible for information entering memory from the various sense modalities (e.g. the phonological loop, the visuospatial sketchpad), the activities of which are coordinated by a central executive.

Tulving (1985: 385-398), on the other hand, has divided LTS into four hierarchically arranged systems responsible for episodic memory (for personal events), semantic memory (for general information), procedural memory (for skills) and implicit memory (for priming). In order to establish the existence of each of these many theoretical entities, thousands of experiments have been performed, aimed at revealing the independent of activity of one or another by attempt to block the activity of the others.

The question of whether the activity of a single memory system can be studied in isolation has called into question the very existence of that system. For over a decade, the elucidation of implicit memory phenomena has been a major issue in memory theory according to Schacter, 1987, 1992; Roediger, 1990; Roediger & McDermott, 1993. In the typical implicit memory experiment, subjects study a list of items which includes both words and pictures have been used, by processing them briefly. This can be as simple as reading the word or naming the object, or it can be more involved, such as deciding whether the items belongs to a certain class of items e.g., is a car a kind vehicle? or decomposing it in to parts e.g., counting the number of letters in words, or counting the edges or corners in pictured items. The subjects then take part in a memory test, although they are not told that it is a memory test, and it could indeed be performed without having studied the material. In this test, they see a new list of items, some of which, unbeknownst to them, are the same as (or closely related to) the items they have studied. Such tests are sometimes puzzles of various sorts (e.g., completing incomplete words or identifying the items in incomplete pictures). Sometimes they are as simple as deciding whether the items are true words (as opposed to pronounceable non-words such as BLICK) or possible objects. People perform reliably better on these tasks when the items in question are ones that were on the study list (or closely related to items on the study list) than when the items are new. Upon post-experimental debriefing, however, they are often unable to say which items they had studied before and which they had not. This is the classic implicit memory effect.

However, it has been argued by Roediger & McDermott (1993) that explicit memory may be “contaminating” the hypothesized effect of the implicit memory system. The degree of this contamination is not clear, but it is possible, in principle, that ALL implicit memory

phenomena are the result of covert explicit memory. According to Jacoby (1991) the evidence for this comes from comparing the behaviour of a typical implicit memory group with that of a control group that goes through the same procedure but is told *explicitly* that the answers to some of the test problems are items they studied before. The outcome is that these subjects do almost as well as the experimental subjects, thus calling into question the “implicitness” of the traditional subjects’ memories. As a result, many have begun question the very existence of the implicit memory system. Many psychologists argue that the implicit memory effects are the result of a certain kind of processing of a more general memory system, not the autonomous activity of a distinct system of its own. <http://psycprints.ecs.soton.ac.uk/archive/00000553/>

With the entry of computer models into psychology, the theories have become even more complex, using dozens of theoretical entities. A recent version of Chomskyan linguistic theory, postulates more than two-dozen rules that are said to control the building and interpretation of grammatical sentences Here the empirical data must bear fairly directly on each theoretical entity. None of these rules is without specific predicted effects. Each of the rules performs a certain function without which the construction and interpretation of grammatical sentences could not proceed correctly. For example, *RULE ATTACH-VP (verb phrases)*, attaches verb phrases to sentences; *RULE ATTACH-NOUN* similarly attaches nouns to noun phrases; and so forth. Part of what justifies the inclusion in the theory of terms referring to each of these entities is the fact that they are explicitly connected to specific empirical phenomena.

In each of the models Green has described so far, each theoretical entity represents something in particular, even if that something is itself theoretical. The existence and properties of the entities represented are supported by empirical evidence relating specifically to that entity. In a typical connectionist model, however, there are dozens, sometimes hundreds, of simple units,

bound together by hundreds, sometimes thousands, of connections. Neither the units nor the connections represent anything known to exist in the cognitive domain the network is being used to model. Similarly, the rules that govern how the activity of one unit will affect the activity of other units to which it is connected are extremely simple, and not obviously related to the domain that the network is being used to model. The same applies for the rules that govern how the weights on the connections between units are to be changed. In particular, the units of the network are not thought to represent particular propositional attitudes (i.e. beliefs, desires, etc.) or the terms or concepts that might be thought to underlie them. This is all considered a distinct advantage among connectionists. Neither the units nor the connections correspond to anything in the way that variables and rules did in traditional computational models of cognition. Representations, to the degree that they are admitted at all, are distributed across the activities of the units as a group. Any representation-level rules that the model is said to use is likewise distributed across the weights of all of the connections in the network. This gives connectionist networks their characteristic flexibility: they are able to learn in a wide variety of cognitive domains, to generalize their knowledge easily to new cases, to continue working reasonably well despite incomplete input or even moderate damage to their internal structure, etc. The only real question is whether they are, indeed, *too* flexible to be good theories or whether, by contrast, there are heretofore-unrecognised features of good theories of which connectionist models can apprise us.

Each of the units, connections, and rules in a connectionist network is a theoretical entity. Each name referring to it in a description of the network is a theoretical term in the theory of cognition that it embodies. With the previously described theories, it was evident that each theoretical entity had a specific job to do. If it were removed, not only would the performance

of the model as a whole suffer, but it would suffer in predictable ways, viz., the particular feature of the model's performance for which the theoretical entity in question was responsible – i.e., that which it represented – would no longer obtain. The units and connections in a connectionist net – precisely in virtue of the distributed nature of their activity – need not bear any such relation to the various activities of the model. Although this seems to increase the model's overall efficiency, it also seems to undermine the justification for each of the units and connections in the network. To put things even more plainly, if one were to ask, say, of Berwick's (1985) symbolic model of grammar, "What is the justification for postulating *RULE ATTACH-NOUN*?" the answer would be quite straightforward: "Because without it nouns would not be attached to noun phrases and the resulting outputs would be ungrammatical." The answer to the parallel question with respect to the connectionist network – viz. "What is the justification for postulating (say) unit 123 in this network?" – is not so straightforward. Precisely because connectionist networks are so flexible, the right answer is probably something like, "No reason in particular. The network would probably perform just as well without it". <http://psycprints.ecs.soton.ac.uk/archive/00000553/>

If this is true, according to Green (2002), we are led to an even more pressing question: exactly what is it that we can actually be said to *know* about a given cognitive process once we have modelled it with a connectionist network? In the case of, say, the Atkinson and Shiffrin model of memory, we can say that we have confirmation of the idea that there are at least two forms of memory store – short and long term – and this confirmation amounts to a justification of sorts for their postulation. Are we similarly to say that a particular connectionist model with, say, 326 units that correctly predicts activity in a given cognitive domain confirms the idea that there are exactly 326 units governing that activity? This seems ridiculous – indeed almost

meaningless. Aside from the obvious fact that we don't know what the "units" are units of, we might well have gotten just as good results with 325, or 327 units, or indeed with 300 or 350 units. Since none of the units correspond to any particular aspect of the performance of the network, there is no particular justification for any one of them. Some might argue that the theory instantiated by the network is not meant to be read at this level of precision – that it is not the number of units, specifically, that is being put forward for test, but only a network with a certain general sort of architecture and certain sorts of activation and learning rules. This seems simply too weak a claim to be of much scientific value. As Popper told us, scientists should put forward "bold conjectures" for test. The degree to which the hypo dissertation is subject to refutation by the test is the degree to which it is scientifically important. Even without accepting Popper's strong stand on the unique status of refutation in scientific work, this much remains clear: To back away from the details of one's theory – to shield them from the possibility of refutation – is to make one's theory scientifically less significant. Surely this is not a move connectionist researchers want to make in the long run.

It might be argued that the mapping of particular theoretical terms on to particular aspects of the behaviour being modelled is unnecessary; it may just be an historical accident, primarily the result of our not being able to keep simultaneous control of thousands of theoretical terms until the advent of computers. Perhaps surprisingly, Carl Hempel (1952: 36) seems to have presaged this possibility in his classic essay, *Fundamentals of Concept Formation in Empirical Science*: "A scientific theory might... be likened to a complex spatial network: Its terms are represented by knots, while the threads connecting the latter correspond, in part, to the definitions and, in part, to the fundamental and derivative hypotheses included in the theory. The whole system floats, as it were, above the plane of observation and is anchored to it by

rules of interpretation. These might be viewed as strings that are not part of the network but link to certain points of the latter with specific places in the plane of observation. By virtue of those interpretive connections, the network can function as a scientific theory: From certain observational data, we may ascend, via an interpretive string, to some point in the theoretical network, thence proceed, via definitions and hypotheses, to other points, from which another interpretive string permits a descent to the plane of observation. Now, it is, by no means clear that Hempel had in mind there that there might be literally thousands of “knots in the network” between those few that are connected to the “plane of observation,” but by the same token there is nothing in the passage that seems to definitely preclude the possibility either.

The real question seems to be about what one can really be said to have learned about the phenomenon of interest if one’s model of that phenomenon contains far more terms that are not tied down to the “empirical plan,” so to speak, than it does entities that are. Consider the following analogy: suppose that an historian wants to understand the events that lead up to political revolutions, so he tries to simulate several revolutions and a variety of other less successful political uprisings with a *connectionist network*. The input units encode data on, say, the state of the economy in the years prior to the uprising, the morale of the population, the kinds of political ideas popular at the time, and a host of other important socio-political variables. The output units encode various possible outcomes: revolution, uprising forcing significant political change, uprising diffused by superficial political concessions, uprising put down by force, etc. Among the input and output units, let us say that an historian places exactly 72 units that, he says, encode “a distributed representation of the socio-political situation of the time.” His simulation runs beautifully. Indeed, let us say that because he has

learned the latest techniques of recurrent networks, he is actually able to simulate events, the order in which they took place over several years either side of each uprising.

What has he learned about revolution? Perhaps he learned that there must have been approximately 72 units involved? This is certainly not so. If the “hidden” units corresponded to something in particular – say, to political leaders, or parties, or derivative socio-political variables – that is, if the network had been *symbolic*, then perhaps he would have a case. Instead, he must simply repeat the mantra that they constitute “a distributed representation of the situation,” and that the network is likely a close approximation to the situation because it plausibly simulates so many different variants of it.

It must be concluded that he has not learned very much about revolution at all. The simple fact of having a working “simulation” seems to mean little. It is only if one can interpret the *internal activity* of the simulation that the simulation increases our knowledge; i.e., it is only then that the simulation is to be considered a scientific *theory* worthy of consideration.

Greens opinion is that this is a non sequitur; but rather than arguing the point he turns to a less controversial case. Assume that some aspiring amateur physicist, blithely unaware of the work of Galileo and Newton, gets the idea that the way to study the dynamics of balls rolling down inclined planes is to simulate their movements with a connectionist network. He sets up the net with inputs corresponding to variables such as the mass and volume of the ball, the length and angle of the plane, etc. Perhaps, not really knowing what he is after, he adds in some interesting variations such as ellipsoidal balls and curved surfaces, and includes the pertinent features of these in his encoding scheme. The activity of the output unit represents simply the time it takes the ball to complete its descent down the surface. He throws in a handful of 5

hidden units, and runs the simulation. Eventually the network is able to predict closely how long it will take a certain ball to run down a certain surface, and it is able to generalize its knowledge to new instances on which it was not trained. If asked what the hidden units represent, the young physicist says, “the individual units represent nothing in particular; just a distributed representation of the physical situation as a whole.” What has he learned? Not much, it would seem. Certainly not what was learned in the explanation of these kinds of phenomena in the theories of Galileo and Newton, in which the theoretical entities clearly refer to relatively uncontroversial aspects of the world (e.g., distance, duration, size).

One way that cognitive scientists might try to avoid the fate of hypothetical connectionist historian and physicist is to claim that connectionist units do correspond to something closely related to the cognitive domain; viz., the neurons of the brain. Whether this is to be considered an analogy or an actual literal claim is often left vague, by those who suggest it. Most connectionists seem wary of proclaiming too boldly that their networks model the actual activity of the brain. McClelland, Rumelhart, and Hinton (1986: 10-11), for instance, says that connectionist models “seem much more closely tied to the physiology of the brain than other information-processing models” but then they retreat to saying that their “physiological plausibility and neural inspiration... are not the primary bases of their appeal to us.” Smolensky (1988:9), after having examined a number of possible mappings, writes that “given the difficulty of precisely stating the neural counterpart of components of subsymbolic (i.e., connectionist) models, and given the very significant number of misses, even in the very general properties considered... it seems advisable to keep the question open.” Only with this caveat in place does he then go on to claim “there seems no denying, however, that the subconceptual (i.e., connectionist) level is *significantly closer* (emphasis added) to the neural level

than is the conceptual (i.e., symbolic) level.” Precisely what metric he is using to measure the “closeness” of various theoretical approaches to the neural level of description is left unexplicated. <http://psycprints.ecs.soton.ac.uk/archive/00000553/>

The general aversion to making very strong claims about the relation between connectionist models and brain is not without good reason. Crick and Asanuma (1986) describe five properties that the units of connectionist networks typically have that are rarely or never seen in neurons, and two further properties of neurons that are rarely found in the units of connectionist networks. Perhaps most important of these is the fact that the success of connectionist models seems to depend upon the fact that any given unit can send excitatory impulses to some units and inhibitory impulses to others. No neuron in the mammalian brain is known to do this (though “dual-action” neurons have been found in the abdominal ganglion of *Aplysia*. (Levitan & Kaczmarek 1991: 196-197) Although it is certainly possible that dual action neurons will be found in the human brain, the vast majority of cells do not seem to have this property, whereas the vast majority of units in connectionist networks typically do. Even as strong a promoter of connectionism as Paul Churchland (1990: 221) has recognized this as a major hurdle to be overcome if connectionist nets are to be taken seriously as models of brain activity. What is more, despite some obvious but possible superficial similarities between the structure of connectionist units and the structure of neurons, there is currently little hard evidence that any specific aspect of cognition is instantiated in the brain by neurons arranged in any specified connectionist configuration.

It would accordingly appear that at present the only way of interpreting connectionist networks, as serious candidates for theories of cognition would be as literal models of the brain activity that underpins cognition. This means, if Crick and Asanuma are right in their critique,

that connectionists should start restricting themselves to units, connections, and rules that use all and only principles that are known to be true of neurons. Other interpretations of connectionist networks may be possible in principle, but at this point none seem to have appeared on the intellectual horizon. Without such an interpretation, connectionist modellers are left more or less in the position of our hypothetical connectionist historian. Even a simulation that is successful in terms of transforming certain inputs into the “right” outputs does not tell us much about the cognitive process it is simulating unless there is a plausible interpretation of its inner workings. All the researcher can claim is that the success of the simulation confirms that some connectionist architecture is involved, and perhaps something very general about the nature of that architecture (e.g. that it is self-organizing, recurrent, etc.). There is little or no confirmation of the specific features of the network because so much of it is optional

Now, it might be argued that this situation is no different from that of early atomic theory in physics. Visible bits of matter and their interaction with other bits of matter were explained by the postulation of not just thousands, but also millions upon millions of theoretical entities of mostly unknown character, viz. atoms. This, the argument would continue, is not so different from the situation in connectionism. After all, as Lakatos (1970) taught us, new research programs need a grace period in the beginning to get them established. Although the researcher does not have a demonstrative argument against this line of thought, he thinks that it has relatively little merit. We know pretty well what atoms are, and where we would find them, were we able to achieve the required optical resolution. Put very bluntly, if you simply look closer and closer and closer at a material object you’ll eventually see the atoms. Atoms are, at least in the sense, perfectly ordinary material objects themselves. Although they

constitute an extension of our normal ontological categories, they do not *replace* an old well-understood category with a new ill-understood one.

By contrast, the units of connectionist networks (unless identified with neurons or other bits of neural material) are quite different. They are not a *reduction* of mental concepts, and as such give us no obvious path to follow to get from the “high level” of behaviour and cognition to the “low level” of units and connections. That it is not a *reductive* position is in fact often cited as *strength* of connectionism but, if the researcher is right, it is also the primary source of the ontological problems that have been discussed here.

Green concludes that it is important to note that he was not arguing that connectionist networks must give way to symbolic networks because cognition is inherently symbolic. The apparent success of connectionisms in domains where symbolic models typically fail may be due as much to the huge number of additional “degrees of freedom” that connectionist networks are afforded by virtue of the blanket claim of distributed representation across large numbers of uninterrupted units, as it is to any inherent virtues that connectionism has over symbolism in explaining cognitive phenomena.

Theories of socialization

Socialization is the process of social interaction by which people acquire those behaviours essential for effective participation in society, the process of becoming a social being. It is essential for the renewal of culture and the perpetuation of society. The individual and society are mutually dependent on socialization. <http://highereducation.mcgraw-hill.com>).

Human socialization presupposes that an adequate genetic endowment and an adequate environment are available. Hereditary and environmental factors interact with and affect each other.

Theories of socialization include functionalist and conflict theory perspectives as well as three microlevel approaches. Social learning theory emphasizes conditioning and observational learning. Cognitive developmental theory argues that socialization proceeds differently in the sensorimotor, preoperational, concrete operational and formal operations stages. Symbolic interactionists say reflexive behaviour facilitates the development of the self.

One of the most important early agents of socialization is the family. As children grow, peers and schools become important agents of socialization. The mass media, especially television, also serve as agents of socialization.

If they are to adapt to their social environment, human beings must be able to communicate. Communication refers to the process by which people transmit information, ideas, attitudes, and mental states to one another. It includes the verbal and nonverbal processes (body language, paralanguage, proxemics, touch, and artefacts) by which we send and receive messages.

An important part of socialization is learning what constitutes reality-the basic schemes we use to make sense of and understand the social and physical world. Definition of the situation is the interpretation or meaning we give to our immediate circumstances. Our definitions influence our construction of reality, an insight captured by the Thomas theorem.

The formation of the self-the set of concepts we use in defining who we are-is a central part of the socialization process. The self emerges in the course of interaction with other people and represents the ideas we have regarding our attributes, capacities, and behaviour. It typically includes an egocentric bias.

Fauconnier & Turner's theory of conceptual integration

Conceptual blending is a general cognitive operation equal to analogy, mental modelling, conceptual categorization and framing. It is best developed in Fauconnier and Turner (2002:40) which propose a theory of mental spaces, conceptual packets that are subconsciously constructed when humans think and talk, to aid local understanding and action. Conceptual blending operates in the moment of thinking and results in products that become entrenched in conceptual structure and grammar and it performs new work on previous products as inputs (<http://www.inform.umd.edu/EdRes/Colleges/ARHU/Depts/English/englfac/MTurner/cin.web/cin.html>).

Fauconnier & Turner's theory of conceptual blending presents an excellent springboard for understanding and implementing the programme of problem-based learning that the researcher develops in the course of this study.

The structure from input mental spaces is projected to a separate, "blended" mental space. The projection is selective and through completion and elaboration, the blend develops new structure that was not provided in the original inputs. Blending is often difficult to detect because for the most part it is a routine workaday process that escapes detection except on technical analysis. The products developed in the blend affect cognition, thus modifying the initial inputs and changing perceptions of the corresponding situations.

Blending operates according to a set of consistent structural and dynamic principles. It furthermore observes a set of optimality principles.

According to Turner, mental spaces are structured by *frames*. Frames, in their most generic and schematic forms, form a basis for grammatical constructions. Words are constructions, thus lexical meaning is an intricate web of connected frames. Although cognitive framing is guided by language, it is not inherently linguistic. People use many frames than they have words and constructions for. Analogical mapping shows up at all levels of grammar and meaning construction, such as the interpretation of counterfactuals and hypotheticals, category formation, and creative or conventional metaphor.).

Turner says that since the cognitive process of conceptual integration has been largely overlooked, it is useful to give evidence for its operation in a wide variety of areas. Since conceptual integration has uniform structural and dynamic properties, it is important to reveal this uniformity behind the appearance of observational and functional diversity. He started the report with an effective but somewhat idealized example of blending, in order to illustrate the issues and terminology. He then outlined the general process of conceptual integration and the systematic dynamic properties of blends. We work through some case studies in a variety of areas.

The riddle of the Buddhist monk as an instance of problem-based reasoning

A Buddhist monk begins at dawn one day walking up a mountain, reaches the top at sunset, meditates at the top for several days until one dawn when he begins to walk back

to the foot of the mountain, which he reaches at sunset. Making no assumptions about his starting or stopping or about his pace during the trips, prove that there is a place on the path which he occupies at the same hour of the day on the two separate journeys.

(Koestler 1964, cited in Fauconnier and Turner 2002:39):

According to Fauconnier and Turner, our demonstration of the power of blending is likely to be more effective if the reader will pause for a moment and try to solve the problem before reading further. The basic inferential step to showing that there is indeed such a place, occupied at exactly the same time going up and going down, is to imagine the Buddhist monk walking both up and down the path on the same day. Then there must be a place where he meets himself, and that place is clearly the one he would occupy at the same time of day on the two separate journeys. The riddle is solved, however a cognitive puzzle develops. According to Fauconnier and Turner (2002:39-40), the situation that we devised to make the solution transparent is a fantastic one. It is impossible for the monk to be making the two journeys simultaneously on the same day, and he cannot "meet himself." This implausibility is disregarded and does not stand in the way of understanding the riddle and its solution. The conceptual blend that helps solve the riddle combines features of the journey to the summit and of the journey back down, and uses emergent structure in that blend to make the confirmatory answer evident.

This is how it works. According to Fauconnier and Turner (2002:40-48), *mental spaces* are very partial assemblies containing elements, and structured by frames and cognitive models. These mental spaces are interconnected, and can be modified as thought and discourse unfold and are used to model dynamical mappings in thought and language.

In the diagrams, the *mental spaces* are represented by *circles*, *elements* by *points* or *icons* in the circles, and *connections* between elements in different spaces by *lines*. The *frame* structure recruited to the mental space is represented either *outside in a rectangle* or by *icons inside the circle*.

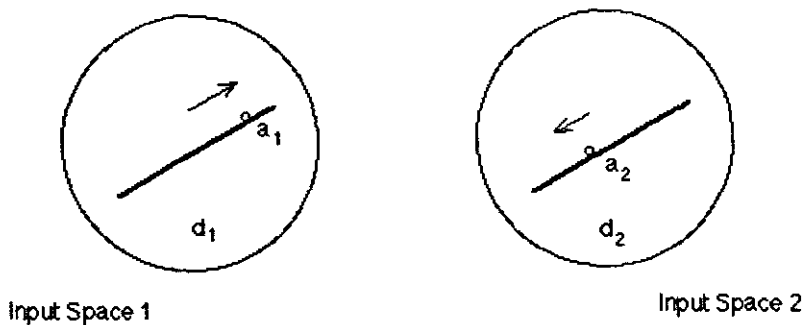
There are two input spaces, each of which is a partial configuration corresponding to each of the two journeys.

d_1 is the day of the upward journey

d_2 is the day of the downward journey

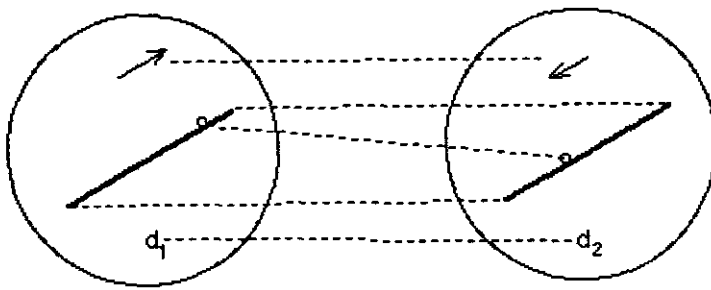
a_1 is the monk going up

a_2 is the monk going down



There is a *partial cross-space mapping* between the input spaces that connects the counterparts.

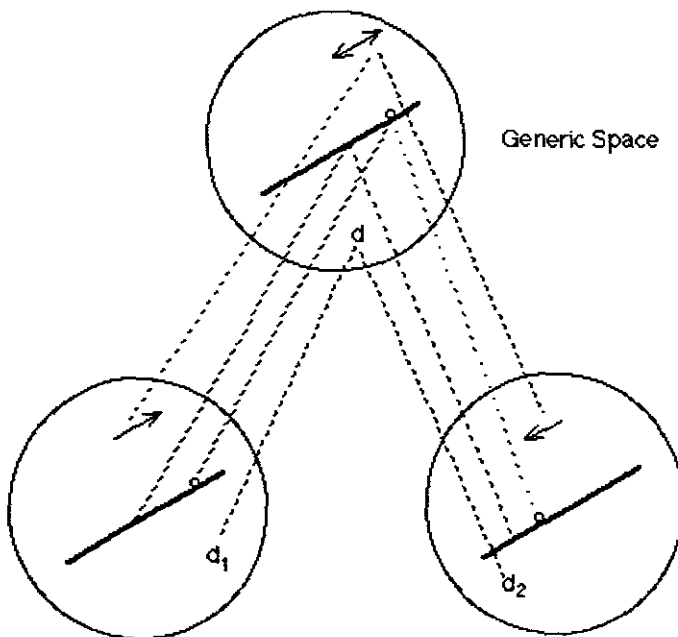
The mountain, moving individual, day of travel, and motion in one space is connected to the mountain, moving individual, day of travel, and motion in the other space.



Input Space 1

Input Space 2

The *generic space* maps onto each of the inputs. The generic space contains what the two inputs have in common: a moving individual and his position, a path linking the foot and summit of the mountain, a day of travel. The direction of motion or the actual day is not specified or taken into account.

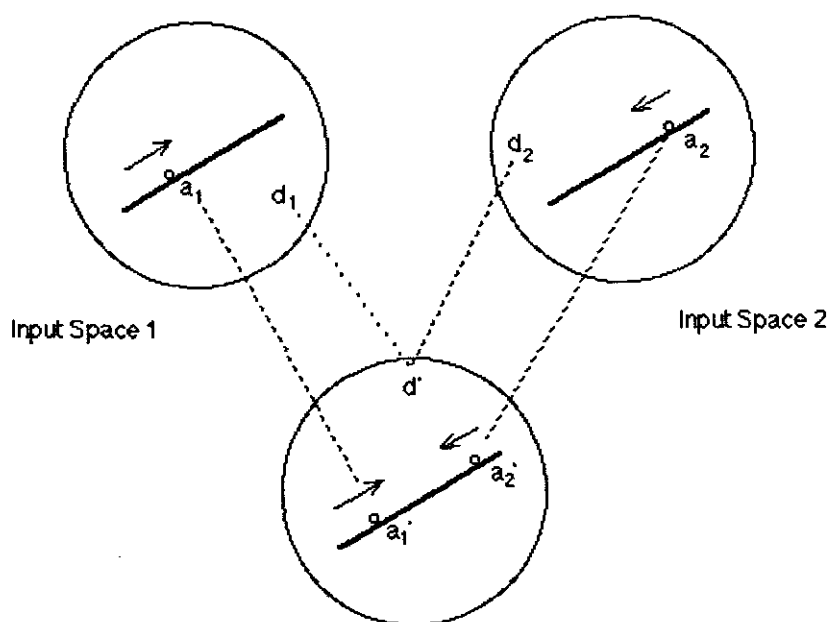


Input Space 1

Input Space 2

The fourth space is the *blend* where the two counterpart identical mountain slopes are mapped onto a *single* slope. The two days of travel, d_1 and d_2 , are mapped onto a single day d' and *fused*. While in the generic space and in each of the input spaces there is *one* moving individual, in the

blend there are *two* moving individuals. The two moving individuals in the blend and their positions have been projected from the inputs in such a way as to preserve time of day and direction of motion, and *therefore the two moving individuals cannot be fused*. While Input 1 represents the entire upward journey, Input 2 represents the entire downward journey. The projection preserves *times* and *positions* into the blend. Time t of day d' contains a counterpart of a_1 at the position occupied by a_1 at time t of d_1 , and a counterpart of a_2 at the position occupied by a_2 at time t of day d_2 . However, the projection of structure to the blend is *selective*, for example, the *calendrical time* of the journey is *not* projected to the blend.



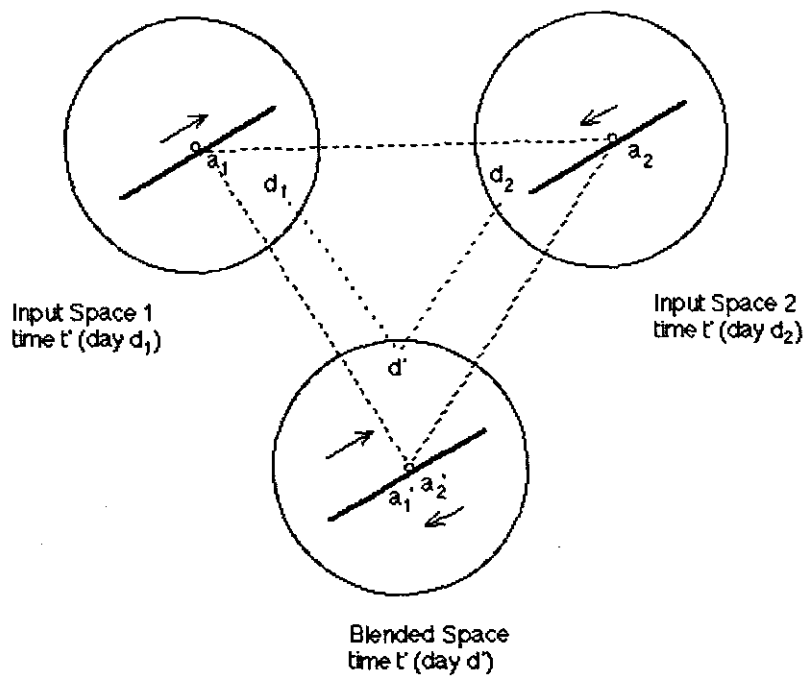
The blend now contains *emergent* structure **not** in the inputs. Firstly, the *composition* of the elements from the inputs presents relations in the blend that did not exist in the separate inputs. There are two moving individuals in the blend instead of one in each of the inputs. The individuals are moving in opposite directions, starting from opposite ends of the path, and

their positions can be compared at any time of the trip, since they are travelling on the same day, d' .

The second emergent structure is *completion*, which brings additional structure to the blend.

The structure of two people moving on the path can be viewed as a salient part of a familiar background frame: two people starting a journey at the same time from opposite ends of the same path. By completion, the structure is recruited into the blend. "Common sense," i.e. familiarity with the background frame, tells us that the two people will necessarily meet at some time t' of their journey. It is not necessary to compute this encounter afresh. It is supplied by completion from a pre-existing familiar frame. There is no encounter in the generic space or in either of the inputs, however there is an encounter in the blend, and this supplies the central inference.

Significantly, the blend space remains hooked up to the Inputs, so the structural properties of the blend can be mapped back onto the Inputs. In the above example, the frame obtained by completion has the completely automatic inference that there is a meeting time t' with a common position p . The mapping back from the blended space to the input spaces yields the following diagram:

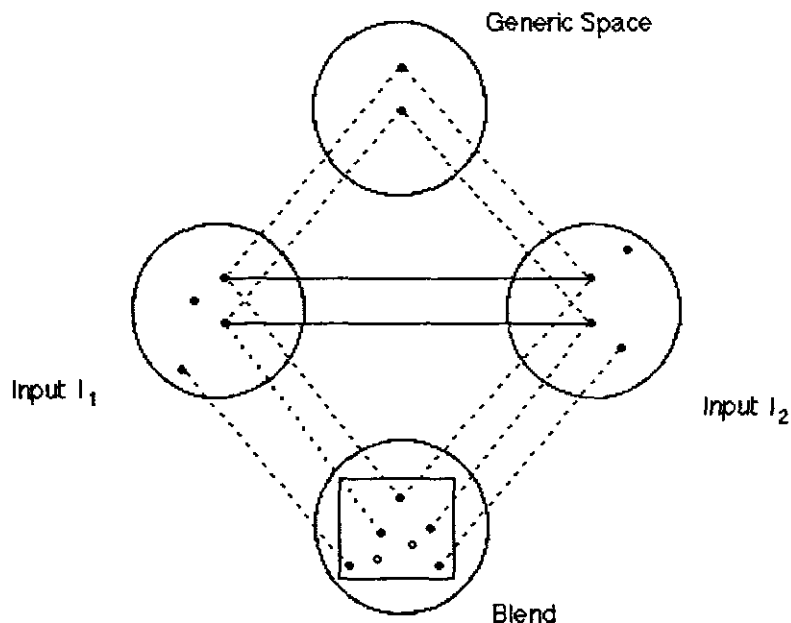


It must be noted that some counterparts such as the days, the path on the different days, and the corresponding times on different days have been fused, while other counterparts, namely, the monk on the way up, the monk on the way down, the directions of motion have been projected separately. Neither the specific dates of the journeys, nor the fact that the monk will stay at the top for a while after his upward journey are projected. The blend now has a new "emergent" structure that is not in the Inputs: two moving individuals whose positions can be compared and may coincide, and the richer frame of two travellers going in opposite directions on the same path and inevitably meeting each other. This emergent structure is central to solve the cognitive riddle.

In the riddle of the Buddhist Monk, the isomorphic representation of the scenario does not solve the riddle, but representing it as two input spaces to a blend and imagining a mental depiction of that blend does indeed create an event of encounter in the blend. This, according to Fauconnier and Turner, points to a solution, not for the blend, but for the input spaces and

therefore identically for the original scenario. In this case, mental simulation depends crucially upon conceptual blending to provide the effective scenario to begin with.

Network models of conceptual integration



The circles in the above figure represent mental spaces, for instance in the example of the Buddhist Monk, there are four mental spaces, i.e. the two inputs, the generic, and the blend. There are also the background frames that are used to develop these mental spaces, such as the background frame of two people approaching each other on a path. Networks in cases of conceptual integration can more input spaces and multiple blended spaces.

In conceptual integration, the solid lines in the above figure represent counterpart connections. There are of many kinds counterpart connections: connections between frames and roles in frames; connections of identity or transformation or representation; metaphoric connections, etc. In the monk example, the monks, paths, journeys, days, and so on are counterparts.

As the conceptual projection unfolds, the structure that is recognized as belonging to both of the input spaces constitutes a generic space. The generic space maps onto each of the inputs at any given moment, which defines the current cross-space mapping between them, where a given element in the generic space maps onto paired counterparts in the two input spaces.

In blending, the structure from the two input mental spaces is projected to a third space, the "blend." In the monk example, the two input spaces have two journeys completely separated in time, while the blend has two simultaneous journeys. The generic spaces and blended spaces are related, that is, blends contain generic structure captured in the generic space, but also contain more specific structure, and can contain structure that is impossible for the inputs, such as two monks who are the same monk.

The projection from the inputs to the blend is selective. In the figure above, not all elements from the inputs are projected to the blend.

The three operations involved in constructing the blend are composition, completion, and elaboration.

Blending *composes* elements from the input spaces that provide relations that do not exist in the separate inputs. In the monk riddle, *composition* yields two travellers making two separate journeys. Fusion is one kind of composition, while counterparts may be brought into the blend as separate elements or as a fused element. The figure above represents one case in which counterparts, that is, the two days in the inputs are fused in the blend into one day and another case in which counterparts, that is, the two monks are brought into the blend as separate entities.

Blends take on a great range of background conceptual structure and knowledge without us recognizing it consciously. Thus, the composed structure is *completed* with other structure. The primary subtype of completion is pattern completion. A small composition in the blend can be extensively completed by a larger conventional pattern. In the monk example, the structure achieved through composition is completed by the scenario of two people journeying toward each other on a path which yields an *encounter*.

Elaboration develops the blend through imaginative mental reproduction according to principles and logic in the blend, some of which will have been brought to the blend by completion. Continued dynamic completion can recruit new principles and logic during elaboration that may also arise through elaboration itself.

Composition, completion, and elaboration lead to *emergent structure* in the blend that is not copied from the inputs. In the figure above, the square inside the blend represents emergent structure.

Conclusion

In this chapter the researcher reviewed various theories of cognition and socialization, including the Theory of Conceptual Blending proposed in Fauconnier & Turner (2002). Conceptual blending is adopted as the theoretical framework best suited to problem-based learning, firstly because it facilitates problem solving, and secondly because it is compatible with the Theory of Role Relationships, which plays a prominent part in the cooperative learning model that is developed in this study for the purpose of integrative teaching.

In the chapter that follows, the researcher will present the key concepts that inform the theoretical framework for this study.

Chapter 3

KEY CONCEPTS

Preview

In this chapter the researcher will define the key concepts relating to his research regarding using an integrative approach to learning. The purpose of this chapter is to introduce the main concepts that the researcher will use to analyse in greater detail in subsequent chapters.

The elements of learning

Cognition

According to Meadows (1993:1) cognition is a broad term, which has been traditionally used to refer to such activities as thinking, conceiving, reasoning, etc. Meadows says the Psychologists have used it to refer to any class of mental “behaviours” (using that term very loosely) where the underlying characteristics are of an abstract nature and involve symbolizing, insight, expectancy, complex rule use, imagery, belief, intention, problem solving, and so forth. “At one level cognition is what people can be observed to do when they have to think, learn, remember, understand, judge, use concepts and so forth; at another level it is the system behind these different abilities.” Cognition is a central aspect of this study, which focuses on the roles of cognition and communication in an integrated approach to learning.

The conceptual basis of language structure

Klopper (1999a: 260-270) outlines the conceptual basis of humanity’s language capacity based on the pioneering contribution of Langacker (1987a, 1987b, 1990 and further elaborated by

Ungerer & Schmid 1996 and Dirven & Verspoor 1998. Summarised briefly Kloppe's outline states that whenever one perceives an interrelationship between entities, or between entities interacting with one another during events, such a perception entails that mental images of the observed objects become neurologically associated with one another because specific neural pathways are entrained to transmit neural impulses regarding that particular entity or event. If such a pattern of association is perceived repeatedly, it becomes entrenched and forms a predictable pattern that one can anticipate. Predictable behaviour is rule-governed behaviour.

Because nouns and adjectives are constantly used in close proximity with one another as in: *the tall boy / the big dog / sweet cakes*, this predictable pattern leads us to posit a structural relationship between the noun and the adjective that qualifies it. If one sees that an adjective is only sometimes used with the noun, one concludes that the adjective is an optional element in the noun phrase:

The *tall* boy caught the ball/ the () boy caught the ball

The *big* dog chased the cat/ the () dog chased the cat

On the basis of perceiving predictable patterns of co-occurrence one can also distinguish prepositional phrases as in: at the table/ in the water, adjectival phrases within noun phrases: snow white feathers, sea-blue eyes, and quantifier phrases: very few survivors, round about 100 observers.

The point that Kloppe makes is that humans are able to posit grammatical structures for their languages based on the neurological associations that have the physical perception of events as input.

Categorisation

According to Rosch (1978: 28) categorisation is based two basic principles: they are (1) the function of category systems to provide maximum information with the least cognitive effort and (2) the structure of the information that asserts that the perceived world comes as structured information rather than as arbitrary attributes.

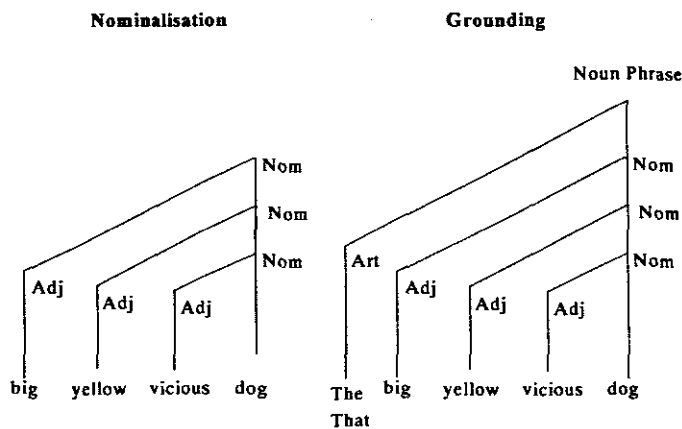
The classical approach to categorisation accords equal status to all members of categories whereas the prototypical approach to categorisation, following Wittgenstein, distinguishes prototypical and atypical members in categories. The prototypical members form the core of the category because the members share many attributes. Atypical members form peripheral members within the category. The members share fewer attributes with other members than the core members.

The word oak for instance entails selecting a particular subcategory of things for cognitive processing (Dirven & Verspoor 1998: 95). The term forms a subordinate category within the super ordinate category tree, which in turn is a subordinate category of the super-ordinate category plants. On its own the word oak therefore entails only the cognitive process of categorisation. Adding an adjective to the noun as in tall oak, is still only an instance of categorisation where one type of oak, namely with the attribute of being tall in size, is selected from the super-ordinate category oak and by doing so, one foregrounds all oaks that are tall while (Dirven & Verspoor 1998:96) eliminating all oaks of other sizes.

Grounding

According to the principles of cognitive linguistics, as outlined in the previous section, the addition of adjectives and quantifiers form part of the process of changing the scope of

conceptual categories. The addition of such scoping specifiers is known as Nominalization. A conceptual category like noun only achieves referential potential (the potential to refer to the THING that it semiotically represents) in the process of interpersonal communication—spoken or written—with the addition of deictic language elements such as articles (a or the), or deictic pronouns (this, these, those and there (is a ...)). With the addition of such deictic elements the lexical category noun is grounded as a syntactic phrase, and can be used to refer to THINGS during actual conversation. The process of Grounding therefore marks the boundary between cognition and actual communication:



The clustering of adjectives as part of the process of nominalization follows a tendency in the Germanic languages (including English) where shape adjectives precede colour adjectives, which in turn precede dispositional adjectives. This tendency is in line with Rosch's prototype theory of categorisation according to which at the basic level of categorisation humans have conceptual shape-based image schemas in their minds. If ordinary persons were asked to doodle the image of a man, a woman or dog, most would merely draw these shapes in two dimensions as in figure below:



Only artistically inclined people would tend to add three-dimensional features, colour and dispositional features to their drawings.

Sequential scanning

When one thinks about the individual phases / stages of an event one is using sequential scanning, as in *He walked to the shop*, conceptualising this event from the starting point to the destination. (Dirven and Verspoor 1998:8) The sequence of actions involved (i.e. processes involving change) is referred to as sequential scanning which is suitable for temporal relations and is predominantly expressed by finite verbs. (Ungerer and Schmid 1996:193)

Summary scanning

Unlike sequential scanning, summary scanning does not look at an event in a sequence but in a summary form, e.g. Reading is my favourite pastime. The facets of a situation, (Ungerer and Schmid 1996:193) as reflected in cognitive units, are examined one after the other, the data are added up and when the scanning process has been completed, all the relevant aspects of the cognitive unit are assembled as a whole.

Semantic / thematic role schemata

Some events we describe involve participants with different semantic roles. Some events we describe involve participants such as an agent who exerts a great deal of energy. Others involve participants such as a patient who undergoes energy. Others do not involve any energy and are called states. This flow of energy or its absence is typically expressed by different types verbs. Therefore event schemas can be indicated by the most prototypical verbs that are used to ask questions about the events taking place. When considering a singular event, we use only one verb to refer to what has happened as in write for instance (Dirven and Verspoor 1998:82). Multiple participants can however be involved in an event such as in Tom wrote a letter to Harry. In this example, the two parties fulfil different roles during the event. Tom is the one that is namely active, whilst Harry is passively involved in the event. Humans distinguish different role entities that can fulfil such events. The active party is known as the agent and the passive party is known as the patient. (Dirven and Verspoor 1998:83)

Event schema 1 (the being schema) a patient exists

This term refers to any event where the THEMATIC ROLES entity and locus are obligatory as in: *The telephone is on the table.* The main participant (Patient) is not dominant. (Dirven and Verspoor 1998: 83)

Event schema 2 (the doing schema): an agent does something on its own

We use this semantic role pattern to express an event where the active party does something that does not directly affect another party as in *Mother cooked the meal.* (Dirven and Verspoor 1998:85)

Event schema 3 (the domination schema): an agent dominates a patient

This semantic role pattern is used to express an event wherein the active party dominates the passive party. E.g. *the dog chased the cat.* (Klopper1999a: 263)

Event schema 4 (the cooperation schema): co-agents cooperate with one another

This semantic role pattern denotes a voluntary co-operation between the agents e.g. *Tom and Tina love each other.* (Klopper1999a: 263)

Event schema 5 (the competition schema): counter-agents compete with one another

This semantic role pattern shows that there is no co-operation between the agents e.g. *Lewis fought Leon for the title.* (Klopper1999a: 263)

Event schema 6 (the experiencing schema): experiencer experiences stimulus

For this role archetype, the term experiencer rather than agent seems appropriate (Dirven 1998: 86). The stimulus provides the link between the experience and the experience. There is no agent or patient as in the “doing schema” e.g. *John saw the spider.* (Dirven and Verspoor 1998:86)

Event schema 7 (the stimulation schema): a stimulus stimulates an experiencer to feel some type of sensation

This semantic role pattern (Klopper 1999a: 263) denotes a link between the stimulus and the experiencer whereby the stimulus causes the experiencer to feel some kind of sensation. E.g. *Spiders frighten Amy.* (Klopper 1999a: 263)

Cognitive Literary Theory

This theory looks at how human beings form concepts or combine image schemas to form concepts. (Klopper 1999c: 303) It also looks at how certain schemas are foregrounded for special attention (cognition) and how these concepts are expressed in aesthetic constructs like the arts (literary genres i.e. prose and poetry), the visual arts and the design and creation of any type of product that is considered to express a certain type of style.

Figurative language

Contrary to the general perception, human language does not predominantly refer to literal events, but to a significant extent, it also incorporates Language use such as in metonymy and metaphor.

Metonymy

The basic meaning of a word can be used for a part or the part for the whole. E.g. *His golden boot won the soccer match.* (Dirven and Verspoor 1998:33)

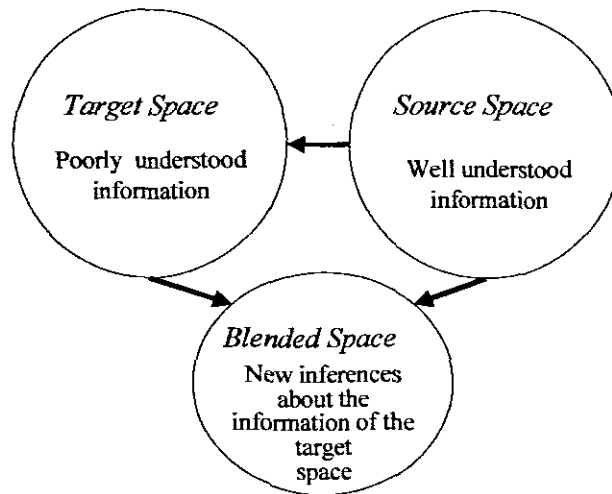
Metaphor

A metaphor is based on perceived similarity. (Dirven and Verspoor 1998: 34) E.g. *He boiled with anger.* Metaphors, along with other forms of figurative speech such as metonymy, and simile are instances of conceptual blending, which is outlined below.

Conceptual Blending

This theory (Fauconnier 1985, Fauconnier & Turner 1994, Klopper1999c: 309) accounts for a person's capacity to interrelate and blend concepts extracted from ones broad domain of knowledge. It is a momentary process of symbolisation that selectively interrelates concepts

from two separate cognitive domains, a target space and a source to conceptualise a new perceived relationship known as blended space. During blending new and abstract information is understood in terms of knowledge already understood, known or concrete. (Klopper1999c: 310)



Conceptual blending

In the expression, He boiled with anger, the target space is the poorly understood and complex domain of human emotions, and the source space the well understood domain of temperature ranges in the physical world. Humans know that if you apply heat to a liquid like water in a container at room temperature it will steadily become hotter until it reaches boiling point until it becomes steam and evaporates. When projecting the heating scenario onto the domain of human emotions, the conceptual blend will lead one to consider what the source of heat is—like the behaviour of others, failure to succeed at a task, etc.—that has caused the person under discussion to become emotionally upset, to boil with anger.

Inferential links in texts

This refers to figurative narratives where one interpretation rests on one set of inferences and another interpretation will rest on another set of inferences. (Turner 1991, Turner 1996, Turner & Fauconnier 1995, Klopper 1999c: 311-315) There are two types of inferential linking, namely propositional inferences and image-schematic linking. Propositional links are accorded great significance, because it is considered more than the necessary and sufficient logical operators used to establish the truth-values of statements. One of the functions of propositional links therefore is that they help us determine whether a statement is true or false. (Klopper 1999: 311) Image Schematic links are used to give image schematic roles to small spatial stories and give overall narrative cohesion and momentum.

Cognitive Science

Cognitive science is a cluster of disciplines that study the human mind. The term refers to an amalgamation; it is an umbrella term that includes a host of once disparate approaches such as cognitive psychology, epistemology, linguistics, computer sciences, artificial intelligence, mathematics and neuropsychological science.

Concepts

Concepts may be understood as “a person’s idea of what something in the world is like.” (Stenberg 1998: 276) Concepts are ideas to which various characteristics may be attached and to which other ideas may be connected. Concepts relate to specific things, their attributes, the conceptual categories that they belong to and how some of these entities act on one another from an anthropocentric perspective (the biased perspective of human beings based on what the limitations of human senses and sensations will permit us to understand of the world that we live in). In the survival scenario that the researchers propose, he will use a programme of

integrative interdisciplinary approach to learning. Objects that are useful for human survival play an important role.

Emotion

This term is specific and intense and is a reaction to a particular event. (Sternberg 1998: 542)

An emotion is a feeling comprising physiological and behavioural (and possibly cognitive) reactions to internal and external events. Emotions can be either pre-programmed (genetic) or learned and they can be manifested in various ways. Furthermore, they can be caused either by stimuli impinging on us from the outside or by things that happen within our bodies. Evans (2002: 1-13) states that philosophers as well as psychologists are increasingly emphasising the positive, constructive role that emotions play in reasoning (and therefore learning). In this dissertation the researcher will show how what range of positive and negative emotions children would have to cope with in an island survival scenario, and what intrapersonal and interpersonal resources they could employ to help them cope.

Intelligence

Intelligence is goal-directed adaptive behaviour. (Sternberg 1998:352) Intelligence is the capacity to meet situations, especially if new or unseen, by a rapid and effective adjustment of behaviour. (Webster Comprehensive Dictionary: 660). The island scenario will require of learners to envisage what sort of problems they could encounter and how to adapt their forms of behaviour in a goal directed way to cope with the new problems they would encounter.

Because human beings can imaginatively transport themselves in time and space we are not limited to experiencing things in the learning process. We can also anticipate proactively and

plan for them. Envisaging and planning therefore should play crucial roles in the learning process.

In the classroom, learners will therefore be motivated to engage in procedures of intellectual intelligence and emotional intelligence to imagine what sort of problems they could encounter if stranded somewhere and to plan survival contingencies.

Multiple Intelligences

This theory of human intelligence, developed by psychologist Howard Gardner, suggests there are at least seven ways that people have of perceiving and understanding the world. Gardner labels each of these ways a distinct intelligence – in other words, a set of skills allowing individuals to find and resolve genuine problems they face. (Klopper 2000:15) The seven types of intelligences are: Verbal linguistic, logical-mathematical, visual – Spatial, Body – Kinesthetic, Musical – Rhythmic, Interpersonal and Intrapersonal.

Intelligence Quotient (IQ)

This term refers to an age-related measure of intelligence level. It is defined as 100 times the mental age (MA). MA, (determined by standardized test) divided by chronological age (CA). (Webster Comprehensive Dictionary: 660)

Emotional Intelligence

Daniel Coleman, as quoted in Klopper (2000:36), states that emotional intelligence encompasses the following five characteristics and abilities:

Self – awareness – knowing your emotions, recognising feelings as they occur, and discriminating between them.

Mood management – handling feelings so they're relevant to the current situation and you react appropriately.

Self-motivation – “gathering up” your feelings and directing yourself towards a goal, despite self-doubt, inertia and impulsiveness.

Empathy – recognising feelings in others and tuning into their verbal and nonverbal cues.

Managing relationships– by handling interpersonal interaction, conflict resolution, and negotiations.

“Emotional Intelligence is a master aptitude, a capacity that profoundly affects all other abilities, either facilitating or interfering with them.”(Coleman 1995:80)

Knowledge

Knowledge is those mental components that result from all processes, be they innately given or experientially acquired. Knowledge is a result or product of knowing information or of understanding acquired through experience, practical ability or skill. (Webster Comprehensive Dictionary: 706)

Learning

This is the process of acquiring knowledge (Sternberg 1998:228) or the actual possession of such. Psychologists generally define learning as any relatively permanent change in the behaviour, thoughts, and feelings of an organism- human or other animal- as a consequence of prior experience.

Core Curriculum Learning

According to Klopper, (2000:6) during this form of learning, fundamental (core) skills, knowledge and abilities are taught to learners. A single scenario can be taken as point of departure to teach the core curriculum of disciplines.

Whole Language Learning

Neuman and Judith M. Heineman in Klopper (2000: 7) state that this form of learning forms part of a constructivist approach to education. This philosophy about curriculum – in both arts and a more general programme of learning – is based on recent research of how children acquire oral and written language skills. In traditional curricula language learning focuses on scenarios of everyday mundane existence e.g. the home, school, modes of transport etc. The traditional approach therefore narrowly selects the items of vocabulary the types of language exercises and types of essays that learners would be required to complete or do. By creating an island survival scenario that takes learners out of the realm of everyday mundane existence, and that challenges them to *imagine extraordinary ways of existing*. They will be motivated to explore new domains of knowledge and to learn new vocabularies. Applying the process of imaginative envisaging

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Multicultural Learning

Banks and Banks, in Klopfer (2000: 9) contend that multicultural learning is based on the belief that cultural dynamics constitute the fourth force – along with the psychodynamic, behavioural, and humanistic forces – that helps to motivate human behaviour. Because cultural differences cause curiosity and emotive tension, it provides the intellectual spark for effective learning. Children of different cultures depending on one another for survival sake, the knowledge systems of different cultures could be applied for survival sake. Therefore the scenario that the researcher is proposing, will ideally lend itself to teaching the pupils of multicultural learning.

The process called over-learning relates to people routinely applying prior knowledge to manage repetitive aspects of daily living. Over-learning therefore reinforces the neural pathways that enable people that go through a day, doing mundane things without applying new cognitive skills to living. Once people have learnt how to brush their teeth, knot a tie, tie their shoelaces or ride a bicycle they do these things automatically without giving these processes particular thought.

Whole brain learning takes place when people have to form associations between entities which were not considered to be interrelated to one another, from a neurological perspective. This form of learning causes the formation and strengthening of new neural pathways to encode new understanding. Therefore brain based learning consist of over-learning to manage routine aspects of human existence, as well as constructivist learning to adoptively cope newly encountered aspects of existence.

Brain-Based Learning

Renate and Geoffrey Caine and Leslie Hart, discussed in Klopper (2000:12), hold the view that brain-based learning is the neurological version of the general theory of constructivist learning. According to this theory learning automatically takes place in any normal brain due to the self-organising structure and functions of the brain. Unless the brain is somehow inhibited from fulfilling its normal processes due to factors like abnormal organisation, coma trauma or drugs, learning will spontaneously and continuously occur. (Klopper 2000:12).

Hemisphere Preferential Learning

Bernice McCarthy in Klopper (2000:16) states that according to the theory of hemisphere preferential learning, individual learners by preference interpret information predominantly through the neo-cortex – the thin outer layer of grey matter – of either the left or right hemispheres of their brains. Hemisphere preferential learning relates to particular learning biases that people exhibit. People that are left hemisphere dominant are inclined to focus on details on the sequential interrelationships between things, the logical basis on which things can be organised and the hierarchic patterns to which they interrelate with one another. People that are right hemisphere dominate would tend to focus on wholes rather than details, would apply imaginative and creative means to explore knowledge would tend to be more interested

in the overall meaning of things rather than their interrelationships. These biases have been described in the theory of learning styles.

Learning Styles

This concept is based on research demonstrating that different individuals have a tendency to both perceive and process information differently. (Klopper 2000:14) A learning style is a method a person uses for acquiring knowledge. Every person learns in his or her own unique way. A learning style is not what a person learns but how that person learns it. Again, learning styles help to explain why one child might learn to recite the alphabet after reading an alphabet book, another child might learn the letters by playing with building blocks.

How are learning styles used?

Knowing the child's learning style enables the educator to create educational experiences that are more personalized, meaningful and effective. (The Seven learning istyles.htm)

Children gain knowledge and internalize what they have learned when that subject or skill is taught to them in a way that they can best relate. Discovering a child's learning style is discovering how to teach him/her most effectively.

What are the seven learning styles?

Physical learners

Physical Learners are the toe-tappers, hand-wavers, and fidgeters of the world. These are the people who can't seem to sit still. They relate best to the world through their hands and bodies. Physical Learners will enjoy sports, building, and dancing. Physical Learners benefit

most from role play, manipulating and touching objects, or performing movement exercises, e.g. professional dancers, professional athletes, surgeons and craftspeople.

Intrapersonal learners

Intrapersonal learners are the loners, those who march to the beat of their own drum, and may be described by others as shy. Intrapersonal learners aren't anti-social. Activities Intrapersonal learners may enjoy include journal writing, exploring the Internet, and goal setting. Intrapersonal learners benefit most from self-paced activities, independent projects, and research, e.g. psychologists, novelists, philosophers, and computer programmers.

Interpersonal learners

Interpersonal learners are the social butterflies, the helpers, and the true team players. Activities Interpersonal Learners may enjoy include team sports and group discussions. When learning new information or developing academic skills, they benefit most from playing cooperative games, researching with partners or working in small group, e.g. counsellors, teachers, politicians, coaches, business executives, and entertainers.

Linguistic learners

Linguistic learners are the wordsmiths, the bookworms, and the people who always know what to say. Activities Linguistic learners may enjoy include giving speeches, writing poetry and reading literature. When learning new information or developing academic skills, Linguistic Learners benefit most from story telling, listening to lectures, conducting interviews, reading, and writing, e.g. authors, journalists, lecturers and copywriters.

Mathematical learners

Mathematical learners are the math-whizzes, the game-lovers, and the rule-followers. They think in logical ways. They relate best to the world through reasoning, numbers, patterns and sequences. Activities they may enjoy include counting, sorting objects, making time-lines and solving "brain teasers". They benefit most from performing scientific experiments, following step-by-step processes, and using mathematical calculation, e.g. scientists, mathematicians, accountants, and lawyers.

Visual learners

Visual learners are the budding Picassos, the doodlers, and the people who have a flair for colour. They relate best to the world through pictures and images. Activities they may enjoy include painting, sculpting, and creating graphs. They benefit most from drawing diagrams, reading flowcharts, creating maps or performing demonstrations, e.g. architects, pilots, sailors, painters and sculptors.

Musical learners

Musical learners are the hummers; the shower-singers are persons who are described as having an ear for music. Activities they may enjoy include listening to songs, playing instruments, and singing. When learning new information or developing academic skills, they benefit most from writing song lyrics, playing music to accompany their work, or developing multimedia projects, e.g. singers, musicians, orchestra conductors, recording engineers, and web designers.

Observational Learning

According to Bandera, in Klopper (2000:19), this term is also called social learning theory, and occurs when an observer's behaviour changes after viewing the behaviour of a model.

Learning by observation involves four separate processes: attention, retention, production, and motivation.

Problem-Based Learning

In this type of learning, learners are given more and more responsibility for their own education and become increasingly independent of the educator for their education (Klopper 2000:22). Problem based learning is mainly used in science and mathematics. The learner is not presented inductively with a lot of knowledge, rather basic principles are shown and a range of problems that are solved by applying the principle taught. Problem based learning can make a major contribution to the integrative interdisciplinary approach that the researcher is promoting in this dissertation.

Cooperative Learning

Cooperative learning consists of instructional techniques that require positive interdependence between learners in order for learning to take place (Klopper 2000:25). Typical applications are brain storming e.g. debate pros and cons of construction, and consensus e.g. settlement is reached on the items required to implement a technology to solve a problem.

Accelerated Learning

Accelerated learning aims to create school success for all learners by closing the achievement gap between at-risk and mainstream children. (Klopper 2000:26) The idea is to radically change individual schools by redesigning and integrating curricular, instructional and organizational

practices so that they provide enrichment – not just remediation – for learners at risk.

Accelerated learning forms the basis of inclusive learning where physically challenged learners have the benefit of being socialised in mainstream learning settings and where ‘*normal*’ learners have the benefit of rethinking procedures and solutions that would accommodate their physically challenged peers particularly during co-operative group learning sessions.

Accelerated learning as well as co-operative learning requires manageable class sizes, the physical space and the resources that will enable learners to engage in the learning process as groups.

Thematic Learning

Thematic learning is the organization of a curriculum around macro “themes”. (Klopper 2000:27) Thematic instruction integrates basic disciplines like reading, mathematics and science with the exploration of a broad subject, such as communities, rain forests, river basins the use of energy, and so on. In the integrative interdisciplinary approach that the researcher proposes in my thesis, themes such as sanitation, food, time zones, etc. can be used. The integrative approach is biased towards thematic learning.

Whole-Brain Learning

Whole brain learning (Klopper 2000:28) is an approach to knowledge construction derived from neurolinguistic descriptions and emphasizes active learning, in which the learner makes connections that tap both the brain’s left and right hemispheres.

Memory

The mental function of retaining and retrieval of information about stimuli, events, images, ideas, etc. after the original stimuli is no longer present. (Sternberg 1998:260)

Short-Term Memory (STM)

Short Term Memory (STM) is used for information that has received minimal processing or interpretation. STM is a relatively limited capacity store capable of holding only about 7 or so “items”. (Sternberg1998: 263)

Long-Term Memory (LTM)

Once input information has been processed or interpreted in a reasonably deep fashion the underlying abstractions are stored away in this so-called long-term system. LTM is presumed to be without limit either in capacity to store info or in duration of that which is stored. (Sternberg 1998:263)

Metacognition/ Intrapersonal Communication

Intrapersonal communication occurs when an individual sends and receives messages internally: in other words, a person communicates with himself or herself. (Mersham and Skinner 1999:89)

Understanding

Understanding is an elusive intuitive process whereby one succeeds in apprehending the deep significant meaning of an event, a concept, an idea, etc.

Understanding is the sum of the mental powers by which knowledge is acquired, retained and extended. (Webster Comprehensive Dictionary: 1368)

Constructivism

This is a theory of learning grounded on the premise that human’s beings continuously and *automatically construct knowledge of our interactions with other entities in our environment.*

(Klopper 2000:4) Constructivism calls for the elimination of a standardized curriculum. Instead, it promotes using curricula customized to the learners' prior knowledge and it emphasizes hands-on problem solving.

Mastery Learning

The general aim of mastery learning is to ensure that learners are granted opportunities to be *successful at most tasks, providing an appropriate learning environment, materials and back-up guidance*. The teacher's input is vital. Mastery learning programmes are often described as being teacher-controlled, rather than learner-centred. (Klopper 2000:24)

Communication Science

Communication science consists of different forms of communications, e.g. intrapersonal communication, interpersonal, small group communication, public communication, organisational communication and mass communication.

The communication process

This process consists of a communicator, a medium that 'carries' the message, and a recipient.

Communication codes

A communication code is a collection of related signs and /or symbols and the rules that regulate their use in communication. Words, for example, are signs or symbols and grammar is the set of rules that regulate their use. (Mersham and Skinner 1999:17)

Why people communicate

People communicate to express ideas or messages, and to make sense of the situation in which they find themselves. People communicate to exchange thoughts, feelings, and information. It does not necessarily mean agreement. (Mersham and Skinner 1999: 2)

Forms of communication

Van Schoor (1979:13) states that all forms of human communication are based upon the process of expression and interpretation of messages. The first context is internal, that is it occurs in the mind of the communicator.

Intrapersonal communication

The communication takes place internally in our minds. (Mersham and Skinner 1999:90)

Interpersonal communication

The communication deals with communicating between people, usually in a face- to face situation. (Mersham and Skinner 1999:90)

Group communication

This form of communication relates to the interaction of people in small groups, usually in decision-making settings. (Mersham and Skinner 1999: 115)

Public communication

This form of communication focuses on a situation where the communicator e.g. a lecturer, politician, public speaker, or entertainer does most of the talking, while hundreds or thousands of people do most of the listening. (Mersham and Skinner 1999: 131)

Organisational communication

According to Mersham and Skinner (1999), this form of communication occurs in large cooperative networks and includes virtually all aspects of both interpersonal and group communication. It includes topics such as the structure and function of organisations, human relations, the process of organising and organisational culture. Communication is usually described in terms of the levels hierarchies and communication networks in the organisation. (Mersham and Skinner 1999:148)

Mass communication

Mass communication deals with communication that reaches large numbers of people via modern technologies.

The Internet and digital communications

The internet allows millions of computers and other electronic devices such as cellular phones, portable computers, computer networks, pagers, video cameras etc. to communicate with each other via telephone lines and satellites around the world in an economical, easy to use way. (Mersham and Skinner 1999: 188)

The Contexts of Communication

The contexts offer a convenient way of organising certain ways of looking at the communication process and these contexts do not exist on their own. (Mersham and Skinner 1999: 88)

Conclusion

In this chapter the researcher presented the key concepts of this study. In the chapter that follows, he will show that a knowledge of language patterns and communication skills are crucial in problem-based learning.

Chapter 4

THE CRUCIAL ROLES OF LANGUAGE AND COMMUNICATION IN PROBLEM-BASED LEARNING

Preview

Classroom learning involves cognition as well as the communication process that includes educators and learners in verbal and non-verbal communication. This communication affects the development of learners and educators. A close review of the communication process in the study of communication science is necessary to facilitate the integrative system of teaching and learning in the classroom.

There are a number of approaches to the communication process. The first is an ad hoc approach, which is used where a particular form of communication is invoked, as you need it, without relating it to systematic approaches to communication science. The second is some form of systematic interrelationship between the various communication processes. One can for instance, in media and communication studies, focus on a variety of forms of communication and how they are applied in the news media, print media (newspapers, magazines) and mass electronic media (radio and television). Finally, one can systematically study all aspects of communication within an integrative framework.

Language and learning

It is a common belief that the most important characteristic of humans is their ability to use signs and symbols in thought and speech (Mersham and Skinner 1999) Humans are capable of knowing, preserving and sharing knowledge. Animals can warn their young of danger only when it is immediately apparent. They cannot warn of future dangers that may be encountered

in their lifetime. Humans can separate reactions and thoughts from what is happening at any given moment and can generalise about experiences and learn to predict future occurrences. The human capability of thinking (envisaging, foreseeing, planning, weighing up and concluding) along with communication (to collect, share, manipulate and use information along with fellow humans) has been fundamental to the development of the species. We employ language as our best tool for survival.

Language as a code system

The explicit study of language structure should be an important part of education in general and communication studies in particular. In spite of this, over the past quarter century language study has progressively been reduced to the study of literature and to conversational skills, even in first language studies in school. As explained in this study, communication entails considerably more than conversation, and advanced communication skills require an excellent command of language patterns.

Language is a code system consisting of words and grammar called a linguistic code (Mersham and Skinner 1999:18). Language is the most versatile and frequently used of all codes in communication. Linguistic codes are of two main types: Verbal or spoken codes and nonverbal codes.

Nonverbal communication is as important as verbal communication in providing a total message. (Mersham and Skinner 1999:37) Nonverbal communication can be improved by paying careful attention to the feedback from the recipient. Distracting mannerism can be consciously removed or avoided. Improve aspects such as tone of voice, posture, appearance and hand gestures.

The recipient receives communication that can be in verbal or non-verbal communication codes. Non-verbal communication codes are instantiated in the form of facial expressions, gestures, pantomimes and other body language. Verbal communication codes have paradigmatic and syntagmatic relationships

Paradigmatic relationships

The use of schemas that are closely analogous to rules and grammatical classes can be considered to be paradigmatic. (Langacker 1990:114) The schemas capture generalizations and categorize a series of content structures that are parallel in formation. It does not relate one content structure to another, except in the sense of expressing their similarities, e.g. articles, nouns, verbs, prepositions, etc.

Phonological categories

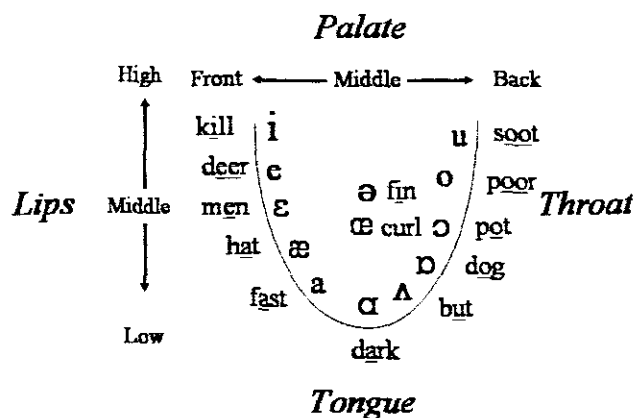
In this study the researcher is emphasising the importance of English phonology & the sound system of English & during language teaching because there are clear indications that reading problems, locally and abroad, are the result of the abandonment of phonics as the basis of the teaching of reading skills. This approach was introduced under the term “whole word reading” in the USA about a quarter century ago, from where it spread to foundation phase classrooms around the Western world. This is not intended as a fully blown linguistic exposition of phonology, but as an account that is robust enough to teach teachers and learners to what extent spoken communication forms the basis of written communication.

Vowels

Vowels are speech voiced sounds that are produced with the vocal tract wide open so that the airflow from the lungs passing through the mouth is relatively unrestricted. There are two types of vowels that act as phonemes, namely monophthongs and diphthongs.

Monophthongs are single vowels as in the words man [mæn], sit [sɪt] and foot [fut].

According to Lass (1984: 21) the configuration of vowels that function as phonemes in a language (vowels that distinguish words from one another) can be organised in an idealised “pseudo-articulatory” space that can be characterised by means of descriptive features such as relative height and relative frontness as in the English vowel chart below:



Diphthongs are combinations of two vowels that function as phonemes. Below the researcher provides a number of examples without being exhaustive:

[aɪ] as in fight, light, right, write, few, sight and fight.

[iʊ] as in dew, few, pew, skew queue, and beauty.

[ɔɪ] as in boy and toy.

[u^h] as in cure, lure, pure and sure.

Semi-vowels

These are three sounds articulated at the beginnings of words with an open vocal tract, similar to that of vowels but with a non-continuous air stream similar to that of consonants:

Front	Middle	Back
[w] as in <u>w</u> et	[j] as in <u>y</u> es and <u>y</u> et	[h] as in <u>h</u> and

Consonants

When consonants are articulated, the outgoing air stream is either terminated or severely restricted in the front, middle or back of the vocal cavity:

	Front	Middle	Back
Voiceless stops: [p, t, k]	<u>p</u> ig	<u>t</u> ap	<u>k</u> it
Voiced stops: [b, d, g]	<u>b</u> at	<u>d</u> og	<u>g</u> ut
Voiceless fricatives: [f, θ]	<u>f</u> an <u>l</u> augh	<u>th</u> umb <u>p</u> ath	
Voiced fricatives: [v, ð]	<u>v</u> an <u>h</u> ave	<u>th</u> is <u>b</u> reath <u>e</u>	
Oral sonorants: [r, l]	<u>r</u> an <u>l</u> ung		
Nasal sonorants: [m, n, ŋ]	<u>m</u> an <u>h</u> am	<u>n</u> o <u>m</u> an	<u>l</u> ong

There are also morphological categories and lexical categories

The organisation of phonological codes

Phonemes that occur in syllables or words induce phonetic modifications that alter the semantics of that phonological unit:

<i>When one substitutes phonemes, you get new words</i>		
<i>Phoneme</i>	<i>Word</i>	<i>Meaning</i>
b	ban	<i>To forbid</i>
d	Dan	<i>Name of male</i>
f	fan	<i>Device to stir air</i>
k	can	<i>Metal vessel usually sealed</i>
m	man	<i>Adult human male</i>
P	pan	<i>Usually wide shallow metal vessel</i>
r	ran	<i>To have moved rapidly</i>
t	tan	<i>To bronze skin by sunlight</i>

The organisation of morphological codes

Morphemes are symbolic units that associate phonologically and semantically. Consider the morpheme DOG. The word is assembled out of smaller phonological units [d], [], [g]. These smaller units combine syntagmatically to form the higher order phonological unit.

The organisation of syntactic codes

Syntagmatic relations are the integration of two or more component structures in semantic, phonological or symbolic space to form a composite structure of greater size in the same domain. (Langacker 1995:94) The integration of two or more symbolic structures involves their integration at the semantic and phonological planes. When individual words are combined according to set patterns, one has syntactic phrases.

Typical noun phrases

Article + noun: *a man*

Quantifier + noun: *two men*

Adjective + noun: *tall man*

Typical prepositional phrases

Preposition + noun: *on time*

Preposition + prepositional phrase: *up to the house*

The Communication Process

Humans do not primarily use language to think, but to communicate their thoughts to one another. To communicate successfully is a complex task (Mersham and Skinner 1999: 40). Because of the very complicated nature of the communication process, the complexities of people and the environment, human communication can fail, especially if the communicator ignores one or more of these aspects. Four basic parts or stages of Communication by

Objectives (CBO) have been identified to obviate/ overcome these problems. The stages of the planned communication process are:

Identifying the needs

Formulating the objectives

Analysing the destination

Arranging for feedback and evaluation

CBO starts from the assumption that all communication is motivated by and directed at the satisfaction of one or more needs, (Mersham and Skinner 1999:41) which include psychological and physiological needs. These needs are satisfied directly or indirectly through communication, which must be accurate and specific, so that there is no miscommunication or misunderstanding because the parties involved are aiming at different needs.

The communicator must formulate the objectives in such a way that the achievement or lack of achievement of the objectives is measurable (Mersham and Skinner 1999:50). The communicator must have a method of measuring and evaluating the degree of success of the communication. An objective can be described as the desired end result of the communication *that is measurable in terms of achievement that satisfies the needs of the communicator.*

(Mersham and Skinner 1999:50) The objective is described in terms of behaviour. Objectives must have time frames i.e. (Mersham and Skinner 1999:52) short-term, medium-term and long-term which will depend on the intensity of the need to be satisfied. It is recommended that objectives should be restricted to the minimum to enhance the chances of success. Too many objectives may lead to confusion. Instead, more than one communication programme or

effort should be programmed (Mersham and Skinner 1999:54). Most important of all objectives must be realistic and attainable. The communicator must be capable of attaining the objectives and the cost must be realistic. (Mersham and Skinner 1999:55)

The success of a communicator in any communication process depends on the how well the communicator can match own encoding process with the decoding process of the recipient. (Mersham and Skinner 1999:65)

Communication is successful if you communicate with the recipient in terms of what he or she knows, wants, believes, feels and expect which influence the recipient's interpretation of the communication signs and symbols used to convey the message. The communication must adapt to the recipients needs (Mersham and Skinner 1999:65)

Analysing the destination is important in order to identify the possible barriers that may impede communication and to identify factors that will increase the possibility of success (Mersham and Skinner 1999:65)

We can analyse the destination, i.e. the recipient of the communication, by considering the following aspects: (Mersham and Skinner 1999:65)

Demographic characteristics

Demography, (the study of the changing numbers of births, deaths and diseases in a community over a period of time), includes details such as sex, age, nationality, occupation, marital status, education, income. Communicators should beware of making inferences based on stereotypes because stereotypes become unreliable and less accurate as the size of the recipient group decreases.

Gender

Traditionally male and female interests and activities differed. However communicators should be careful not to trust this stereotyping too much because differences in interest, occupation and education between the sexes are becoming less marked.

Age

People advance through different developmental stages as they age, and are socialised in much the same way in any specific culture. This information helps the communicator to establish a rapport and hold the attention of the recipient. Marketers, advertisers and social scientists target the age grouping.

Communicators should update themselves on the latest trends and ideas of the target age-group as they may differ markedly from generation to generation. This communicator would be well advised to take note of the difference in choice of vocabulary and morphological and syntactical complexity of words and tendency in the use of words in vogue.

Nationality

National differences occur linguistically as well as culturally. Modern communication and increased international contact are reducing national and cultural differences. A good communicator will be sensitive to the differences in nationality and culture that does exist and that is preserved and protected by those that are proud to maintain them.

Tribalism and Ethnicity

Tribal societies are ordered, cultured and disciplined, but in First World terms, they are economically poverty-stricken. Tribal societies are extremely wealthy socially and morally for they have their philosophies in which all share. They have clarity on structure and order of their society and they have a deep and sincere care for the community, which is considered to be worth more than material riches. Group values are strong. Boon (1998:61) suggests that people retreat into ethnicity when they are most threatened e.g. Afrikaners, Zulus, Jews, English. Communicators should beware of applying stereotypes carelessly.

Occupation

Occupation can be used to deduce people's general interests. People of different interests will develop opinions, viewpoints or attitudes towards specific topics that are linked to their work.

Education

Education usually determines the level of language that is used and understood.

Communicators should establish the level or relevance of education of the recipient to the topic. It should be noted that higher education is not a mark of high intelligence. Similarly the communicator should not underestimate intelligence of people who have not completed formal education.

Income

Marketers and advertisers differentiate between target recipients for products and services intended for people of differing levels of income usually use income levels of people as indicators.

Geography

Communication is sometimes intended for people living in particular parts of the region, country or world. For instance, a communication can be geographically bound to the coast, inland areas, a particular suburb, city or climatic area.

Communication habits and media preferences

People have communication preferences. Some prefer the print media such as newspapers. Others prefer the radio or television. Others rely on word of mouth. People accord credibility to the communication medium of their choice and suspicion to other media. People are creatures of habit and they differ in their communication habits. The knowledge of these habits will enable the communicator to better compete for their attention.

Feedback is the term used to refer to the information coming back from the recipients of the communication. Arrangements for feedback must be carefully planned before the delivery of the communication. (Mersham and Skinner 1999:81)

If decisions about what you want to measure, how to measure it and the actual methods of obtaining the feedback are rushed, then it is usually badly designed or poorly thought out.

(Mersham and Skinner 1999:81) Some of the most common methods of obtaining feedback for the communicator to evaluate are:

Direct observation

Questionnaires (includes tests and examinations)

Changes in behaviour

Comments

Surveys

Evaluation is critically important in the communication process to gauge the success of the communication efforts because of the cost, time and other resources committed.

Contexts of Communication

Van Schoor (1999:13) states that all forms of human communication are based on “the process of expression and interpretation of messages”. The first context is the internal communication that occurs when a message arises in the mind of the communicator.

(Mersham and Skinner 1999:87) This internal communication is called *intrapersonal communication*. The second context involves another person. Communication between the communicator and recipient is called *interpersonal communication*, usually in a face-to-face situation.

Small group communication (Mersham and Skinner 1999:88) involves interpersonal interaction usually in a decision-making setting. *Public communication* focuses on public speaking where the communicator does most of the talking while the large group does the listening. *Organisational*

Communication occurs in large co-operates which include both interpersonal and group communication. *Mass communication* involves communication via modern technologies to large numbers of people.

Intrapersonal communication

'Intra' means 'within' or 'inside'. Intrapersonal communication occurs (Mersham and Skinner 1999:89) when a person communicates with himself i.e. a person sends and receives messages internally. Blignaut and Fouries (1970:97) define intrapersonal communication as "the inner intercourse of every human being with himself. Intrapersonal communication enables an individual to make sense of the world around him by expressing and interpreting his own messages and can occur while communicating in any other setting. Intrapersonal communication is the basis of communication in all other contexts and occurs in all communication acts (Mersham and Skinner 1999:89) and can take place without communication in other arenas.

Andersch in Mersham and Skinner (1999:90) explains that something perceived by our senses is called a percept or an image that is interpreted in the process of intrapersonal communication. Because each person's life experienced and circumstances are unique, one person's percept may differ from that of another person's with regard to the same object or event. (Educators note) Interpretation must take place before meaning is ascribed to the experience. The ascription of meaning in intrapersonal communication is an extremely important part of our ability to act as communicators. Therefore, intrapersonal communication is a prerequisite for all communication. Behaviour and attitude is shaped by the intrapersonal communication. "Self-awareness, self-acceptance and self-actualisation all arise in the process of intrapersonal communication". (Mersham and Skinner 1999:90)

Interpersonal communication

The prefix “*inter*” means “*between*” (Webster 5 Comprehensive Dictionary 1992:662)

Interpersonal communication occurs between two or more people in physical proximity in a face-to-face situation (Mersham and Skinner 1999:90). The communication behaviour will be interdependent, that is, participants will continually provide feedback and response to each others messages – there will be focused interaction and reciprocal exchanges. Verbal and non-verbal codes such as facial expressions, gestures and body language are observed. Kiesler (1978:16) agrees that interpersonal communications involve psychological phenomena that influence social interaction in groups and organisations.

According to Mersham and Skinner (1999:91), communication is the largest single factor determining our social environment. Communication is the foundation for all interpersonal relationships. According to Buber as reported in Mersham and Skinner (1991:91) the basis of human existence is that people are communicating beings. In Buber’s view, it is the nature of the relationships that people form with each other that determines the meaning that life holds for each individual.

Buber describes two types of interpersonal relationships the “I-YOU” and the “I –IT” relationships which differ greatly from each other. The first is a two-way relationship and the second is a one- way communication.

The “I-YOU” relationship involves a dialogue or conversation between two people in which both participants have the opportunity to express themselves and to interpret each other’s messages. This includes mutual respect, sincerity and honesty in a reciprocal relationship (Mersham and Skinner 1999:92). The “I” (communicator) and the “YOU” (recipient) each

enter into the relationship with his or her whole being. Each individual reveals the true person that he or she is. All feelings, thoughts beliefs, opinions are authentic. Buber (Mersham and Skinner 1999:92) calls this “shared space” that opens between people in such a relationship the ‘interhuman domain’ where the “I and YOU” become “WE” through dialogue. The dialogical relationship “WE” is based on inter-subjectivity, i.e. the participants acknowledges the differences between each other while striving to understand each other. One person is not dominated by the other person and *vice versa*. Each partner in the relationship retains his or her individuality and acknowledges the other as unique while simultaneously reaching a deeper understanding of self.

The “I – IT” relationship is characterised by an unequal relationship which involves an active participant (communicator) who does all the talking while the recipient remains silent. There is no exchange of meaning between the participants. This is not a dialogical relationship – (Mersham and Skinner 1999: 93) because the communicator conducts a monologue where only his / her point of view and needs are considered. The “I – IT” relationship can be described as self centred, pretentious, dominating, exploitive and manipulative. There is no mutual trust, openness and reciprocity in the relationship. The intention of the “I” is to persuade and manipulate the other to his or her own way of thinking without taking into account or consideration the views and needs of the other person. Buber (Mersham and Skinner 1999: 94) acknowledges that the “I – IT” relationship is sometimes necessary but suggests that good communicators will try to establish the “I – YOU” relationship.

According to Buber, the “I- YOU” relationship implies an authentic mode of existence and the “I – IT” relationship implies an inauthentic mode of existence.

According to Mersham (1999:94) relationships are at the heart of interpersonal communication. There are four important characteristics about relationships:

Relationships are always connected to communication and cannot be separated from it.

The nature of the relationship is defined by the nature of communication between its members.

Relationships are usually defined implicitly rather than explicitly.

Relationships develop over time through a negotiation process between those involved.

Kiesler (1978) argues that there are four psychological principles that comprise the fundamentals of the interpersonal communication process:

People respond and act on their own views of reality

People are influenced by the immediate social situation they perceive themselves to be in

People act on motives that they bring to the situation

Interpersonal actions are guided by values and beliefs

There are two basic ideas about communication. The first is the idea that- “one cannot *not* communicate”- which emphasizes that we are always affecting other people’s perceptions.

(Mersham and Skinner 1999: 95) Any behaviour on the part of one person is potentially communicative to the other person present. The second idea about communication is that every conversation involves two messages, that is, a content message and a relationship message. (Mersham and Skinner 1999: 95) When two people communicate, there is an

exchange of information. Simultaneously, each also comments on the relationship at a higher level. This simultaneous comment is not obvious and may be non-verbal.

It is called meta-communication or communication about communication, for example, on the content level; an educator announces an upcoming test. The relationship message (meta-communication) could include: "I am the authority in this classroom, I teach, you learn; what I taught was important; I need feedback on your progress; I want to judge you; I want to know how well I taught this lesson." The pupils' responses could also include a relationship dimension. In communication the educator and the learners constantly define and redefine the nature of their relationship.

The three factors that influence interpersonal relationships are interpersonal communication and needs, self- disclosure and the communication environment, and interpersonal communication and feelings.

Interpersonal communication and needs

Theories about interpersonal needs enable us to understand why we behave as we do in relationships and also other people's needs and motivations. As the relationship between two people grows, it becomes easier to communicate in a way that both understand (Mersham and Skinner 1999:96). Schutz, in his theory of interpersonal communication needs, (Mersham and Skinner 1999:96) argues that there are three main interpersonal relationship needs:

The need for inclusion

The need for affection

The need for control

The need for inclusion (Mersham and Skinner 1999: 96) is about the desire for social contact and acceptability. People feel accepted understood and worthwhile when the need for inclusion is met and people feel lonely and unwanted when this need is not met. Schutz describes three main types of people. The first are 'introverts or undersocial people who feel little need to be included in groups and avoid interacting with others. The second are oversocial or extroverts, people who are always looking for companionship and join many groups. Schutz argues that both types fear being ignored or left out, but display different behaviours to compensate for their fears. The third type is the majority, people who do not belong to either extreme. Relationships function best, according to Schutz, when people achieve a balance between the need to be alone and to be with others.

The need for affection (Mersham and Skinner 1999:97) is reflected in the development of emotionally close relationships in which affection is shown and expressed verbally and non-verbally in varying degrees. At one extreme, *underpersonal* individuals value privacy and seem to have little need for affection. At the other extreme, *overpersonal* people display a high need for close relationships with others. They tend to confide in everybody they meet, express their feelings openly and freely and expect others to reciprocate. Between the extremes are the people who express and receive affection when desirable and maintain a distance when necessary.

The need for control is the desire to sometimes successfully manage and influence the events and people around you and also, at other times, to allow others to establish that control.

(Mersham and Skinner 1999: 97) At one extreme, the *abdicates* are people with a strong need to be controlled. They assume a submissive or subordinate role in a relationship. At the other extreme are the *autocrats*; those who dominate others and who always want to be in charge. The

democrat falls in between these extremes. They know when to take control and are comfortable submitting to others when necessary.

Schutz argues that the most successful relationships develop between people who are not extreme in their interpersonal needs. (Mersham and Skinner 1999:97)

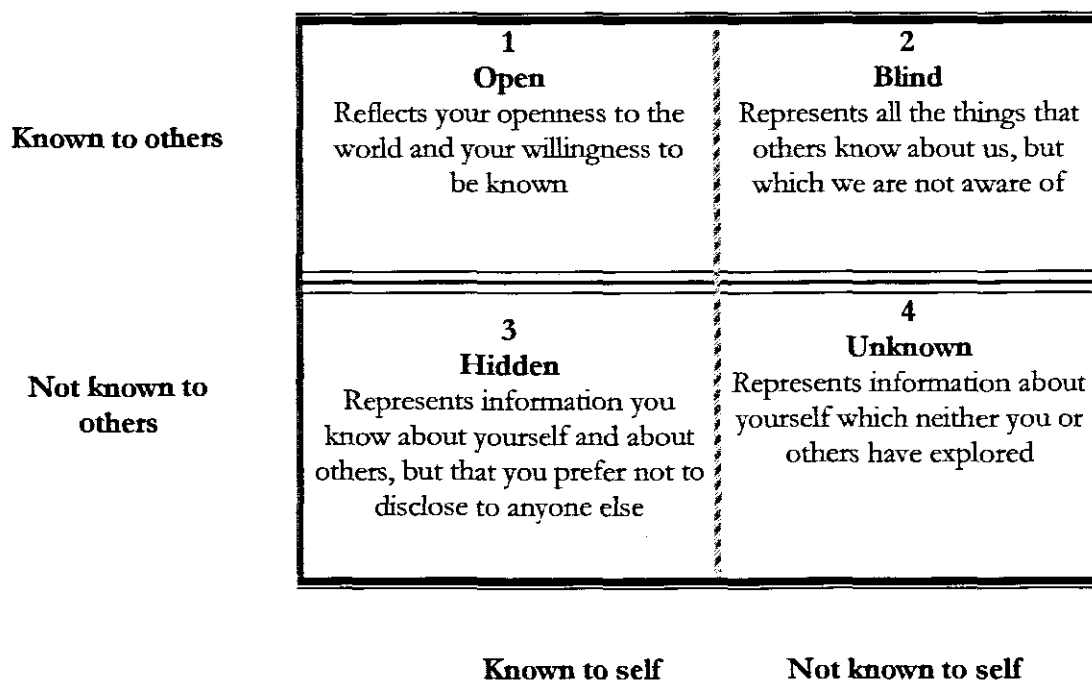
Another theory on interpersonal communication needs is Homans' social – exchange theory. (Mersham and Skinner 1999: 98) This theory focuses on why people maintain some relationships and terminate others. According to Homans, all social interactions involve some sort of exchange for example, a person may assist someone in exchange for gratitude, talk to someone in exchange for friendship. One interpersonal need is exchanged for another. The reward for making the bargain is calculated and the cost incurred for the investment. The profits and losses in the relationship is calculated to decide whether to pursue or terminate the relationship.

Social-exchange theory implies that a person will strive to maintain a relationship only as long as the rewards or profits are greater than the costs. The relationship will continue only as long as both parties are profiting from it (Mersham and Skinner 1999:98)

Self-disclosure and the communication environment

The amount of information that is disclosed in an interpersonal relationship influences the relationship. The Johari window is a model that helps to assess the types of information that is disclosed, who the disclosures are made to and the communication environment (Mersham and Skinner 1999:99) The Johari window provides a link between intrapersonal and interpersonal communication. The window is divided into four quadrants that represent the

four different selves. The size of the quadrants depends on the amount and type of information that is shared. The four quadrants of the Johari Window are represented below:



The four quadrants are interdependent. A change in one quadrant affects another, (not shown here). Different arrangements of the Johari window are possible, (Mersham and Skinner 1999:101) which depends on the communication style of the individual. For example, Sam is reluctant to disclose information about himself. He will have a very small open area (quadrant) and a large hidden area (quadrant 3). Jesse, on the other hand is reluctant to receive feedback about herself but willing to disclose information. She will have a large open area (quad 1) and a large blind area (quad 2). As the individual discloses information the open quadrant becomes bigger and the hidden quadrant is reduced. Luft, as reported in Mersham and Skinner (1999:101), propose that not only is it rewarding and satisfying to learn more about yourself and thus gain self-insight, but also it is rewarding and satisfying to reveal enough about yourself to others to enable them to get to know you better. He believes that a greater

knowledge of ones self leads to increase in self- esteem and self- acceptance. Hybels and Weaver, in Mersham and Skinner (1999:102), propose that the ideal Johari window is formed after a relationship has had a chance to develop and mature, thus increasing size of open area.

Interpersonal communication and feelings

Steinberg in Mersham (1999:102) states that the way in which we express ourselves to others, especially in sensitive areas of feeling, needs and opinions, can have affect interpersonal relationships positively or negatively. Feelings that arise in confrontations, conflicts and adversity are all part of meaningful relationships. There is a need to build trust, engage in self-disclose, and resolve conflicts and express feelings and needs honestly and sensitively with other people. It is necessary to understand and develop personal qualities for quality relationship.

Small Group Communication

Small group communication usually refers to interpersonal communication within a group of between three and twenty-five people (Williams 1992:169). For example the family, school groups, work groups, social clubs, religious groups, study groups. People in groups usually share a common purpose or goal which brings them together, (Sternberg 1998:493) that can be either task orientated or social orientated or the purposes may overlap. Sternberg says that groups serve two main purposes: to get work done and to handle relationships among the members of the group.

A small group is not a random collection of people. There are four criteria that defines a small group in communication, (Mersham and Skinner 1999:114), namely:

There is a sense of belonging and identity among the members of the group.

Members interact verbally and non-verbally

Members occupy certain roles in relation to one another.

Members co-operate to achieve a certain goal or objective.

Vu 1997: http://www.slc.edu/comm/syllabi/jones/com_jones.htm agrees that members of a group usually have something in common, such as motivation, perception, goals or destiny. A small group is composed of three to twenty people interacting face to face, so that each individual influences and is influenced by each and every other members of the group.

The *advantages* of small groups include the following:

Individuals can contribute a wide range of resources, expertise and information to achieve goals and reach decisions.

Individual motivation and commitment increase to the task at hand.

Better and superior decisions and solutions are often reached because brainstorming enables the group to anticipate difficulties, identify weaknesses, and explore possibilities and consequences.

Confirmation of ones ideas by others provides a feeling of personal satisfaction self esteem and self-actualisation.

The *disadvantages* of small groups include the following:

Small groups such as committees often make riskier decisions than individuals because the sense of personal responsibility is diminished.

The workload may not be fairly distributed among all members of the group. All members talk but the actual work is carried out by a few or hard workers hogged by a few dominating members.

Forceful individuals may be dictatorial and dominating in proceedings, thus preventing others from participating.

Personal agendas of group members sometimes conflict with group goals to the extent that they interfere with group objectives.

An effective group can achieve success if the following criteria, is present.

The group must have an optimum number of members. Research indicates that a group of five to seven people is the most productive size that enables maximum participation by all members. An odd number is preferable for voting purposes when consensus cannot be reached.

The group must have a good working environment

The group must demonstrate cohesiveness and commitment to the task.

The group must respect norms. According to Kiesler (1978:123) norms are shared expectations, which guide the behaviour and beliefs of the members in the group.

The group must meet the key role requirements.

An effective group climate will have the following characteristics: (Mersham and Skinner 1999:115)

Mutual supportiveness

Participative decision making

Trust among group members

Freedom to speak with openness and candour

Pride in achievement of the groups goals

Group dynamics is the scientific study of small groups (Mersham and Skinner 1999:116). A group may be ineffective for a variety of reason. If the group leader is strong, dominant and respected, the group may “stick together” too much and is said to suffer from too much cohesion. Such groups experience “group think”, where members concentrate on minimising conflict and preserving harmony. Ideas are not examined critically. The group tends to overlook negative information or ignore ethical consideration in order to preserve the cohesiveness of the group. Since non-conformity may damage cohesion, members who privately disagree with decisions, views, opinions and ideas may be unwilling to risk conflict by publicly disagreeing.

Different roles in small groups

The roles that are discussed in the following sections are conceptually grounded in the role relationships found in Dirven & Verspoor (1999) and Klopper (2000). A role is the function that someone has or is expected to play within a small group (Mersham and Skinner 1999:117). According to Borchers (1999: <http://www.abacon.com/commstudies/groups/roles.html>) some roles relate to the task aspect of the group, while others promote social interaction. A person’s relative status or position may determine his/her role. Usually role structure develops from within the group. The roles will be examined in more detail because they will figure

promptly in the integrated learning chapter where learners have to engage in cooperative learning scenarios in order to solve survival related problems. The roles are:

Task roles

Maintenance roles

Self-centred and self-serving roles

Leadership roles

Task roles

Task roles will depend on the work a group must do to accomplish its goals. Task roles are often interchanged among the members of the small group. Task roles include the following: (Mersham and Skinner (1999:118) and Borchers 1999:<http://www.abacon.com/commstudies/groups/roles.html>):

The information or opinion giver will provide content or well-considered opinions that will help the group move smoothly towards the best decision.

The information or opinion seeker will gather additional information or opinions that the group lacks but finds necessary to reach a decision.

The expediter-energiser helps the group stick to its agenda when the members digress from the relevant topic and stimulates the group to higher levels of performance.

The idea person is an imaginative person who comes up with one or more alternatives that may serve as a basis for the final decision.

The analyser is usually highly skilled in problem solving.

The elaborator will explain the ideas within the group and offers to clarify the ideas.

The coordinator shows the relationships between the ideas.

The orienter shifts the direction of the group's discussions.

The evaluator-critic measures the group's actions against some objective standards.

The procedural technician completes the logistical functions for the group.

The record keeper maintains the records of the group's actions.

Maintenance roles

Maintenance roles are concerned with the feelings of persons and the emotional behaviour of the group whilst being engaged in getting the work done smoothly and effectively.

Maintenance roles include the following: (Mersham and Skinner 1999:119)

The active listener recognises the contributions of others and responds with specific verbal or non-verbal reinforcement such as a nod of the head, smile, etc.

The game leader recognises when the process is becoming tedious, tiring or when the decision is getting out of hand. The game leader will tell a timely joke, digress or comment to improve spirits or break the tension when necessary.

The harmoniser is a considerate and empathetic person who is able to reduce or reconcile differences and misunderstandings in the group.

The *gatekeeper* makes sure that channel of communication are open and that everyone has a chance to enter the discussion.

The *compromiser* usually acts when two or more prominent positions emerge so that a happy decision is finally made.

The *front person* or public relations person is the person skilled at interacting with outside groups and individuals. The person is also skilled in public speaking and interpersonal relationships.

Self Centred and self-serving roles

Self-centred and self-serving roles reflect people's own ambitions and self-serving functions.

Self-serving roles are counter-productive and have a negative effect on the group's achievement of its goals (Mersham and Skinner 1999:120). Self-serving roles are destructive and include the following:

The *aggressor* works for his or her own ends by criticising or blaming others when plans do not work or where things go wrong.

The *blocker* blocks ideas from group acceptance or rejects suggestions on a personal basis.

The *competer/ recognition seeker* continually competes with others to gain attention.

The *special pleader* has his or her own agenda or pet ideas that he/she works to integrate into whatever is planned or done.

The *joker* displays behaviour that includes clowning, mimicking and generally disrupting the group in order to seek attention.

The *withdrawer* refuses to contribute or be a part of the team.

The *monopoliser/dominator* feels the need to talk all the time and dominate proceedings.

The *help seeker* tries to gain the sympathy of the group.

Leadership roles

A leader is a person with the ability to influence the group to accomplish a task successfully.

(Mersham and Skinner 1999:121) A skilful leader guides a group through discussion, pointing out advantages and disadvantages of items discussed by the committee so that the best outcome is reached. Effective leaders are skilful at both task orientated and maintenance-orientated functions.

Borchers(1999:<http://www.abacon.com/commstudies/groups/leader.html>) agrees. He adds that groups can have two leaders, each for a different task, e.g. one for a social dimension and the other for a task dimension. Borchers believes good leaders are born with traits that make them effective leaders.

Effective and competent *Leaders* demonstrate the following skills:

EFFECTIVE LEADERSHIP SKILLS ABILITY	Superior intelligence; Scholarship; Insight and verbal facility.
SOCIABILITY	Dependability; Activeness; Co-operation; Popularity.

MOTIVATION	Initiative; Persistence; Enthusiasm.
COMMUNICATION SKILLS	A high level of competence in a variety of communication skills.

There are three main leadership styles:

Leadership styles

TYPE	CHARACTERISTICS	ADVANTAGES/DISADVANTAGES
Laissez-faire (Where minimum of interference may produce the best results)	Does not direct group at all. Supplies information, advice and material when asked but does not actively participate in group-decisions.	Group has complete freedom in determining policy, procedures, tasks and roles. But members of this group may often be distracted from the task at hand and suffer loss of direction; with the result that the quality of work they produce suffers. However, this kind of leadership is appropriate in situations where too much direction would stifle group creativity.
Authoritarian (Appropriate when urgent decision is required)	Task-orientated, firm opinions on how to achieve group goals. Exercises direct control over determining policy and procedure, assigning tasks and roles to members, deciding who may talk and who may not and makes decisions without consulting the group.	Although this approach may be effective during crisis situations as it produces fast decisions, the usual outcome of this style is that it causes conflict within the group and group satisfaction is low. Task leadership may create discontentment and/or result in less individuality. But more work is done under a task leader than a person-centred leader.
Democratic (When commitment)	People-orientated. Guides rather than directs a group by involving all members in discussion and debate.	Produces high quality results as it allows for originality and creativity, stimulates group cohesiveness, motivation to work

to the group. decision is of greatest importance	Allows everyone's points of view to be heard. While such leaders may suggest alternatives, it's left to the group to decide on specific policy, procedure and the task and roles of members.	and achieve goals, and the desire to communicate. Motivation and originality are greater under a person-centred leader. More friendliness is shown.
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The democratic style of leadership is usually regarded as the best in most circumstances because it is group centred. Leadership is also about taking unpleasant and unpopular decisions and being responsible for those decisions as an individual. The *One-best-style leadership* approach advocates that given a particular situation, one particular style of leadership is most effective. A fourth type of "leadership" is the *abdicator leadership*. No person exercises leadership and the group disintegrates.

Guidelines for participating in small groups

There two way of participating in a small group i.e. speaking and listening.

Speaking

Ideas and opinions must be communicated as accurately and concisely as possible. Nosfinger (1991: 3) says that conversation is the primary method through which interpersonal relationships are formed, dissolved or maintained.

Here are some ways to increase effectiveness in speaking according to Mersham and Skinner (1999:124):

Organise the remarks you want to make.

Before you speak summarise what you want to say into the shortest possible sentences.

Address the comments to the group as a whole. Involve everyone in the group by scanning as you speak.

Relate ideas and opinions to what others have said by making connections to previous comments.

State only one point at a time so the group can digest and respond to individual points.

Speak clearly and use language that all members of the group can understand. English appears to be the international language, but it is the second language of the majority of South Africans. Technical terms and metaphors must be used with caution.

Listening and feedback

Listening effectively is as important as speaking effectively in a small group. Here are some guidelines to listen aggressively, according to Celano and Salzman (1988:111-118):

Consciously concentrate. Focus on the matter at hand.

Visibly respond to the speaker by acting interested, maintaining eye contact and responding verbally or non-verbally.

Do not engage in conversation with another member of the group while listening.

Try to create an atmosphere of informality to assist shy or less confident individuals.

Avoid filtering out the negative comments and opinions expressed by members of the group.

Sum up by paraphrasing what has been said to help crystallise ideas, aid memory and clarify *miscommunications*.

Interrogate politely to allow the speaker to know that you are interested in the information.

Take notes but be selective. Write down key words, phrases and statistics.

If a speaker is “talking over your head” or is incoherent, you must request for clarification.

Avoid “killing the messenger” by criticising the person delivering bad news. The golden rule is “criticise the policy, not the person”.

Get to yes or no or a “speeder-upper” when a quicker answer is required.

Listen to more than just the words. Some research indicates that 90% of a person’s real message is communicated non-verbally. Consider the speaker’s facial expression, eye behaviour, posture and gestures.

Public communication

Public communication refers to the situation where the communicator (public speaker, entertainer, and lecturer) does most of the talking; while several dozen to several thousand of people do most of the listening (Mersham and Skinner 1999:131) Groups of people addressed in the public context are usually much larger than in the small group context. Direct interaction between the members is very limited or even impossible.

According to Williams (1992:211-212), the term *public communication* referred to communication that was disseminated widely to large groups of people. He adds that traditionally, when such communication involved messages being distributed indiscriminately to the public; social scientists had called it *mass communication*, reflecting the concept of anonymous individuals that constituted the impersonal mass society. However, this had to change in the present era of

specific media and selected target audiences where the individuals in the public are no longer so anonymous.

In public speaking one person addresses an audience in a public setting. It is difficult for the speaker to maintain direct eye contact with the audience or to monitor body language or other non-verbal communications. The audience is also affected by such factors as distance from speaker, lighting and sound system.

Public communication is a formally structured where the speaker speaks and feedback or questions are delayed. Public communication differs from other forms of communication in two important ways (Mersham and Skinner 1999:133)

One, public speaking situations include two distinct and separate roles i.e. speaker and audience.

Two, in the speaker-audience relationship, the speaker carries more responsibility for the communication process than the audience, whereas speakers and listeners exchange roles and responsibilities in other communication situations.

The social context of public communication is the larger community itself. (Williams 1992:213)

The public media are distributed to selected large groups in the society, as in the audience of a prime-time television programme, e.g. the news.

According to Williams (1992), the four main characteristics of public communication are:

(1) *Low cost, rapid duplication and wide dissemination.* The messages are reproduced in large numbers and rapidly disseminated to a large number of people at negligible cost to the recipient. Public

communication grew with the development of technology. The main message flow is usually one way.

(2) *Organisational sources of message.* An organisation is usually used for the production and dissemination of public communication even though an individual reporter writes the news or an individual author writes a book. Professional communicators typically make up the personnel of the organisational institutions.

(3) *Potentially large and varied audience.* In the older sense of the term, the audiences of *mass* communication would be any person or group of persons who read the newspaper, books, magazines; listen to the radio; watch television or movies. However, in the modern public communications business, the characteristics of the audiences are better known. The messages are directed to particular sociological, cultural, age or political groups. The term “*mass*” applies now mainly to the number of people and not to the anonymity of the audience. Due to the explosion of media formats, there is a large and varied selection of options to the consumer, a “self service” or personal choice by the audience. Williams calls this change in the nature of audience the “*demassification*” of the traditional forms of public communication.

(4) *A role in economic or governance structures.* In free enterprise economies, most public communication organisations operate as profit making institutions that may include information, education, entertainment, instruction, or advertising. The institution must make a profit in performing its function, thus operating more as a business than for social purposes or consequences. However the primary function of public communication media in non-Western or socialist countries is to protect and otherwise advance the nations cultural and political

interest and not profit for the owners. Public communication is thus inextricable from the governance structures in these countries.

Purpose of public communication

A successful public speaker must have a clear purpose in mind when addressing the audience. Although purposes may overlap, the speaker must decide whether to inform, persuade or entertain the audience (Mersham and Skinner 1999:135).

Information exchange

Information can be exchanged in a variety of locations e.g. the soccer field, classroom, conference centre. The format of the information exchange can vary, for instance, instructions, reports, lectures, demonstrations, etc. (Mersham and Skinner 1999:135). The main goal of the informative speaker is to transmit information successfully, i.e. how well does the audience understand the material.

Persuasion

Persuasion is a deliberate attempt to reinforce or change the attitudes, beliefs or behaviour of a person or group of people through communication (Mersham and Skinner 1999). Aristotle, a Greek philosopher who lived more than two centuries ago, said that persuasion could be accomplished by using *logos* (an appeal to the audience's logic and reasoning), *pathos* (an appeal to the audience's emotions) and *ethos* (proof of the speaker's morality and credibility). The success of a communicator's speech depends on how well s/he understands the listeners' attitudes, beliefs, values and behaviour because it is that which the communicator wishes to change and/or influence. According to Kiesler (1978: 72) communicators sometimes distort or make the message seem less controversial to the recipients so that it pleases the audience. This

is done especially when the audience and the communicator are dissimilar in attitude, power, or experience. When an audience perceives that the message is to benefit them and the communicator is sincere, a clear direct approach is effective.

Entertainment

Any speech or presentation that is intended to entertain, please and/ or amuse the audience is entertainment. Less effort is expended on the part of the audience compared to the informative and the persuasive speeches. There is a strong rapport between the audience and the communicator.

Public communication and the school

Mersham and Skinner (1999) explain that when we contribute in a classroom situation or in the school assembly, we are involved in *public speaking or public communication*. The classroom practitioner is usually involved in informing, persuading or entertaining, or a combination of two or three of the purposes of public communication in the pursuance of his/her duties. Mersham and Skinner (1999:136-7) advise the public communicator (perhaps a teacher) to assess the nature, needs and interests of the prospective audience of the presentation. There are three factors that need to be fully investigated before the presentation:

The characteristics of the listeners (*demographics*). This information will help the communicator to choose examples and illustrations that will be relevant to the audience.

The psychological makeup of the audience (*psychographics*). Information about the interests, attitudes, and beliefs will enable the communicator to anticipate reactions of the audience to the presentation, especially if the presentation is about something controversial.

The *place* where the presentation is to be made. The setting is very important to the presentation. The communicator must have information about the size of the audience, the *size of the venue, the seating arrangements*, the acoustics and sound systems, the ventilation, and availability equipment such as overhead projector, videos, etc.

Conclusion

In this chapter the researcher showed that knowledge of language patterns and a range of communication skills are a prerequisite for problem-based learning within an interdisciplinary learning framework. In the next and final chapter he demonstrates how integrative teaching of all learning areas can be done by using an adventure story as a springboard.

Chapter 5

INTEGRATIVE TEACHING

Preview

A variety of curriculum integration options range from concurrent teaching of related subjects to fusion of curriculum focus to residential study focusing on daily living; from two-week units to year-long courses. Important consultations are choosing proper criteria for successful curriculum integration dealing with the attitudes of key individuals and groups, and establishing validity proceeding from selection of an organizing centre to scope and sequence of guiding questions to a matrix of activities for developing integrated units of study. A useful distinction must be made between *curriculum*—the content and *metacurriculum*—those learning skills helpful in acquiring the curriculum content being taught and in developing the capacity to think and learn independently.

According to Jacobs (1986), curriculum integration is not a panacea. Many integration decisions entail tradeoffs. Integration illuminates the value of higher-order thinking and learning skills and provides a vehicle for their integration into curriculum.

The Growing Need for Interdisciplinary Curriculum Content

A 2nd grader defines mathematics as “something you do in the morning.” Unfortunately this statement reflects an internalisation of mathematics as an experience to be absorbed. We rarely explain to students why the school day is designed as it is. It should be no surprise then that students look at the arbitrary divisions for reading, mathematics, social studies, science, art,

music, and physical education and begin to define the subject/learning areas as separate bodies of knowledge with little relationship to one another.

As the learner moves into senior grades, the subject matter delineations become even more entrenched as the academic areas are forced into time blocks taught by individual specialists. Many secondary school students complain that school is irrelevant to the larger world. In the real world, we do not wake up in the morning and do social studies. The adolescent begins to realize that in real life we encounter problems and situations, gather data from all of our resources, and generate solutions. The fragmented school day does not reflect this reality.

The British philosopher Lionel Elvin (1977) uses an analogy to describe the problem of the false time constraints of the school day: *When you are out walking, nature does not confront you for three quarters of an hour only with flowers and in the next only with animals.*

Elvin's analogy is that when out walking, you can also sit and pick up the flowers and concentrate solely on them for three-quarters of an hour and learn a great deal. The problem is that in school we generally do not consider both perspectives as necessary components of a child's education.

Heidi Hayes Jacobs (1986) makes the following observation after studying interdisciplinary approaches for more than 15 years. Although teachers have good intentions when they plan interdisciplinary courses, these courses frequently lack staying power.

There are two problems in content selection that often plague courses:

1. The Potpourri problem Each of the units become a sampling of knowledge from each of the disciplines. If the subject is Ancient Egypt, there will be a bit of history about Ancient Egypt, a

bit of literature, a bit of the arts, and so forth. Hirsch (1987) and Bloom (1987) have criticized this approach for this lack of focus. Unlike the disciplines that have an innate scope and sequence used by curriculum planners, there is no general structure in interdisciplinary work. Curriculum developers must themselves design a content scope and sequence for any interdisciplinary unit or course.

2. The Polarity Problem Traditionally, interdisciplinarity and the discipline fields have been seen as either/or polarity which has promoted a range of conflicts. The curriculum design suffers from a lack of clarity. Real tensions also emerge among teachers. Some feel exceedingly territorial about their subjects and are threatened as new views of their subject are promoted. However, there is a need for both interdisciplinary and discipline-field perspectives in design.

To avoid these two problems, effective interdisciplinary programs must meet two criteria.

Firstly, they must have carefully envisioned design features: a scope and sequence, a cognitive taxonomy to encourage thinking skills, behavioural indicators of attitudinal change, and a solid evaluation scheme.

Secondly, they must use both discipline-field-based and interdisciplinary experiences for learners in the curriculum.

To simply list a set of considerations for selecting interdisciplinary content would be to avoid grappling with the complexities and possibilities for interdisciplinary work. When Mr X, social studies teacher, and Mrs Y, English teacher, are sitting in the faculty lounge and decide to do a unit together, there is a chance that their work will fall prey to both the potpourri and the

polarity problems. It is essential that they take time to contemplate on some fundamental questions:

To establish the need for interdisciplinary possibilities

To define terms used in the field

To present a set of assumptions to guide effective practice

Reasons for Curriculum Integration

The interest in and need for curriculum integration has intensified for several reasons.

The Growth of knowledge

Knowledge is growing at an exponential proportion in all areas of study. If one looks at one field, such as science, one sees the remarkable degree of specialization that has stemmed from research and practice. Each learning area of the curriculum has the blessing and burden of growth. The curriculum planner must grapple *not only with what should be the curriculum*, but in English, there are new writers, new books, and new interpretations to think about every year. In the social sciences, there are complicated questions of selecting focal cultures, for we obviously cannot study every country in the world.

Then there are the annual state education mandates that get passed down to schools based on current problems. Every curriculum should include AIDS. Drug prevention curricula have been included for many years. Sex education and family life curricula are now becoming an integral part of the school curriculum. There are critical topics, but they do add pressure to the school schedule because of time constraints. We need to rethink the ways we select the various areas of study. Knowledge will not stop growing, and the schools are bursting at the seams.

Fragmented schedules

Teachers complain, “The day is so fragmented!” Elementary teachers say, “I never see my kids for a prolonged period of time,” and secondary school teachers add, “I must plan my lessons to fit 40/50 minutes time blocks rather than the needs of my students.”

Schools react to departmental requirements by dividing time into blocks to parcel out specific responsibilities and to maintain accountability. *Departmental requirements are stated in terms of minutes or hours per week.* Learners feel this fragmentation keenly. Every change of period may result in students leaping out of their seats and rushing to another setting for another subject or another teacher.

Relevance of curriculum

A universal concern of students is the irrelevance of their course work in their lives out of school. They find it hard to understand why they need mathematics when most of their instruction is based on a textbook used in isolation from its applications. The fragmentation of the day only complicates the dilemma, as students never have the chance to explore a subject in depth.

The relevancy issue also strikes a profound chord. Only in school does one have 30 to 60 minutes each of Mathematics, English or Science. Outside of school, one deals with problems and concerns in a flow of time that is not divided into knowledge fields. We get up in the morning and face up to the whole of our lives. It is here that relevancy comes into play. It is not that schools should avoid dealing with particular disciplines; rather, they also need to create learning experiences that periodically demonstrate the connection of the disciplines, thus heightening their relevancy. There is a need to actively show students how different subject

areas influence their lives, and it is essential that students see the strength of each discipline outlook in a connected way.

The attempts at interdisciplinary work that seem to be most successful are those that tackle the polarity question in a different way. No matter what the content, one can devise active linkages between fields of knowledge. One can teach the works of Shakespeare with an eye to the history of the times, the arts, the values, the role of science, and the zeitgeist rather than simply sticking with specific passages. The student who does not possess a literary bent may come upon King Lear in another subject area. Integrated curriculum attempts should not be seen as an interesting distraction but as a more effective means of presenting the curriculum, whether one wished to teach Plato or feminist literature. The curriculum becomes more relevant when there are connections between subjects rather than stringent isolation.

When one considers the definition of “history” given by Ravitch and Finn (1985:206) in which they rightly ask us to provide a solid and thorough understanding of history and at the same time to embrace an interdisciplinary point of view beyond “...*the memorization of dates and facts or the identification of wars and political leaders, though these have their place.... Properly conceived, history includes the history of ideas, cultural developments, and social, political, and economic movements. It includes the evolution of diverse cultures and the changing relationships among peoples, races, religions, and beliefs*”

Society's response to fragmentation

We cannot teach people in specializations and expect them to cope with the multifaceted nature of their work. A doctor cannot be educated only in physiology and the biology of the body; a doctor treats the whole human being. The ethical questions that confront doctors have a great deal to do with the success of their treatments on patients. Business schools are now

providing ethics courses, education schools are also providing business administration course, and so forth. We live in a specialized world, but we need some balance, so that we may draw from the range of fields to better serve our particular fields. The new trend in schools is to integrate strategies from their studies into the larger world.

Definitions that clarify practice of integration

Many versions of the curriculum terminology are used in discussing the integration of knowledge. One educator's reference to "interdisciplinary unit" can be very different from a colleague's down the hall. It is essential that there be some fundamental agreement for the meanings of the words that will be used to describe the plan that surface from the design efforts or there can be real confusion. The following are some terms whose definitions attempt to illustrate the shades of difference between conceptions of knowledge.

Discipline Field: A specific body of teachable knowledge with its own background of education, training, procedures, methods, and content areas (Piaget 1972).

According to Jacobs (1986), the starting point for all discussions about the nature of knowledge in schools should be a comprehensive understanding of the disciplines. Lawton (1975) suggests, each discipline asks different questions. There are distinct frames of reference and kinds of statements, and each of these proposes unique procedures and end results that are in fact the discipline fields. The British thinker, Hirst, (1964), views each discipline as a form of knowledge with separate and distinct characteristics. Within each form are unique concepts and propositions that have tests to authenticate their truth.

The motivation for discipline divisions is based on the notion that the disciplines encourage efficient learning. The structure of the disciplines is essential for knowledge acquisition. It is

essential in order to learn how things are related (Bruner 1975). The advantage of the disciplines is that they permit schools to investigate with systematic attention to the progressive mastery of closely related concepts and patterns of reasoning (Hirst and Peters 1974). The choice of educators to specialize goes back to Aristotle, who believed that knowledge should be divided into three arenas: the *productive* disciplines, the *theoretical* disciplines, and the *practical* disciplines.

Certainly the emphasis on discipline-field curriculum in the American public school rests largely on a rationale that refers to its instructional effectiveness, inherent conceptual cohesion, and socially sanctioned community base. Yet, we seldom discuss with children the reason for dividing the day into discipline areas of focus. The way the day is divided has more to do with a change in educator attitude or the use of a part of the room than with any understanding of what a scientist does or the purpose of reading literature. We simply omit telling children why we have planned their school lives in blocks of time. Before any meaningful inter-disciplinary experience can happen, students need to begin to understand the nature of knowledge on a level that is clearly appropriate to their age and experience.

Interdisciplinary: A knowledge view and curriculum approach that consciously applies methodology and language from more than one discipline to examine a central theme, issue, problem, topic, or experience.

In contrast to a discipline-field based view of knowledge, interdisciplinarity does not stress delineations but linkages. Meeth (1978) has noted that the emphasis is on intentionally identifying the relationship between disciplines. It is a holistic approach with a tradition in Western thought that comes from Plato's unity as the highest good in all things.

Interdisciplinarity nurtures a different point of view with focus on themes and problems of life experience.

When examining the relationship between fields of knowledge, there is a range of prefixes that connote various nuances. Consider the following:

Cross-disciplinary: Viewing one discipline from the perspective of another; for example, the physics of music and the history of mathematics (Meeth 1978).

Multidisciplinary: The juxtaposition of several disciplines focused on one problem with no direct attempt to integrate (Piaget 1972, Meeth 1978)

Pluridisciplinary: It is the juxtaposition of disciplines that are assumed to be related to one another e.g. mathematics, Physics, French and Latin (Piaget 1972).

Transdisciplinary: Beyond the scope of the disciplines; you begin with a problem and bring to bear knowledge from the disciplines (Meeth 1978).

These represent significant differences in the way the curriculum designer will shape the ultimate unit or course of study. It is necessary that decisions regarding the curriculum be (Jacobs and Boland: 1986) made with a deliberate agreement as to the kind of discipline-field emphasis that will occur; otherwise, there is the tendency toward the potpourri and a confused melee of activities when a team starts producing the lesson plans. The objective here is to have informed practitioners.

Support for an interdisciplinary curriculum

The philosophy of the curriculum developer will always permeate the final design. The more aware we are of our (Jacobs and Boland: 1968) philosophical beliefs, the more likely we are to make reliable design choices that reflect a cohesive and lasting quality in the educational experience we are attempting to build. The following beliefs and assumptions should be considered as you create your statement of philosophy for interdisciplinary work.

Students should have a variety of curriculum experiences that reflects both a discipline-field and an interdisciplinary orientation. Just as pioneering artists like Joyce and Picasso could not break the rules until they had fully mastered them, students cannot fully benefit from *interdisciplinary studies until they acquire a solid grounding in the various disciplines that interdisciplinarity attempts to bridge* (Jacobs and Borland 1986).

To avoid the potpourri problem, teachers should be active curriculum designers and settle on *the nature and degree of integration and the scope and sequence of study*. The teacher's decisions will most directly affect students in the day-to-day running of the classroom. The teacher should be empowered to work as a designer, to shape and to edit the curriculum according to the learner's needs.

Curriculum making is a creative solution to a problem; therefore, *interdisciplinary curriculum should only be used when the problem reflects the need to overcome fragmentation, relevance, and the growth of knowledge*.

Curriculum making should not be looked at as a covert activity. The interdisciplinary unit or course should be presented to all members of the school community. Few parents will have experienced integrated curriculum, and they will feel less suspicious if they are well informed.

Students should study epistemological issues. Regardless of the age of students, epistemological questions such as “What is knowledge?”, “What do we know?”, and “How can we present knowledge in the schools?” can and should be at the heart of our efforts (Jacobs and Borland 1986). The preschool child deserves to know why the room is organized the way it is, why there are “choice times,” and why there are set times for “group meetings.”

Relevance commences with the rationale for educational choices affecting the school life of the student.

Interdisciplinary curriculum experiences presents an opportunity for a more relevant, less fragmented, and stimulating experience for students. When properly designed and when criteria for excellence are met, then students break with the traditional view of knowledge and begin to actively cultivate a range of perspectives that will serve them in the larger world.

Students can and, when feasible, should be involved in the development of interdisciplinary units. It is not always desirable for students to participate, but student interest in the units is often enhanced by their involvement in the planning process (Jacobs and Borland 1986).

By understanding the growing need for curriculum integration programmes, clarifying the terminology that will be used in choices made by the curriculum maker, and articulating a set of guiding assumptions, solid and lasting designs will emerge.

Integrating thinking and learning skills across the curriculum

Imagine that we have the opportunity to observe two classrooms where the teachers are discussing the Boston Tea Party. Both teachers have been integrating certain ideas across several subject matters, but they do not have the same agenda.

In classroom A, the teacher highlights an integrative theme, dependence and independence. The students have already read the history of the Boston Tea Party. To foster collaborative learning, the teacher divides the class into groups of two or three. The students in each group are supposed to make what the teacher calls a “dependency map.” “Who depends on whom, how much, and in what ways?” the educator asks. The learner set out to diagram some of the intricacies behind the Boston Tea Party. For example, the Boston tea sellers were not entirely dependent on British tea; there was a thriving black market in Dutch tea.

But now compare events in classroom B, where another teacher is emphasizing a different approach to integration, a skill called “concept mapping.” Again, the students have read the text, and again the teacher divides the class into groups of two or three. The students are to make a “concept map” that shows how key groups involved in the tea party and its surrounding circumstances relate to one another. “You’ll remember,” the teacher says, “that in making a concept map we try to highlight important relationships.

There is reason to be puzzled here. A distinction was promised between content and skills integration, yet the two teachers seem to be doing essentially the same thing. In both classrooms A and B, the students are working in groups, making diagrams, and highlighting dependency relationships. Where, then, lies the difference?

The difference cannot be seen clearly in one lesson on one topic. However, if we look across several lessons in different subjects, we begin to see the essence of two contrasting attempts at integration across the curriculum. In classroom A, the approach is thematic: dependence and independence is the recurrent motif. In another lesson, an introduction to the concept of ecology, the teacher involves the students in discussing (not concept mapping) patterns of dependence and independence in the food web. In exploring a short story about a child who

runs away from home, the students make up additional episodes for the story, showing how the child just shifts his dependencies rather than become independent.

However, in classroom B, where the students also study ecology and read the story about the boy who ran away, matters play out differently. As part of their ecology unit, the students make a concept map of the ecological system of a pond: They highlight cause-and-effect relationships and predict the behaviour of the system over time. After the students read the short story, the teacher asks them to prepare concept maps of the problems the child faces upon running away from home: how to find food, how to find shelter, how to feel safe, and so on.

These examples illustrate the difference between content-oriented integration and skill-oriented integration. The first approach is “thematic” in nature, aimed at helping students acquire “higher-order content,” general ideas such as dependency, that they can use to order and illuminate their understanding of particular topics and situations. The second approach is “procedural” in nature, to enable students to acquire general skills and strategies that they can apply widely to understand situations and solve problems.

We focus on the potentials of integrating thinking and learning skills across the curriculum.

The question arises, When? How? and Why? might we cultivate such an approach to integration? What are its promises and its pitfalls?

The Skills versus Content Relationship: Contrasting Visions

In its broadest sense curriculum integration embraces not just the interweaving of subjects/learning areas (e.g., science and social studies) but of any curriculum elements (e.g., skills and content) that might be taught more effectively in relation to each other than

separately. While virtually all educators agree that students ought to acquire both skills needed to acquire knowledge and some knowledge itself, there is nowhere near unanimity on how instruction aiming toward these complementary sets of goals should be organized. From a *curriculum integration perspective*, it makes obvious sense to try to build solid connections between the development of skills and the teaching of contents, because “skills” may be helpful, even essential, to students trying to unlock the content. But there are many obstacles to systematic skills-content integration. To bring these issues to the fore, it is helpful to contrast a *standard view* of the relationship between skills and content and a *futuristic alternative*.

Conventional Paradigm: What is most conspicuous in the prevailing approach to skills and content is the dichotomy between elementary and secondary education. In elementary schools, skill teaching, notably the “3Rs,” is prominent, while the content areas of science and social studies get short shrift. The skill teaching orientation is so pervasive that it engulfs whatever it comes in contact with. Thus, *basal readers run students through a gauntlet of literature skills* in addition to regular reading skills, social studies emphasizes map skills, and proponents of higher-level thinking see their elevated visions transformed into still more skills lists. Advocates for stronger content emphasis are rebuffed by the argument that young students must focus on “the skills” so they can handle the massive amount of content awaiting them in the years ahead. Proponents of teaching reading and writing skills across the elementary curriculum receive a mixed reaction. On the one hand, there is a positive response, since endorsement is being given for doing more of what most elementary teachers are disposed to do anyway, which is to teach language arts. On the other hand, the proposal is viewed as “unfair,” since it steals minutes from subjects that are already time-poor.

In the secondary schools, subject matter content dominates, and the prevailing assumption is that students have already learned basic skills. Skill-deficient students are assumed to need remedial help. More advanced instruction in reading and especially writing are assumed to be the province of *English teachers*. In their *English classes*, however, students actually are instructed in and practice reading literature and writing in a literary vein. Proponents of reading and writing in the content areas often are rejected because of unwillingness to sacrifice any amount of subject matter coverage. Proponents of higher-level thinking often are discounted on the grounds that the existing subject matter content already is intellectually sophisticated and that to learn it well is to learn to think, at least in an academic context.

Futuristic Alternative: In this conception, “curriculum” throughout the grades has two levels: the *curriculum* and the *metacurriculum*.

The curriculum is comprised of substantive content and concepts of knowledge about the world deemed vital for students to acquire. *Content learning* is regarded as important for all students, even those in the primary grades, and is not shunted aside in the name of basic skills. The curriculum is about important topics and ideas, and instruction aimed to make these ideas come alive in a manner appropriate to children of different ages, developmental stages, and degrees of background knowledge. Except during the time when instruction in decoding is a major focus, literature, not “reading,” is viewed as a subject, and materials are selected like those in other content subjects: for their capacity to illuminate experience. The secondary curriculum revolves around traditional content, sometimes linked across two or more subjects. The metacurriculum is comprised of learning skills and strategies selected on the basis of their

value in helping students: Acquire the curriculum content being taught and develop the capacity to think and learn independently

The metacurriculum is also defined for all grades; and all teachers, regardless of departmental affiliation, have metacurricular and curricular responsibilities. The metacurriculum is integrated with the curriculum, meaning that the skills are selected and instruction in them “scheduled” so they are directly applicable to learning the content being studied in a particular grade or subject. Connections are made clear to students. The metacurriculum is integrated across subjects. For elementary teachers in “self-contained” classrooms, this means teaching the same learning skills in several subjects, highlighting similarities and differences. For secondary (and departmentalised elementary) teachers, it means working out a sequence of learning skills that dovetails with the content sequence of each subject; using a common “learning skills” vocabulary; and, as their non-departmentalised colleagues would do, comparing and contrasting how the skills can be used to learn different subjects.

Toward an integrated metacurriculum

The questions that must be addressed are, Is this vision of skills-content integration persuasive?, and is it achievable? There are many difficulties, but we can consider the benefits: By integrating the curriculum and a metacurriculum in the manner suggested, the acquisition of vital learning skills would be enhanced, perhaps significantly, by reinforcement and refinement through a range of applications.

Students would be given a far more coherent set of learning experiences. They would know why they were being taught various “skills,” and they would know better how to mobilize themselves to make sense of curriculum content.

Teachers from different departments would have a means of working together toward

common goals without sacrificing their own subject matter concerns.

“Process” and “content” goals would be unified; they would not compete against one another (although there may always be some degree of tension between them.)

There seems to be a *great deal of potential* but can the proposed scenario withstand scrutiny?

To determine this, a number of pivotal questions must be addressed.

First, we need to identify the kinds of skills that would be included in a “metacurriculum.”

How would they be chosen? How would a “metaskills” list compare to prevailing lists of “basic skills?”

Secondly, we need to give careful consideration to the assumptions that underlie the conventional paradigm. Teaching from within that paradigm is guided by the beliefs that most secondary students already have the kinds of skills in question, that the subjects matter already embodies higher-level thinking skills, that skills shouldn’t be sacrificed for content in elementary education, and that content shouldn’t be sacrificed for skills in secondary education. Is there evidence to refute the empirical claims and are approaches available that successfully address the concerns about proper emphasis?

Thirdly, we need to analyse the practical implications of trying to teach skills “in” a content area. How would curriculum and instruction be organized? What would teachers actually do? What alternatives are possible and what are the trade-offs? What does skills-content integration “look like” in practice?

Skills for a metacurriculum

Perhaps the most obvious question that a metacurriculum raises, concerns its content: What does the metacurriculum contain that the familiar curriculum leaves out? Here it is useful to

focus on three distinctions that help to chart the range of the metacurriculum: thinking skills and symbolic skills, familiar and innovative skills, and teaching through practicing and through structuring. Each distinction will be discussed in turn.

Thinking skills and symbolic skills

With the development of students' thinking, an essential agenda for many contemporary educators, it is easy to see that thinking skills would be a significant part of the metacurriculum.

There is ample opportunity to integrate skills of decision-making, problem solving, creative thinking, and more across the subject matters. For example, studying the Boston Tea Party provides an occasion for students to project themselves into history. Faced with the tea tax, what options did the colonists have? What else might they have done? What are the pros and the cons of various options? Such exploration can help youngsters appreciate that history is not inevitable; it is in large part made of human choices.

Moreover, students could apply the same decision-making strategies to explore the thinking of the child who ran away from home. In the context of ecology, they could examine the decisions of lawmakers concerned about protecting the environment. In other words, strategies of decision-making and many other thinking skills lend themselves to integration into several subject matters.

However, the other important category besides thinking skills is symbolic skills. Recall, for example, the concept mapping activities pursued in classroom B in the introduction. Concept mapping basically is a novel mode of representation designed to help learners organize their ideas about a topic. Or consider, for instance, higher-order reading skills or writing tactics such as keeping a log of your thinking in a subject matter. These, too, are all skills in the effective

handling of representations for better thinking and learning. Moreover, like thinking skills, these symbolic skills often are neglected by the conventional curriculum.

It is worth noting that the contrast between thinking and symbolic skills is far from sharp: *symbolic skills are thinking skills of a sort. By and large, we do not just think, we think by means of symbolic vehicles such as words and images, sometimes with the help of pencil and paper and sometimes just in our heads.* Nonetheless, a rough distinction between symbolic skills and more paradigmatic thinking skills such as decision-making and problem solving seems useful for the sake of enlarging our sense of the metacurriculum.

Familiar and Innovative skills

Among symbolic and thinking skills, it is inevitable that some are more familiar, widely recognized, and even taught; others are less familiar and are rarely addressed in education. For example, the symbolic skills of reading and writing receive considerable attention. In contrast, concept maps or “thought diaries” have no place in the typical classroom, even though they appear to be valuable.

Categorizing and seeking causes and effects are two of the most familiar thinking skills. In the context of science or history, it is not uncommon to focus students’ attention on causes or categories. But often the activities have more to do with memorizing the answers suggested by the text than engaging students in their own explorations. At least classification, causal, and other relationships receive some attention.

In contrast, certain kinds of thinking rarely surface in school settings. A good example is systems-oriented thinking where families, economies, ecologies, living organisms, and so on are all viewed as complex interacting systems that display “emergent” system properties. This rich perspective is addressed in studying ecology. However, because there is usually no effort

to generalize the perspective, one cannot expect youngsters to acquire a general thinking skill.

Practicing and Structuring

For any target thinking or symbolic skills, there are at least two kinds of instructional activities to consider: practicing and structuring. Students need practice to be able to use any skill effectively with other activities. In addition, most skills invite efforts to restructure them into more effective patterns. For example, spontaneous decision making tends to be a bit blind: people often consider only the obvious options, without searching for more creative answers that might serve better. Accordingly, a typical agenda in the teaching of thinking is to restructure students' decision making so they pay more attention to creative options.

The same can be said for symbolic skills. It is well established that students need extensive practice with reading to develop reflexive pattern recognition of a large vocabulary of words and phrases. As their encoding becomes more automatized, their minds are freed to deal with higher-order aspects of the text. At the same time, however, students' reading invites restructuring in a number of ways. For instance, students typically approach a reading assignment by beginning at the beginning and reading every word until the end. However, research shows that this is not a very effective way to read for either retention or understanding. Restructured patterns of reading that include a preliminary scan, the formulation of questions, and only partial reading of the body of the text can be much more effective.

What to Choose?

Simply to identify these contrasts-thinking skills and symbolic skills, familiar and innovative

skills, and practicing and restructuring activities-is to show that the potential reach of the metacurriculum is large.

Practicing the most familiar symbolic skills is a well-established element of schooling: students experience plenty of practice in *reading, writing, and arithmetic, for example*. This is simply to say that “basic skills” occupy a well-defined niche in the scheme we have laid out. However, as soon as we depart even a little from the trio of symbolic, familiar, and learning by practicing, we enter the realm of the metacurriculum where conventional instruction ventures less often. In particular, thinking skills in contrast with symbolic skills receive little attention. Innovative skills are neglected in favour of more familiar skills-concept mapping versus conventional essay writing, for example. Finally, most of the instruction applied even to familiar symbolic skills, such as *reading and writing, highlights practice much more than efforts to structure or restructure*.

This description might make the metacurriculum sound larger than the curriculum and discourage efforts to develop it, but that would be too hasty a reaction. Indeed, the potential topics of a metacurriculum are innumerable, just the potential content-oriented theme for integration are innumerable. But it makes no more sense to try to teach all of the possible metacurriculum than it would to try to use dozens of content-oriented integrative themes simultaneously. *We must always select just a few areas to focus on.*

It is certainly not our purpose here to dictate the choice; rather, we simply hope to raise awareness of the range of possibilities. Teachers planning a metacurriculum would do well to look among familiar symbolic and thinking skills-reading, writing, decision making, problem solving-where there is great opportunity to cultivate students’ abilities. Also, they would do well to look to less familiar skills, considering the introduction of concept mapping or systems

thinking. Too, they would do well to adopt ways of restructuring students' symbolic and thinking skills, not relying on practice alone to amplify students' abilities.

The entrenchment of the conventional paradigm

We can see that a rich metacurriculum awaits any educators concerned enough to pursue it.

However, it experience with education teaches us anything, it is that change often comes hard.

Successful change demands the appreciation of the forces that foster and inhibit innovation.

Among those forced are an array of beliefs about the adequacy of the conventional paradigm of education, the defend it even as they petrify it While this is a large topic, for present purposes four familiar "misconceptions" seem especially worth commentary

Misconception 1: Students already have these skills, Sometimes educators feel that there is no need to cultivate certain familiar skills, such as everyday decision making or problem solving.

After all, these are part of life; why should they require schooling?

This posture is understandable, but it does not accord with research into the difficulties students and adults actually experience. Commonplace thinking processes, such as decision making, are often handled poorly; people commonly make decisions without searching for creative options. Also, people usually tackle problems without analysing their essence, a powerful move that often reveals "back door" solutions.

Just because students "get by" with decision making and other familiar skills does not mean they need no help.

Misconception 2: The subject matters already embody these skills. It is often believed that nothing specific need be done about many symbolic and thinking skills. Surely students can learn good writing by reading the great models of writing in the curriculum. Don's history books discuss the causes of events and encourage students to explore them? And, for those who do not catch on, well, what can you do?

Unfortunately, the circumstances are not so straightforward as these points suggest. First, abundant evidence shows that learners who do not chatch on spontaneously often gain substantially from efforts to spell out the principles involved; it's simply not the case that students, even when well motivated, automatically learn to their capacity. Many of the examples of symbolic and thinking skills that students find in their texts are implicit models; research indicates that students often do not recognize the significance of the models but can do so with more direct help from the teacher.

In addition, content as usually taught simply does not embody many of the skills we would like to cultivate in students. History, for example, typically is taught as the story of what happened, not as a chain of human decision points or the manifestation of complex interacting systems. While students get ample exposure to narrative and descriptive organization, they get hardly any exposure to close argument or to forms of symbolic representation such as concept maps.

Misconception 3: Skills are for elementary education and content for secondary education.

Perhaps this is not so much a misconception as a tradition. Although the statement certainly reflects practice, few would defend it. Plainly, young children have the capacity to learn a great deal of content, and older children often show substantial shortfalls in higher-order skills. The two mesh so nicely that there is little point in segregating them from one another. Indeed, this

point leads to the next.

Misconception 4: There is a time and resource competition between the curriculum and the metacurriculum. Most often, this surfaces as a commitment to coverage. How can I cover the textbook if I take time out to do concept mapping or decision-making activities?

To be sure, there would be a genuine time and resource competition if one set out to fill hours a day with metacurriculum content in place of curriculum content. But this would actually be difficult to do even if you wanted to: You can't pursue decision making or concept mapping very far without addressing contexts of decision or concepts to map, and those contexts and concepts might as well come from the curriculum. No doubt, it is possible to have an imbalance. But the basic answer to this concern is that a well-designed metacurriculum is highly synergistic with the curriculum. Far from undermining students' learning of content, it deepens student understanding and retention.

A broad generalization from considerable research speaks to this point. There have been many efforts to enrich the curriculum with thinking skills or other metacurricular treatments.

Sometimes there are marked gains in content-oriented measures; sometimes there is no significant difference in comparison with control groups. But it is very rare that there is less content learning in the innovative group. In other words, the metacurriculum often helps content learning and rarely does harm. The illusion of covering less is just that—an illusion.

Perhaps fewer pages have been read, but the knowledge gains are almost always about the same or better. The topper, of course, is that gains in understanding and insight are often much greater with the innovative approach than with the standard one.

In summary, a number of reasons for supporting the conventional paradigm do not appear to

be valid. Of course, even if all educators came to a more enlightened perspective, there are still many forces that stand in the way of integrating the curriculum with the metacurriculum, not least of them the additional effort required from teachers who are already overworked. Accordingly, the integration of thinking and learning skills across the curriculum must be cultivated not just through argument and inspiration, but through systematic examination of options and techniques that can make it practical on a day-by-day basis.

The practical side of skills-content Integration

In this section, we take a closer look at what is meant by “integrating” skills with content. The simplicity of the notion of skills-content integration masks numerous questions about how curriculum and instruction would actually be organized. Even if there is agreement about which skills should be taught, decisions must be made as to who (teachers of which subjects and grade levels) will teach which of the skills and, more significantly, how the skill teaching will relate to the content that students are to learn. Jacobs outlines a range of options for integrating two or more content areas; there is an analogously wide spectrum of possibilities for skills-content integration. The options noted here generally move from less ambitious to more ambitious (and from low-risk/low-payoff to high-risk/high-payoff) in relation to prevailing approaches. The direction is reversed in the final section, where the weight of argument supports an ultimately greater content than skills focus. (In relation to secondary education, this is consistent with tradition.)

From any angle, each potential decision entails trade-offs. Let’s now identify and briefly analyse some of the main alternatives.

In Which Subjects Might the Skills be Taught?

This question is often interpreted as: Will the skills be taught in elementary reading/language arts classes (and secondary English classes) or in both reading/English and content area classes? With either option, the reading/English program is the hub of the operation and attention focuses on whether there is follow through by content area teachers on the periphery. A more egalitarian schema would have each subject responsible for the “lead” teaching of some thinking and learning skills and for the reinforcement and application of others. Thus, while English teachers might continue to assume greater than average responsibility for instruction in reading and writing, science teachers could assume the same *degree of responsibility for skills of empirical inquiry*, social studies and health teachers for skills in decision making, and math teachers for approaches to problem solving. This hardly sounds revolutionary. What would be different is if, for instance, the social studies curriculum were organized to both “teach” decision-making skills (confident that they would be reinforced in other subjects) and to reinforce skills in reading, writing, empirical inquiry, and problem solving that had been introduced, respectively, in English, science, and mathematics classes. We might call this the “multi-hub” approach. Another alternative would be simply to identify the skills to be taught along with the subjects and years in which they are to be taught, without making any subject especially responsible for particular skills. While many arrangements are possible, a plan for at least some degree of mutual reinforcement is necessary for a learning skill or strategy to become a well-established, flexible part of the student’s cognitive repertoire.

How might the skill development be accomplished? Will instruction be explicit or implicit?

Will evaluation of skill learning be implicit or explicit?

In implicit skills integration, activities are planned that required students to use the skills

deemed important, but the teacher does not present lessons on the skills and students do not do assignments whose main purpose is skill building. Some coaching of the skills is likely as teachers guide students in the completion of skill-embedded tasks, but the coaching is ad hoc. Similarly, evaluation of skill learning can be “implicit” through the design of tests that require use of the skills but do not measure skill acquisition per se or result in skills grades.

In explicit skills integration, the skills are taught formally; they are identified, defined, modelled, and coached. To provide for adequate practice, students may need to complete assignments focused on skill building, and the “content” of the exercises may not always relate to the main subject matter content. If the philosophy of explicitness is applied to student evaluation, the skills can also be tested, and, at least theoretically, students can be given a grade distinct from the content grade. More simply, the course grade can be defined as an implicit or explicit amalgam of skill attainments and content knowledge. The tests may either have separate skills items or, more economically, may be designed so that student performance can be evaluated from both a skills and a content perspective.

Decisions on degree of explicitness are pivotal in determining what a given curriculum ultimately will offer students. There are no easy answers and there has been limited research on the trade-offs. One rule of thumb: The more explicit the skill teaching, the more demanding of instructional time from the content area teacher, the more implicit, the more ambiguous the skill development program. Assuming fidelity to most if not all of the prevailing content goals of the curriculum, this line of reasoning would seem to favour the implicit approach. As many teachers fear, there actually may not be time to interpolate an explicit skills teaching program without radical excisions of content. On the other hand, the weight of research suggests that a more explicit approach yields better learning. More fundamentally, if students don't really have the skills, and if they need the skills to really “get” the content (or to get it without being

spoon-fed), then how can we defend a curriculum that does not teach them what they need to know, in the name of content coverage?

How closely related will the learning of the skills be to the learning of the content?

On one end of the continuum, skills and content may be loosely coupled. In this model, students are given instruction in skills that are needed for learning content, but there is no plan to link the skill teaching with particular content activities. The curriculum may include an instructional sequence on outlining, for example, on the grounds that outlining is a generally useful study skill, but students won't necessarily use outlining to learn course content. The current elementary curriculum as a whole focuses on an array of skills that are loosely coupled with the learning of a limited amount of science and social studies content. At either the elementary or secondary level, teachers may make a special effort to encourage students to "generate questions" on the grounds that a disposition to question will broadly benefit their learning, but curriculum units per se may not revolve around question generating. The skill and the content thus are perceived as connected but only in a general way.

By contrast, when skill teaching and content are tightly coupled, the skill is taught with particular content learning in mind. The teacher's chain of reasoning is:

What topic or content will the students be learning about?

What activities and assignments will the students be doing?

What skills will students need to carry out the activities and assignments?

An instructional sequence is then generated to help students develop the selected skills, with an eye toward improving their performance in the content learning activity.

The coupling of skills and content may be quite specific. For example, a life science teacher planning to present the circulatory system by means of an analogy to the flow of traffic through a network of highways may decide to lay the groundwork by introducing the general notion of understanding through analogy and giving students warm-up exercises in identifying analogies and evaluating their strengths and limitations. The rationale for such skill practice would be even greater if analogies were used often in the course to help students grasp difficult concepts. In a social studies unit we are familiar with, 7th grade students are involved in a simulation of a pre-Civil War political convention called to determine what could be done to resolve sectional tensions (and ultimately to see whether the impending national catastrophe could be avoided). A “tightly coupled” instructional sequence on decision making could provide students with tools useful for the simulation activity (and also for other course topics and for decision making outside of schools).

When can skills be taught in relation to the content?

The basic choices are before and during. A skill teaching segment can be provided at the outset to prepare students for subsequent content learning activities. The circulatory system-traffic flow analogy and the Civil War simulation described above illustrate both tight coupling and the timing of skills instruction “before” content learning. Another example is a program for 6th graders entitled “Wax Museum,” which begins with a skill development sequence in note taking and outlining, then requires students to conduct library research on a famous person, and culminates in a large-scale performance in which students converse in character with classmate and parents visiting their “was museum.”

It is also to plan to help students develop their skills in the midst of or during content instruction. As suggested earlier, skills coaching can be provided “as you go” or on a “need to know” basis as teachers help students tackle their assignments. Assuming that the assignments are the ones really wanted by the teacher for content learning, and have not simply been given for the sake of covering skills, the coaching can be said to be directed toward simultaneous development of learning skills and content knowledge. In another variation, skill-building can be planned or improvised and needs are identified. Even where the skills and content don’t blend into each other, the teacher committed to skills development may opt to incorporate skills instruction and practice in parallel with content instruction rather than push it into isolated curriculum segments.

How might cross-curricular skills integration be organized?

Skills and content have the potential to be doubly integrated: they can be integrated both within a subject and across the curriculum. The cross-curricular version obviously requires more planning and coordination. The essential idea is that teachers at a grade level, representing different subject areas (or an elementary teacher planning instruction in several subject areas) identify thinking and learning skills important for two or more subjects and decide to interrelate instruction in each subject to achieve greater impact. The desired degree of impact can be achieved by using the same language of instruction, so that students are hearing the same terms used in different subjects, and by organizing the curriculum so that the skills selected for common emphasis can be addressed during the same portion of the school year.

An elementary teacher or team of middle school teachers, for example, might decide that the skill of making comparison might be approached profitably in tandem in several subjects. In English, the focus might be on comparison of characters or books; in life science on systems of the body; in social studies on cultural regions; and in math, on types of triangles. Similarly, a high school team might decide to zero in on cause-effect reasoning then align curricular elements for which this form of explanation might be especially useful: Macbeth in English, for instance; the American Revolution in social studies; oxidation-reduction reactions in chemistry; and, more metaphorically, deductive proofs in geometry.

The desirability of developing such cross-curricular skills-content connections can be evaluated by the same criteria proposed for the integration of contents: validity for each subject, benefit to each subject, value of the skill beyond the confines of the curriculum, contribution to desirable learning habits, and a host of practical criteria such as the availability of time for curriculum development.

Which will be the focus of attention: the skills or the content?

On one end of a continuum of possibilities is content focus. Here, whatever is done in the way of skill teaching is done totally in the service of content learning. Whatever skill development occurs is regarded as a side benefit rather than an instructional objective. On the other end of the continuum is skills focus, where whatever examination of content takes place is done totally in the service of skill development. A model case familiar to elementary teachers is the widely used "SARA KIT," comprised of a series of readings on myriad topics. The readings are vehicles not for study of the topics but for word analysis and "comprehension" practice. There are numerous points in between on the spectrum. *One* is an arrangement where there is an explicit content focus in content subjects and skills focus in reading, remedial, and study skills classes. Thus, while there might be a skills-content integration throughout the program,

the nature of the relationship in different settings contrasts markedly.

The second approach to the skills-content relationship is to view skills and content as objects of alternating instructional attention. In this approach, it is understood that student attention over the course of the year, and even within a single instructional period, will be directed as some times toward the content of that is being taught and at other times toward the skill aspect. By analogy to painting, the content is the “figure” and the skills are the “ground” Normally, the viewer focuses on the figure, but attention can be shifted to the ground and back again.

Applying the metaphor to instruction, we might say that an important part of teaching artistry is the smooth orchestration of shifts of attention to and from the content that is in the foreground to background metacognitive skills

The third way to view the issue of skills vs. content focus is the “piano student analogy.” The curriculum for the piano student involves a sequential series of exercises aimed at developing technical skills and one or more whole pieces that require skills integration and application (and much more). The pieces-the real music-are analogous to curriculum content.

Metacognitive and other learning skills are not necessarily ends in themselves, but they may be essential to virtusso content learning. In that spirit, secondary subject matter teachers ought genuinely to embrace skills-content integration. By the same token, an elementary curriculum comprised of the equivalent of scales and arpeggios can be a tedious affair. By harnessing skills practice toward real “pieces”-toward exciting content-elementary teachers, like their secondary counterparts, can bring to the fore some of the best ideas in the world.

What results could be expected?

With the vision of integrating the curriculum and the metacurriculum before us, it is natural to ask what results might be obtained. This question is not easily answered because there are so many different ways that such an agenda can be approached. However, we can certainly

suggest the trend of the outcomes.

The most obvious payoff is a gain in students' mastery of the metacurriculum-improvement in thinking and learning skills. After all, if there is a rule that characterizes education it is that students learn some of what is taught. In most settings, what we have characterized as the metacurriculum is hardly taught at all. Accordingly, systematic attention to it will yield at least some valuable learning of higher-order skills.

Just as important are likely gains in the mastery of the subjects. As noted earlier, we can expect at least equal, and often better, content retention. We can expect deeper understanding of the subject matter and improved problem solving, particularly on "transfer" problems that ask *students to apply their knowledge in new situations*.

Beyond higher-order skills and deeper content mastery, we can expect improvements in broader and subtler characteristics of the learner. Students are likely to become more autonomous and proactive in their conduct as thinkers and learners. They are also likely to be more prepared to make connections between contexts that at first seem quite separate.

Imagine, for example, students who have approached the Boston Tea Party and many other topics in different subject matters from the standpoint of decision making, concept mapping, and other higher order skills. Now suppose that the headlines in today's newspaper report the bombing of an abortion clinic. If the integrated program has done its job, the students in such a class will be equipped and indeed inclined to see the event in a broad perspective.

They might ask questions like these: How is such an act of protest like, and not like, the Boston Tea Party? What are the analogies and disanalogies in cause, effect, means, and end of these two acts of protest? From the standpoint of decision making, what options do those who perpetrate such an act have? Why might they have chosen to proceed as they did? What similar decisions to protest have others made at other times, and how have their choices played out?

Questions such as these make it clear that no topic—neither the Boston Tea Party, nor the bombing of the clinic, or the Pythagorean Theorem—can assume rich significance without probing questions that make connections to higher principles and other contexts. Recalling the piano student analogy, students need the technique and creative reach to find the music in the relationships of things. And while curriculum content alone may give them some notes and tunes as points of departure, it is the metacurriculum that cultivates their art with the instruments of their minds.

Conclusion

In this chapter the researcher presented the basis for an integrated approach to teaching and learning. In the chapter that follows, he presents an actual integrative programme for teaching the subject areas of the South African grade 5 curriculum in such an integrated manner.

Chapter 6

AN INTEGRATIVE TEACHING PROGRAMME FOR THE INTERMEDIATE PHASE

Preview

In this chapter the researcher presents an adventure story about a group of children on a schooner in the Indian Ocean as part of a year-long educational trip as a springboard for the integrated teaching programme. In the story the narrator is constantly addressing the second person, so that the reader, whoever s/he may be, becomes the main character of the adventure, and so that the events recounted as is were, are seen through her/ his eyes. It is an intentional co-option strategy to activate the imagination of the reader and by so doing to involve her in an active process of knowledge construction.

A survival related integrated teaching scenario

In the story below, each line is numbered to facilitate easy reference to any particular section of the story.

1 **Out of the Blue**

2 Rembrandt Klopper & KM Govender©

3 *Chapter 1*

4 **END OF SHIFT**

5 It is just after dawn. You are lingering on bow of the sail ship, *The Adventurer*, looking at
6 the first peek of sunrise on the horizon. You feel drowsy, after the 12 bells to 06:00
7 shift, but catching the marvel of the first blush of dawn always seems to invigorate you.
8 You decide to stay on deck a little longer to enjoy the breeze that is tugging at your hair
9 before you bunk down for a well deserved six hours of sleep.

10
11 On deck with you is your good friend Josie, an American kid, one of the forty other
12 children who are also making the yearlong educational journey across the world with
13 you. Both of you are silent, content to enjoy one another's company while listening to
14 the sea whispering promises of another fine day in the tropics. The beginning of
15 another perfect day!

16
17 You enjoy the soothing sounds of early morning at sea. You hear the soft flapping of
18 the breeze in the towering off-white sails that are above you and feel the gentle rolling
19 of the ship as it parts the waves in grey sprays of foam. You listen to the faint creaking
20 of the mast and woodwork in response to the bow of the ship cutting through the
21 waves. How you love these lazy moments between wakefulness and sleep!

22
23 From the stern side you hear the faint bleating of goats, and the clucking of chickens
24 that have been secured in large crates. They are usually bought in big harbour towns for

25 fresh provisions, and as part of the ongoing trade between the ship and the islands
26 where they call to help to secure fresh produce. In the hold there are crates of dry
27 goods like tea, sugar and beans, consumables like batteries, medicine, and iron ware like
28 nails, screws, and nuts and bolts that are also used to trade for fresh produce, as the
29 captain said, "to keep the scurvy at bay."

30

31 You yawn and stretch your arms to drive the stiffness from your joints. You take a
32 deep breath of the tangy sea air. You reach out and grasp a mast rope to steady
33 yourself when the ship rolls. You feel the coarse fibres of the rope between your
34 fingers and the palm of your hand. A wisp of wet sea spray blows onto your face. As
35 you wipe it off, you get the smell of tar that has transferred from the rope to your hand.

36

37 It feels as if the wind is beginning to blow a bit more strongly. You hope it isn't going
38 to toss you about in your bunk when you turn in for some well deserved rest a little
39 later. Above your head the sails are bulging. The bow of the ship is beginning to heave
40 as it cuts the swelling waves.

40

41 Josie grasps the side railing of the ship and says, "Hey, this is *fine* weather for sailing.

42 About time for us to bunk down for some well deserved shuteye!"

43

44 "The next shift is going to enjoy sailing today," you say. "We're really moving along
45 nicely!"

45

46 Below deck you hear the faint clanging of pots and pans in the galley. The whiff of
47 freshly brewed coffee and the aroma of frying bacon come drifting upwards through
48 the companion way from below deck. The smell of the coffee and bacon has made you

49	feel hungry. You decide to see what the chances are of getting an early serving of
50	bacon, baked beans, flapjacks and coffee before you go to bed.
51	
52	The aroma of coffee and bacon reminds you of Sunday brunch at home. You wonder
53	what your parents and the rest of the family are doing. You make a quick calculation.
54	The five hours difference between where you are and where they are means that it now
55	is one o'clock in the morning there. They're all sound asleep now. When your mom
56	gets up in five hours time to make breakfast, you will still be in dreamland. Your dad
57	will be shooin the others out of the bathroom so that he can shower and shave. The
58	other kids will be yawning and stretching, rubbing the sleep out of their eyes, and
59	getting dressed for school on autopilot, and only wake up properly when your mom
60	calls them for breakfast. You smile. Sure, you miss your family. However, it certainly is
61	nice to be on a schooner in the tropics, rubbing shoulders with children from all over
62	the world, and experiencing the ways of life of the peoples of earth first hand. You hear
63	the signal for the change of shift.
64	
65	The new shift comes on deck, yawning and stretching, after a good night's incident-free
66	sleep. They are bleary eyed and squint into the morning light. Greetings are exchanged
67	all round. The two shifts engage in friendly banter until you decide you have to listen to
68	your stomach, and thereafter your body which is calling out to be horizontal.
69	
70	"Come, Josie", you say. "Let's go and see if we can get a bite to eat before we turn in."
71	
72	

73

74

EARLY BREAKFAST and SHUTEYE

75

Your entreaty for an early breakfast is successful. Just as you are wiping the last smudges of syrup from the tin plate with your last flapjack, and washing it down with a gulp of strong coffee, Josie gives a loud burp to announce total satisfaction with breakfast.

79

80

Your plate and mug slide to and fro as the ship heaves and rolls as usual. Then a calm appears to set in. It seemed a bit eerie to Josie too. You look out of the porthole and you see *no sign of the noisy birds that had accompanied the ship. The choppiness of the sea was also no more. It was as if the proverbial oil had been poured over the troubled waters. A blanket of quiet appears to settle over the ship. All that can be heard are the creaks and groans of the ship as it wallows in the water now that the wind has let up. The sails have gone limp and you do not hear the flapping of the sails any more.*

87

88

“Yup,” Josie says, “there is a change in the weather. I wonder what we can expect!”

89

You hear the new shift reporting from their posts. “Let’s get some shuteye. I think we are in for a comfortable, relaxing sleep now that the ship is not rocking and rolling” you tell Josie.

92

93

The both of you get on your bunks and stretch out. Although you try, you can’t relax and fall asleep because the stillness seems to have a weight of its own. You feel uneasy but cannot explain your disquiet to Josie. You have a premonition that things could take a turn for the worse. You toss and turn in your bunk but sleep does not come as

96

97 quickly as you would have liked. It is apparent that Josie is not affected by the pregnant
98 stillness, because his snoring is loud enough to put a sawmill to shame. You think of
99 home and your nostalgia pushes your presentiment of impending danger and the
100 rhythmic snoring to the background.

101

102

Chapter 3

103

RUDE AWAKENING

104 Without realising it you must have dozed off, because you wake with a start. Through
105 bleary eyes you see a vague, dark shadow looming over you. You feel a hand shaking
106 your shoulder. You hear a man's voice booming in your ears. At first you cannot make
107 out what he is saying. Then you wake up completely and hear him shouting:

108

109 "Get up!"

110 "We've got to get on deck immediately!"

111 "The ship is busy sinking!"

112

113 The note of urgency of the voice lifts the fog from your brain. Then you put the face
114 and voice together and realise it is your group captain.

115

116 With your heart pounding like a drum, you realise that you are wedged in between the
117 bulkhead and the bunk because the ship is listing to one side. You struggle to get over
118 the up tilted edge of the bunk. Your group captain grips you by your wrists and pulls
119 you towards him. Suddenly you tumble over the edge onto the cabin floor into ankle
120 deep water that is sloshing about as consecutive waves of water come gushing in

121	through the doorway.
122	
123	Your group captain hauls you on to your feet, out of the water, and you hear shouts:
124	“Come quickly!”
125	“We have to abandon ship!”
126	“A huge damn wave arose out of the blue and hit the ship on the starboard side!”
127	“The ballast has shifted and the ship is listing. We’re taking water on board”
128	
129	The two of you grip the bunk posts and wall hooks, and heave yourselves along the
130	upward slanting floor towards the cabin door. As you get near the door it slams shut.
131	The group captain pulls on the door handle, but the door is stuck. He steadies himself
132	on two slanting bunk posts and grips the door handle with both hands. His face is
133	contorted as he strains and pulls on the door. Suddenly the door gives way and swings
134	inward. The group captain loses his balance, tumbles to the ground and slides towards
135	the porthole.
136	
137	It now is your turn to help him up. The two of you clamber out through the oddly
138	tilted doorway into the passage.
139	
140	There is pandemonium in the passageway as people scream and stumble about in
141	ankle-deep water that comes cascading down the companionway in waves. Some
142	people are in pyjamas or just in trousers. Everywhere people are calling out to one
143	another.
144	

145 "Heelp!"
146 "John! John! John where are you?"
147 "Come and help get this door open! It's stuck and there are people trapped inside!"
148 "We're sinking!!" "We're sinking!!"

149

150 *Chapter 4*

151 **ABANDON SHIP!**

152 You clamber up the tilting companionway onto the oddly slanting deck. The scene
153 before your eyes makes you realise that the ship is helplessly drifting completely out of
154 control. The main mast is broken and you see that it had crashed down onto the
155 wheelhouse, apparently barely missing the captain, who had been in the wheelhouse at
156 the time. There is no sign of any of the sails. The rudder had been powerfully wrenched
157 out of position. The crew are valiantly trying to man the ship, pump out the water and
158 help out with the evacuation. The heavy listing of the ship is making our efforts very
159 difficult.

160

161 One of the lifeboats has plunged into the sea and taken on water. Panicked and
162 struggling animals are bleating, lowing, neighing, squealing, yelping and squawking
163 while they are being hauled through the hatchway from the hold onto the deck. One of
164 the crewmen blindfolds the larger animals to calm them down. Even so, some of them
165 frantically start bucking, kicking and straining against their restraints. Footing on the
166 deck is exceptionally awkward as the deck is wet and the listing of the ship makes it
167 extremely tricky for the animals and their handlers.

168

169	Through another hatchway other crewmen are hoisting containers and crates of
170	provisions. This is a challenging task as the containers and crates had shifted to port
171	side causing the ship to list so severely. One of the crewmen is having some difficulty
172	to break open crates with a crowbar because they immediately start sliding on the deck.
173	
174	“The mayday signal has been sent, Captain” reports Sparks, the communications
175	officer. “I have also relayed the message in Morse Code to any non-English recipients.”
176	“We are taking on water fast!” a panicked voice shouts from down below.
177	“What happened?” you ask the boatswain who is also breaking open one of the crates.
178	
179	“Tsunami! It was a tsunami. It came from nowhere. We had no warning. No warning at
180	all,” mutters the dazed boatswain.
181	“Have there been fatalities?” You enquire.
182	“That’s a miracle! An absolute MIRACLE! Every member of the crew who were on
183	duty has been accounted for,” answers the lieutenant.
184	“Tsunami. It was a tsunami,” the boatswain continues muttering to himself.
185	“A tsunami can be caused by one of three main ways,” says Josie.
186	“I agree with you, Josie,” you respond. “It could have been caused by a volcano,
187	meteor or an earthquake. I wonder what the cause of this one was.”
188	
189	Josie offers up a brief but ardent prayer, “Dear God, please protect and keep us safe.”
190	You hear a chorus of answering “Amen” from all those in listening distance.
191	
192	The captain hails everyone on deck to the lifeboats through a megaphone. His voice is

193	terse but authoritative, like someone who knows what he is doing, someone who is in
194	command of a well drilled procedure:
195	
196	“Attention. ATTENTION!”
197	“All hands on deck. All hands on deck IMMEDIATELY!”
198	“This is not a drill, repeat this is NOT a drill.”
199	“Put on your lifejackets!”
200	“Keep calm and proceed to the life boat that you have been assigned to during the
201	drills.”
202	“Proceed to your life boat without delay.”
203	
204	“You know the drill and the tasks assigned to you. Complete them on the double.”
205	“Lower both anchors.”
206	
207	Containers of fresh water are tied to ropes and thrown overboard to float away while
208	some containers are tied to the life rafts.
209	<i>Chapter 5</i>
210	INVENTORY
211	Each group must draw up an inventory of essential items that should be aboard each of
212	the life rafts so that each life raft will be autonomously self sufficient in terms of
213	catering for the survival and well being of all the occupants in each life raft, whether on
214	land or at sea, for an extended period of time.
215	
216	The following list includes some essential inventory items and also items that are not so

217	vital, i.e. items that are dispensable. There are also essential items that are not included
218	in the given list. The <i>first task</i> at hand is to add those <i>essential missing items</i> to the
219	list, giving motivation why the item should have been included, to enable me to select
220	the items that are absolutely necessary and discard the items from the list that are
221	superfluous. I need to bear in mind the quantities of items necessary for extended
222	period of survival and the capacity of the life raft.
223	
224	The <i>second task</i> is to list the items I must select as essential items to cater for the
225	<i>basic human needs</i> . I will state the basic need, such as, <i>food and water, shelter</i> , etcetera,
226	and I will then list the items that satisfy the criteria.
227	The third <i>task</i> is to exclude items from the list, and explain why they are unnecessary
228	for your situation.
229	
230	Keep in mind:
231	You need a bathroom scale for this exercise.
232	Divide the class in groups of six (Do not allow in-groups to clique together.)
233	1. Floating capacity of each life-raft =seven men or 560 kilograms
234	2. The children from each group must work out their collective total weight and
235	subtract that from the 560 kilograms permitted on their raft in order to
236	calculate what weight is available for survival provisions.
237	3. On an alternate survival scenario groups could be permitted to negotiate with
238	one another for which provisions each group will take responsibility to ensure
239	the survival of the total personnel of the vessel.
240	

	Column 1	Column 2
241		
242	airguns, 3, 2,8kg	linen, rolls, 150cm, 40 kg
243	aprons, 30, 200g	lip stick, bronze, medium, 30, 93g
244	baked beans, 50 tins, 410 g	maps, South East Asia, 10, 189g
245	blankets, single bed, 50, 1.5 kg	mash potatoes, instant, 75 g, 10 pkts
246	barrels, 50 litters, empty 1 kg	matches, 60, 35g
247	beans, dry, 30 pkts, 1 kg	meat, cured, vacuum packed,100, 1kg
248	beds, fold-up, 25, 2 kg	mirrors, hand-held, 40, 154g
249	blouses, 20, 340 g	mouth organs, 25, 238g
250	boogy boards, 10, 800 g	multi vitamin pills, 20 jars of 50
2512	bowls(metal, glass), 50, 150 g	nails (2, 3, 4, 5, 10cm)10pkts, 1kg
52	butter, 30 bricks, 250 g	notebooks, A4, 72 page, 144
253	can openers,20,125g	oil, cooking, 5 litre containers
254	candles, 200, 200g	ointments, 24, 68g
255	canned food, 150, 310g	oven bags, medium, 10 packets
256	caps,80, 225g	paraffin in sealed drums, 54, 20 /
257	CD players (Walkman) 20, 455g	pencils, 12s, 20g
258	chairs, 35, 800g	pens, 20s, 53g
259	chewing gum, 20 packets, 5 sticks	petrol, 37, 20 /
260	chisels, 25, 395g	plates (metal, glass, china), 100, 279g
261	claw hammers, 25, 555g	pliers, 15, 345g
262	cling wrap, 5 m X 450 mm, 10	potato crisps, 30 g, 3 boxes, 48 pkts
263	clothes pegs, 10 packets, 20 pegs	pots and pans, 26, 300g-900g
264		

265	combs, 25, 65g	power generator, 2, 4,965kg
266	compasses, 20,97g	radios, FM and shortwave, 14, 687g
267	condensed milk in tins 340g, 3 doz	raisins, sultanas and currants 500g, 42
268	crowbars,48, 1,025kg	rice, 10kg, 37
269	cups, Styrofoam, 600, 250 ml	rollerblades, 10, 455g
270	curry powder, 30 boxes, 50 grams	rope, 27, 50m
271	curtains, 10, 1065g	sailcloth, 17, 28kg
272	cushions, 45,800g	salt, 200 g, 40
273	cutlery (spoons+ knives),6 ea,1008g	saws, 12, 1,2kg
274	dates, 144, 200g	screwdrivers, sets of 3, 15
275	dehydrated milk, 30 tins, 500g	screws, 100s, 20
276	detergent, 25, 350g	sewing needles, 10 sets
277	diaries,65, 97g	ships' log, 1, 1,2kg
278	dish cloths, 10 packs of 4,235g	soap, 25 boxes of 24, 125g
279	dried meat in cans, 5 dozen, 500g	spirit levels, 4, 225g
280	drill bits,10 sets, 1050g	square, 5, 108g
281	energy drinks, 50, 375 ml	staplers, 10, 100g
282	first aid kits, 45, 2,5kg	string, 8 balls of 3 mm, 20 metres
283	fishing line, 5 kg strength, 8 reels	sugar, 40, 10kg,
284	flare guns +flares 36, 555g	sun block, 50, 80g
285	flints, 25 packs of 10, 65g	sweets, 96, 100g
286	fresh water, 100 barrels, 100 kg full	tables, fold-up, 10, 4,5 kg
287	fruit, dried, 50, 300g	tablets, anti diarrhoea, 100s, 20g
288		

289	gas stoves, 10, 2,8 kg	tablets, painkillers, 50s, 10g
290	glue sticks, 20, 70 g	tin foil, 15 rolls, 5 m
291	guitars, 3, 890g	toilet paper, 10s, 365g
292	hair brushes, 27,45g	torches, 25, 345g
293	hammers, 54, 2000g	toys, boxed cars and dolls, 100, 768g
294	insect repellent, 45 cans, 275g	two way radios, 25, 786g
295	jackets, 30, 670g	vegetables in cans, 10 dozen, 410g
296	kettles, electric, 20, 1.5 l	wax floor polish , 10, 200g
297	knife , 3 dozen, 235g	wire cutters, 9, 439g ea
298	laptop computers,4, 2,8kg	wood planes, 12, 1,2kg ea

299

300

301

Chapter 6

302

DEVASTATION

303

304

305

306

307

308

309

310

311

312

You are in life raft number 7. Three hours earlier, you automatically headed for it, because you had been trained to do so during all the emergency drill sessions. You man the oar together with three other crewmen. The outboard motor for your raft was washed overboard by one of the powerful waves of the tsunami. Fortunately four of the oars survived the deadly sweep because they were secured under the canvas that covered the inside of the raft. There are six of you on the life raft which is packed with provisions and other necessities selected before launching. Josie, your shift mate also happens to be your emergency evacuation team-mate, who sits shoulder to shoulder with you, is also grimly pulling on the oar. None of the other boats or survivors has been sighted.

313	The lieutenant looks at the compass and makes a small adjustment on the tiller. He
314	places the blade of his hand against his forehead and makes a 360° search into the
315	blindingly shimmering horizon. You really miss your cap and Ray Bans (sunglasses),
316	especially now that it is just after twelve. The sun appears to want to finish off the job
317	that the tsunami had failed at completing. Tiredness and the harsh, cruel sun have
318	together succeeded in beating your head down, so that you row like an automaton with
319	your eyes staring unseeingly at your knees. Your companions do not seem to be faring
320	any better. No one is inclined to waste any energy speaking or even listening.
321	
322	Time moves interminably on. To say that you tired, hot and bothered would be a gross
323	understatement. The ration of water and provisions the lieutenant periodically
324	distributes only emphasizes your sad predicament when compared with your situation
325	at six this morning which looked most enviable. The lieutenant and Josie made abortive
326	attempts in stimulating the group. The pain in your back, blisters on your hand and the
327	sun on your head is powerful enough to make the indomitable clever wit of Josie
328	appear truly inane and singularly humourless. Even the undaunted spirit and
329	unwavering optimism of the lieutenant appears to have been adversely affected by the
330	relentless heat of the golden orb. It is late now late afternoon. You are vaguely aware of
331	some agitation from the lieutenant. He puts his binoculars to his eyes and sits up
332	straighter in his seat. You notice that the water appears to be a touch darker in colour.
333	
334	Josie shouts out excitedly, "There is debris in the water and the water is stained brown
335	by runoff from streams and rivers. We must be near land."
336	

337	The lieutenant, binoculars to his eyes, smiles wryly as he says, "I can see land. We are
338	saved."
339	
340	"I hope the others have made it to the island. It would be lovely if the captain and the
341	crew are there to welcome us," you say.
342	
343	Everybody seems to be rejuvenated and row with unsuspected reserves of energy. In
344	half an hour the raft is beached on the island.
345	
346	The island is devastated by the tsunami. Mother Nature can sometimes be harsh with
347	her children-the people, plants and animals. She has ravaged the pristine and unspoiled
348	beauty of the island.
349	
350	Looking at the position of the sun, it is clear that there is little more than an hour to go
351	before sunset. The crew has many tasks to perform in order to ensure that everybody
352	survives to witness the next sunrise.
353	
354	Brainstorm what tasks should be undertaken.
355	Prioritise the tasks in order of importance.
356	
357	
358	

Exercises

Discussion questions

- 1) What is the opposite of the words *dusk* and *stern*?
- 2) Name the period that is between night and day break.
- 3) What do the words *bunk down* and *turn in* mean?
- 4) Where are the tropics?
- 5) What kind of weather is usually experienced in the tropics?
- 6) Use your dictionary to find the meaning of *tangy*.
- 7) What are the mast ropes on a ship used for?
- 8) Why is tar applied to the mast ropes?
- 9) What in the passage tells you that the mast ropes are new?
- 10) What does the "bulging sails" signify?
- 11) Why do you think eggs are not part of the breakfast?
- 12) Why do you suppose tin plates and not ceramic plates are used?
- 13) Josie burps loudly. What is he expected to say thereafter? Why?
- 14) Why does the plate and mug slide to and fro?
- 15) Why is the flash of lightning followed by a faint rumble? What is the rumble? Why do you think the rumble was faint?
- 16) Why is the captain using a megaphone?
- 17) Why is there groaning and stench of vomit?
- 18) Why is "The Adventurer" compared to a bathtub toy?
- 19) What is a Mayday signal?
- 20) What is Morse code?
- 21) Why do you think the companionway is tilting and the deck slanting?

- 22) Why is there water on the cabin floor?
- 23) What animals do you think the descriptive words in lines 183-184 are referring to?
- 24) Some of the animals were kept in the hold? Where is the "hold" and what is it used for?
- 25) What animals do you think were kept in the hold?
- 26) Why were some of the animals blindfolded?
- 27) Why were the crates broken open?
- 28) What are the derricks on board a ship used for?
- 29) Survival kits in life rafts. What do you think they contain?
- 30) What does the term "out of the blue" mean?
- 31) Colour has significance to people. Find out the significance of colours to people.
- 32) What is the significance of colour in religion?
- 33) The colours in flags have significance. Find out the significance of colour in the flags of the world.
- 34) If it is now 6 o' clock on *The Adventurer*, what time will it be in South Africa?
- 35) The meat is "cured." What does cured mean?
- 36) What is "scurvy"?
- 37) In line 364 "Mother Nature can sometimes be harsh with her children-the people, plants and animals." Do you agree? Motivate your answer.
- 38) You are a journalist and have been told to report on the reactions of people in your town/city to the tragedy. Discuss how one writes a question to elicit an answer that is newsworthy.

Examples of lessons/activities

A sample lesson plan:

The sample lesson format and content is merely a suggestion. The educator is at liberty to follow the format prescribed/suggested by the Department of Education or school management.

Social Sciences: World Time Zones

Grade 5

Duration: 1 hour

Learning Outcome/S:

Learning Outcome 1 *Geographical Enquiry*

The learner will be able to use enquiry skills to investigate geographical and environmental concepts and processes.

Learning Outcome 2 *Geographical Knowledge and Understanding*

The learner will be able to demonstrate geographical and environmental knowledge and understanding.

Assessment Standards

We know this when the learner:

AS 1. With guidance, selects and uses sources of useful geographical information [finds sources].

AS 4. Draws sketch maps and/or plans from field observation and measurement [works with sources].

AS 5. Uses an index to find places on global atlas maps [works with sources].

AS 6. Identifies and explores possible solutions to problems [answers the question].

AS 7. Demonstrates knowledge and understanding of the issue through projects, discussion, debate and charts [communicates the answer].

Key Concepts: grid, longitudes, latitudes, zones, GMT time, International Date Line, time difference, revolution.

Previous Knowledge Assumed: knowledge of longitudes and latitudes, how to tell time, how to decompose time into smaller units, how to read maps and use index of the atlas, knowledge of angles, especially revolution= 360° .

Learner Support Material/ Resources: sketch maps of world with latitudes and longitudes at 5° intervals, atlas with political map of world, globe (model of Earth).

Learner Activity:

Learners divided into groups of four. Learners examine map of the world, identifying the longitudes Greenwich Meridian and the International Date Line and the measurement of these lines. Learners shown that the International Date Lines on the sketch map coincides into one line on the globe. Learners' attention drawn to the inconsistency of longitudes joining on the globe but parallel on the sketch map.

The angle from the Greenwich Meridian to the International Date Line is 180° , shown physically on the globe and in sketch map. If the Earth takes 1 day (24 hours) to make one rotation, then half a rotation will be 12 hours. Therefore time difference from Greenwich

Meridian to the International Date Line will be 12 hours. Hence the equation 12hours is equivalent to 180° . Learners find out what is equivalent to 1 hour (1 hour is equivalent to 15°). A place 15° east of the Greenwich Meridian will be one hour ahead of the time at Greenwich Meridian at that moment. Similarly a place 30° east of the Greenwich Meridian will be two hours ahead of the time at Greenwich Meridian at that moment.

Learners will be shown how the index in the atlas can be used to determine time of one place when time of another place is given. Learners then locate the places on the map in atlas.

Assessment:

Learners will complete the following table indicating the longitude and time difference only.

Learners write down the name of a city or town from the political map of the world that corresponds with the longitude that indicates the given time difference.

TIME ZONE WEST OF GREENWICH MERIDIAN	LONGITUDE FROM GREENWICH MERIDIAN	TIME ZONE EAST OF GREENWICH MERIDIAN
0	0 ⁰	0
+1	15 ⁰	-1
+2	30 ⁰	-2
+3	45 ⁰	-3
+4	60 ⁰	-4
+5	75 ⁰	-5
+6	90 ⁰	-6
+7	105 ⁰	-7
+8	120 ⁰	-8
+9	135 ⁰	-9
+10	150 ⁰	-10
+11	165 ⁰	-11
+12	180 ⁰	-12
<i>International</i>	<i>Date</i>	<i>Line</i>

Possible answers. The examples of possible answers come from Webster Comprehensive Dictionary International Edition 1992.

TIME ZONE WEST OF GREENWICH MERIDIAN	LONGITUDE FROM GREENWICH MERIDIAN	TIME ZONE EAST OF GREENWICH MERIDIAN
0 Greenwich	0 ⁰	0 Greenwich
+1 Iceland	15 ⁰	-1 Berlin
+2 Azores	30 ⁰	-2 Leningrad
+3 Rio de Janeiro	45 ⁰	-3 Baghdad
+4 Halifax	60 ⁰	-4 Bokhara
+5 Washington	75 ⁰	-5 Bombay
+6 Chicago	90 ⁰	-6 Lhasa
+7 Denver	105 ⁰	-7 Singapore
+8 Vancouver	120 ⁰	-8 Manila
+9 Dawson	135 ⁰	-9 Kyoto
+10 Tahiti	150 ⁰	-10 Melbourne
+11 Nome	165 ⁰	-11 Kamchatka
+12 Samoa	180 ⁰	-12 Fiji Isles
<i>International</i>	<i>Date</i>	<i>Line</i>

Similarly, educators may design other exercises where learners can indicate time difference between any two given places. Learners may also find places with time difference that includes fractional parts of an hour, e.g. places that are 1½ hours ahead or behind GMT or any selected

longitude or place on the map. Learners prepare and complete a similar table that includes fractional parts of the hour, e.g. in intervals of 15 minutes, such as 1hour 15 minutes, 1hour 30 minutes, 1hour 45 minutes, or intervals of 20 minutes such as 1hour 20 minutes, 1hour 40 minutes, or even 1hour $7\frac{1}{2}$ minutes, etc.

The above activities are by no means exhaustive or prescriptive, but merely a suggestion of possible learner activities that can be included in the lesson plan. The educator must amend the lesson plan to the needs and ability levels of the learners.

Learning Areas

The activities suggested for the given learning areas are by no means exhaustive or complete. The educator is invited to add, edit or amend the activities in each of the learning areas. The educator draws up lesson plans for activities chosen. The suggested activities are merely an illustration of some of the possible learning activities that can be completed using the scenario as a point of departure.

Mathematics

Mass and Computation

Learners introduced to concept of mass.

Units of mass and types of mass measurement instruments discussed. (Mass pieces and types of scales)

Pupils estimate and write down mass of different numbered items brought to class by educator and learners. Actual mass of items found and compared against estimation.

Note to teacher: Divide the class in groups of six (Do not allow in-groups to clique together.)

The learners from each group must work out their collective total weight and subtract that from the 560 kilograms permitted on their raft in order to calculate what weight is available for survival provisions. (Remember-floating capacity of each life-raft =seven men or 560 kilograms.)

Learners find what average mass of one learner is. Learners find what average mass of one group of six learners is.

Learners arrive at permutation of items to be taken on board life raft, which is presented to class, one group at a time. After presentation, learners offered opportunity to motivate for suggestion and amendments.

Economic and Management services

What are needs?

What are wants?

Learners supply a list of needs. (Educators may discuss Maslow's needs and provide the pyramid of needs to the learners).

Learners supply a list of wants. Each learner may have a different priority of wants.

Barter, money and history of money discussed.

Money and banking in South Africa discussed.

Interest and inflation discussed with learners.

International Aid is discussed with learners.

Social Studies

Direction and the compass

Navigational instruments and equipment

Learners introduced to world map. Learners identify continents, oceans, countries, etc.

Learners use longitudes and latitudes to pinpoint places on a selected map.

Tropics and other climatic zones and reasons for climate and weather discussed.

Learners taught the time zones on a world map. Learners calculate time of other countries given the time of South Africa, GMT, or any given country, or *vice versa*.

Learners calculate the approximate position of *The Adventurer* given that it is five hours ahead of South Africa. The countries and islands closest to the ship are listed.

The concepts of earthquakes, volcanoes, meteorites discussed. Learners then discuss in groups and explain to the class how a tsunami could be caused.

Choose one tropical country and study the climate, vegetation, animal life, human activity and natural resources.

Trace the development of sea/water transport. Research the development from the first rafts to the present day creations.

Find out about the types of vessels/ships and the purposes for which they were built.

Science and Technology

Learners make a magnetic compass using a dish, water, cork or polystyrene and magnet.

Make a model raft using ice cream sticks.

Make a sailing ship.

Make a telescope or binoculars.

Trace the development of transport-sailing, steam power, internal combustion engine, development of the wheel, etc.

Machines that help make work easier, such as the wheel and lever.

Make a model of a volcano.

Make a model of the earth showing the different layers.

Life Orientation

Learners discuss friendship as demonstrated by the relationship between “You” and Josie.

Learners discuss what some of the current “burning” or important social issues/ problems facing our community locally, provincially, nationally and globally, e.g. AIDS/HIV; global warming and other environmental issues; overpopulation; morality and religion; genetic modification; abuse of children, women; etc. Learners come up with possible solutions after discussing and listing problems on the chalkboard or chart.

Arts and Culture

Colours have significance. Find out what is the possible significance of the different colours.

Examine the flags of the different countries and discuss the significance of the design and colour, including the flag of South Africa.

Have you heard of colour therapy? Find out and discuss what it is about.

Colour is a means of expression. How is art and drawings used as a means of therapy and expression to help traumatised and psychologically disturbed people?

There is a close correlation between religion and colour. Find out what colour/s is/are associated with some of the religions that you know or discover.

Josie burps. Is it appropriate behaviour? Discuss if it is acceptable in any culture.

South Africa is known as the “Rainbow Nation.” Discuss the people and cultures of some of the predominant racial and/or cultural groups of our country.

Language and communication

Vowel and consonant patterns

Words are built up from speech sounds that are known as vowels and consonants. When one pronounces a vowel, air from your lungs continuously flows out of your body through your mouth, which is wide open. The letters printed in bold in the following words are vowels: “**man**, **eat**, **look**,” and “**understand**.”

When one pronounces a consonant, air from your lungs is cut off somewhere in your mouth. The air stream can be cut off by a combination of your tongue and your soft palate as in “**k**ick, rug, **g**o” or “l**o**ng”, or a combination of your tongue and teeth as in “tease, hit, **d**o” and “r**o**d.” The air stream can also be cut off by a combination of one’s lower lip and your upper teeth as in “v**e**ry, h**a**ve, f**o**ot” or “h**o**of”. In the examples below find five vowels in words, and five consonants in words:

Syllabication

Take note of the relationship between the number of syllables and the number of vowels or vowel clusters, e.g. **te/le/vi/sion**= television= 4 syllables.

Syllabify the words given in the vocabulary list below.

(Find out how many words have syllables that do not have vowels).

Consonant clusters that are mirror images

Find words in the story that have consonant clusters that are mirror images of each other, that is, the order of the consonants in a consonant cluster is reversed in the same word or in another word, e.g. **speed-lips**, **starts-struts** or **starts**.

Vocabulary

Use a dictionary or thesaurus to find out what the words listed below mean. You may add other words to the list if you want to find out what they mean. Use the following rubric to find how good your vocabulary is without the use of any reference books to find out the meaning of the words listed below.

50 words -satisfactory

70 words -good

80 words -very good

90 words -excellent

100+ words -YOU ARE A GENIUS

- | | | |
|--------------|-------------------|----------------|
| 1. abandon | 9. assigned | 17. bow |
| 2. abortive | 10. authoritative | 18. brunch |
| 3. accounted | 11. automaton | 19. bulkhead |
| 4. adversely | 12. autopilot | 20. bunk |
| 5. agitation | 13. ballast | 21. cabin |
| 6. anchors | 14. binoculars | 22. cascading |
| 7. ardent | 15. bleary | 23. choppiness |
| 8. aroma | 16. boatswain | 24. clamber |

- | | | |
|------------------|-----------------|------------------|
| 25. coarse | 49. hoisting | 73. presentiment |
| 26. companionway | 50. horizon | 74. pristine |
| 27. consumables | 51. horizontal | 75. procedure |
| 28. content | 52. impending | 76. provisions |
| 29. crow-bar | 53. inane | 77. ravaged |
| 30. criteria | 54. indomitable | 78. rejuvenated |
| 31. dawn | 55. inventory | 79. relentless |
| 32. derricks | 56. invigorate | 80. restraints |
| 33. devastated | 57. launching | 81. rudder |
| 34. disquiet | 58. lieutenant | 82. schooner |
| 35. dispensable | 59. lifeboats | 83. scurvy |
| 36. drowsy | 60. lingering | 84. secured |
| 37. earthquake | 61. listing | 85. shimmering |
| 38. eerie | 62. looming | 86. singularly |
| 39. entreaty | 63. megaphone | 87. smouldering |
| 40. enviable | 64. meteor | 88. stern |
| 41. essential | 65. nostalgia | 89. superfluous |
| 42. fatalities | 66. optimism | 90. tangy |
| 43. flapjacks | 67. pandemonium | 91. terse |
| 44. frantically | 68. port | 92. tiller |
| 45. galley | 69. porthole | 93. tsunami |
| 46. hatchway | 70. predicament | 94. undaunted |
| 47. hauled | 71. pregnant | 95. unwavering |
| 48. heave | 72. premonition | 96. urgency |

97. valiantly	101. wallows	105. wrenched
98. ventilation shafts	102. wedged	
99. volcano	103. wheelhouse	
100. wafted	104. whiff	

Sentence patterns

Adjective and noun combinations

Adjectives provide additional information about nouns. In the noun phrase “The tall building” tall is an adjective because it provides additional information about the height of the building. In “the lumpy pillow” lumpy is an adjective because it provides additional information about how the pillow feels. The examples below provide additional information about the nouns that they accompany. Divide them into the categories (1) adjectives of time, (2) adjectives of manner, (3) adjectives of degree

- | | |
|---|---|
| 1. another perfect day | 9. make a quick calculation |
| 2. be a gross understatement | 10. of impending danger |
| 3. engage in friendly banter | 11. secure fresh produce |
| 4. footing on the deck is
exceptionally awkward | 12. the new watch |
| 5. for fresh provisions | 13. the coarse fibres |
| 6. of early morning | 14. the soothing sounds |
| 7. in big harbour towns | 15. the swelling waves |
| 8. in large crates | 16. the tangy sea air |
| | 17. the towering off-white sails |

18. these **lazy moments**

20. Through **bleary eyes**

19. this is **fine weather**

21. wisp of **wet sea spray**

Prepositional phrases and particle verbs

Prepositional phrases consist of prepositions that are usually followed by noun phrases. In the example “fell down the stairs” down is a preposition and the stairs is a noun phrase. When we combine a preposition and a noun phrase we get a prepositional phrase e.g. “down the stairs.” See if you can spot the prepositional phrases in the examples given below.

Particle verbs consist of a verb stem and a particle. Particle verbs are often confused with prepositional phrases. In the example “burn up” burn is the verb and up is the particle. See if you can spot the particle verbs in the examples given below.

1. breathing down our necks

11. lifts the fog from your brain

2. bunk down

12. listing to one side

3. complete them on the double

13. on the double

4. drifting completely out of control

14. put the face and voice together

5. engage in friendly banter

15. row like an automaton

6. first blush of dawn

16. take a turn for the worse

7. footing on the deck is
exceptionally awkward

17. taking water on board

18. the door gives way

8. gross understatement

19. time moves interminably on

9. heart pounding like a drum

20. toss and turn in your bunk

10. keep the scurvy at bay

21. turn in

22. wake with a start

24. you must have dozed off

23. wrenched out of position

Answers

Note: (*Italicised bold printed words are particle verbs*)

1. breathing **down our necks**

14. *put* the face and voice *together*

2. *bunk down*

15. row *like an automaton*

3. complete them **on the double**

16. take a turn **for the worse**

4. drifting completely out of control

17. taking water **on board**

5. engage **in friendly banter**

18. the door *gives way*

6. first blush **of dawn**

19. time *moves* interminably *on*

7. footing **on the deck** is

20. toss and turn **in your bunk**

exceptionally awkward

21. *turn in* your bunk

8. gross understatement

22. wake **with a start**

9. heart pounding **like a drum**

23. wrenched **out of position**

10. keep the scurvy **at bay**

24. you must have *dozed off*

11. lifts the fog **from your brain**

12. listing **to one side**

13. **on the double**

Word categories

1. Write down the sentences that contain common nouns and proper nouns in the lines 8 to 18. Underline each common noun and encircle each proper noun.
2. Capital letters are used in lines 8 to 18. Give reasons why each of the words are in capital letters.

3. Underline the pronouns in lines 59 to 70.
4. Write down the adjectives and the nouns they describe in lines 20 to 25. Underline the adjective/s only.
5. Apostrophes are used in the passage. Investigate why they are used.
6. What is a synonym? What is the synonym for *breeze*? Find other words in the story that are synonyms of each other.
7. The following are suggested language and communication activities for the educators to expect of the learners. The learners use the scenario/story to find comprehensive answers to the language and communication categories listed.

Nouns that refer to liquids

E.g. sea

Nouns that refer to hard things

E.g. Woodwork

Nouns that refer to soft things

E.g. baked beans

Nouns that refer to heavy things

E.g. schooner, crates

Nouns that refer to light things

E.g. bacon, foam

Nouns that refer to countable things

E.g. plate, goats

Nouns that refer to uncountable things

E.g. wind, smell

Nouns that identify the different ranks of people

E.g. captain, officer

Nouns in sentences that indicate the person controls other people or things

E.g. The captain hails everyone on deck to the lifeboats through a megaphone.

Nouns in sentences that indicate the person that is being controlled by other people or things

E.g. "The mayday signal has been sent, Captain" reports Sparks, the communications officer.

Nouns that refer to natural things

E.g. volcano

Nouns that refer to things artificial (made by humans) things

E.g. crowbar

Verbs of sensing things with one's five senses (vision, hearing, smell, tasting, and touch)

E.g. feel

Verbs of thinking

E.g. think realising

Verbs that refer to fast movement

E.g. start, pounding

Verbs that refer to completed actions

E.g. gone

Verbs that refer to slow processes

E.g. clamber

Verbs that refer to human sounds

E.g. shouts

Nouns that refer to human sounds

E.g. chorus

Verbs that refer to sounds in nature

E.g. bleating

Nouns that refer to sounds in nature

E.g. creak

Adjective indicating degrees of comparison

E.g. faint (fainter, faintest)

Adjectives that refer to positive human emotions

E.g. content, soothing

Adjectives that refer to negative human emotions

E.g. disquiet

Adjectives that refer to long things

E.g. mast, rope

Adjectives that refer to unevenly shaped things

E.g. tea

Conclusion

In this dissertation the researcher combined the theories of cognition and communication to develop a learning framework for integrative teaching in the intermediate phase of the South African Outcomes-based Education curriculum.

The rationale for following an integrated approach to learning is suggested by the title of this dissertation: 'It's all in the mind.' It is important for officials and teachers alike to acknowledge

that the subject boundaries are fictions of convenience to parcel the learning process.

Knowledge that has to be applied to real life outside of the classroom, has to be integrated across such fictitious disciplinary boundaries.

Recommendations

Having provided a conceptual framework for interdisciplinary teaching, and having presented an actual teaching scenario for interdisciplinary teaching in the last chapter of this dissertation, the researcher wished to make the following recommendations:

Integrative teaching in the different phases of South African primary and secondary school curricula should become the subject of serious further study;

The relationship between cognition, learning and teaching should become the subject of serious further study;

The intricate relationship between intrapersonal communication and other forms of communication in educational settings should become the subject of serious further study;

Prospective educators should be explicitly trained in the principles of interdisciplinary teaching as part of their training;

The principles of integrative teaching could with good effect become part in-service skills upgrading training of present educators.

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