TITLE: STUDENT PROJECT TEAMS:- GREAT IDEA – WRONG SPECIES?

by

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Declaration

This work has not been submitted in whole or in part, for the award of any degree. It is my own work. Each significant contribution to, and quotation in, this dissertation from the work, or works, of other people has been attributed, and has been cited and referenced.

Signature  **Date** 29th MARCH 2005.

Contents

Abstract

Much emphasis is placed today by 'new-age' management theorists and education policy makers alike, on the value of 'collective' learning in creating more effective learning environments. Such environments are believed to be more effective at encouraging the development of particular skills that are deemed necessary in helping create the type of citizen needed to satisfy the economic imperatives of our 'New World Order'. These same interested stakeholders also believe that the most effective medium for achieving these 'leadership' type skills is through the use of teams or some similar form of 'learning organisation'. However, the work of Chris Argyris would suggest that without those initiating and those participating in co-operative learning, changing what he refers to as their Model 1 'theories of practice – espoused theories and theories-in-use', the co-operative learning initiatives advocated by theorists and policy makers alike will fail to achieve the desired outcomes.

This research dissertation presents the findings of an investigation of the literature into the question of whether the use of student project teams helps create a more effective learning environment for the development of the sort of skills referred to above or are they, as Argyris suggests, helping reinforce Model 1 'theories-in-use' such as "skilled incompetence and defensive reasoning", of both educators and learners alike?

Chapter 1 - Introduction

"Having little facility with leadership skills such as feedback, dialogue or conflict management we were left to manage the situation with our various skilled incompetencies. These included issue avoidance, unilateral face-saving and covert coalition building" (Holmer 2001:590)

"Let's split up into groups"

Peter Senge (1994) suggests that most of us at one time or another have been part of a great team (p. 4), but from my own experience and those of my fellow students to whom I have spoken, I am much more familiar with the type of experience expressed by Holmer, which is quoted above. Why is it that in spite of the fact I consider myself a team player, with many memorable experiences coming from when I've been engaged in teamwork, do I now have such a sinking feeling every time I hear the words "let's split up into groups"?

I am a middle-aged former corporate CEO attending the University of Cape Town (UCT) in order to gain a recognised qualification in education, which I hope will help me in my new career as an adult educator. My introduction to co-operative learning at UCT was in 2000 when I participated in a programme – The Advanced Diploma for the Educators of Adults. This is a post-graduate programme and since I do not have a degree I gained acceptance to the programme via a selection procedure for adult educators with appropriate 'experience'. The student body was a diverse group with post-graduate students comprising three quarters of the group and coming both from education and the business world; together with students like myself who had obtained entry through the selection process. As one might expect backgrounds varied considerably not only in respect of occupation and educational background but also age and cultural heritage.

In spite of this diversity some members of faculty had little hesitation for various reasons in uttering those frightening words "let's split into groups"! Most of the time the groups were formed to discuss a paper that each person was supposed to have read; or to decide how to present a plan or a proposal for the achievement of some task. It was also common practice that one member of each group would be required to interpret and present the groups findings or opinions to the rest of the class. This never seemed to be a task that was sought after by any group member and

more often than not seemed to be undertaken reluctantly by the same people in the class irrespective of the group in which they were participating.

The groups themselves were formed at random, which brought back memories of my childhood where I was subjected to 'the popular choice' method of group selection together with all the self doubts that went with not being selected first or being left unwanted and the subsequent humiliation of having to plead to be included. Or worse still, having an adult impose your presence on a somewhat unfriendly or even hostile group of peers.

Perhaps a somewhat less humiliating approach was to 'count off' in the numbers of the size of the groups required. For example if five was to be the preferred group size the class would count off from one to five with the result that all the 'ones' would sit together and the 'twos' etc., etc. One got the impression that this method was considered a more equitable approach than "just join up with the people next to you", a somewhat abbreviated form of the 'popular choice'. Unfortunately, if you didn't have your wits about you, you would suddenly find that all those next to you had joined with all those next to them, and once more, humiliation – you were on your own!

Avoiding discomfort

To the writer, a somewhat puzzling aspect of this phenomenon of splitting up into groups, was the attitude of the students – myself included. Neither the legitimacy of the groups nor the rationale behind the 'group' approach was ever questioned. This, in spite of the fact that as adults we were expected to behave in virtually the same manner as we had as children and regrettably as many children are still treated today. We all just accepted this behaviour and did as we were instructed, never voicing any of the dissatisfaction we felt. Holmer (2001) suggests that this type of behaviour is consistent with our "learned, culturally ingrained habits of avoiding discomfort" (p. 594). But the defensive habit that most consistently and insidiously inhibits learning is that of repressing our own ideas, opinions and concerns, which we are all too willing to do, according to Holmer, rather than risk being seen as uncooperative. She further suggests that by dismissing our own perceptions we fail to see that our own complicity in group dysfunction contributes to a sense of helplessness and cynicism about "work groups" in general (p. 595).

Another somewhat puzzling aspect of this same condition was that of the attitude of the various faculty members who choose to adopt a 'group-work' approach. At no time was I confident that there was a 'method to this madness'. However, my opinions would vary from a very negative view that the use of this approach was an abdication of responsibility for finding an effective learning mechanism for the chosen subject matter; to a more forgiving view that it was an approach, which was considered in educational circles to be politically correct – "Group work rather than directive teaching is one of the features of People's Education that was absorbed into contemporary policy" (Chisholm 2000:28).

It seemed evident to me that the use of student groups by faculty was something that was accepted, as it was by students – without question. And although there seemed to be no malicious intent, it did appear to be done with little or no consideration for even the most fundamental issues regarding student integration, particularly mature postgraduate students of such different demographic and psychographic backgrounds. To the best of my knowledge, at no time during the course of the two-year programme were any students ever questioned as to the effectiveness or otherwise of any of the group work employed; even, I hasten to add, for the course that was given to members of the programme to improve their inter-personal effectiveness within groups.

The diversity of the class and the indiscriminate manner in which groups were formed did little to make my introduction to groupwork at UCT a pleasant one. Initially I experienced a fairly high degree of animosity within some of the groups in which I participated. From a demographic perspective I was at one extreme of the diversity continuum being the only white male in the entire class and an upper middle-class avowed capitalist to boot; a fact, which didn't go unnoticed amongst some of my 'previously disadvantaged' female colleagues. Fortunately, as is so often the case, socially generated group prejudices tend to dilute as people get to know one another as individuals. I believe most of the class began to realise that what we had in common regarding our attitudes towards issues such as a desire to be better educators, was of more importance than our demographic differences. An example of this was given to me by a female colleague who during the second year of our programme confided that when we had first worked together in a group she really "hated me", but

was subsequently able to bridge the perceived demographic gap between us and become a friend.

"Practice fields"

In contrast to the experience of the advanced diploma, my previous exposure to co-operative learning on a formal basis had been in the academic world of business, initially at the Graduate School of Business, University of Cape Town, hereinafter referred to as 'the GSB'. To give the reader some idea of the difference in the two contexts – adult education at the University of Cape Town just six years after South Africa's first democratically elected government came to power and the same university's business school during the 1970's – I should like to look at some of the latter's demographics.

I have already referred to the diversity of the student body on the advanced diploma course, educators who came from almost every section of South Africa's multi-cultural society, a true reflection of our 'Rainbow Nation'. The business school on the other hand, during the nineteen-seventies, was a very different environment, comprised of students who had much more in common both from a demographic and a psychographic perspective, particularly with regard to business ideology and work experience.

For example, at the Programme for Management Development (PMD) in 1972 the class comprised eighty-five white middle-class males representing supposedly, the cream of Southern African businesses' junior to middle management. Each delegate paying for the three-week course the equivalent in today's money of between R 43000 and R46000 (depending on the accommodation preferred) for the privilege of participating. Similarly in 1976 at the inaugural Advanced Management Programme (AMP) of the same school; out of a total of sixty delegates there were fifty-nine white males and one white female; this time representing what was then considered to be the cream of South African senior corporate management and at a cost of R63000 for a two-week programme.

A preferred method of instruction at the GSB is the case-study method using predetermined groups of six members each on a rotation basis throughout the duration of the programme. I have no personal knowledge as to how the school selected the various groups but from my observations each member seemed to bring expertise

from a particular discipline within the business community to the group. To me, this appeared to further promote a degree of unity within the groups. What also appeared to help promote a degree of unity was that each group had a specific task to perform, which was always related to a business issue. These groups by and large, functioned in a similar manner to that which I had previously experienced amongst competent management bodies in organisations with which I had been associated. I would submit that this business school 'case study' approach is similar to what Senge, Kleiner, Roberts, Ross, and Smith (1994) refer to as "Practice fields":

> In sports and in the performing arts, two settings in which teams consistently enhance their capabilities, players move regularly between a practice field and the real game, between rehearsal and performance. It is impossible for us to imagine a basketball team learning without practice or a chamber music ensemble learning without rehearsal. Yet, that's exactly what we expect to occur in our organisations (Senge et al. 1994:35).

Although I was unaware of these words at the time, the GSB did equip me for the future not to have too many unreasonable expectations in respect of my own working environment.

Ensuring social harmony

It was with this background that I entered a Master's programme at UCT in the first year of the new millennium. The programme that I had chosen comprised coursework and a minor dissertation. The coursework I chose was spread over four different subject modules, two in each of the university's semesters. These were to be completed at a pass rate level of 60% or better in order for aspirant Masters students to gain permission to write a minor dissertation in order to complete the degree.

Throughout the course of the first three modules I had chosen, as had been the case in the Advanced Diploma, students were regularly asked by faculty to form groups of three or four persons, to perform a variety of work, from critiquing papers to making class presentations. Once again these experiences for me were rarely pleasurable or worthwhile as a learning experience. But I kept my dissatisfaction to myself, since none of the tasks to be performed appeared to have any direct impact on how I would be assessed individually.

However a climax was reached in October of 2002. Whilst participating in my fourth course module, the course convenor announced that part of the individual assessment for this particular module would be decided on the results of an assignment, which was to be completed by the students 'working in teams'. When I asked the course convenor why this mode of practice was being employed, the response given was that the content of the project seemed to lend itself to co-operative work and that the use of this method of instruction was strongly encouraged within the education department.

The course convenor admitted that she had had no formal training as a facilitator in co-operative learning and as on previous occasions, the selection of the various groups was purely arbitrary.

From my perspective, this experience was most unsatisfactory and I believe little if any learning took place. The group of which I was a member comprised four students, all of whom seemed to have little in common with each other. We all came from very different social, cultural, political and economic backgrounds and the only unifying factor was the task that we as a group were expected to perform. In this regard I had no previous technical knowledge or experience of the task, so I felt very much the 'outsider' and as a result abdicated a lot of responsibility for the task's completion.

However what seemed most important to the group was successful social interaction. This could be evidenced in the way we conducted our project meetings with everyone bringing food and drink to ensure a successful 'party'. However, our endeavours to ensure "social harmony", I suspect were often at the expense of valuable criticism being withheld – "Without sufficient skills development, teams are likely to succumb to tendencies to maintain social harmony at the expense of the inter-personal risk taking leadership that is necessary to maximise creativity and effectiveness" (Holmer 2001:592).

Nurturing a culture of co-operation

Having informally discussed the issue of co-operative learning with friends and other students it would appear that I am not alone in my dissatisfaction of the co-operative learning concept. However my view does seem to be in sharp contrast to the enthusiasm for "co-operative learning through teams" expressed by the South African

Department of Education, as put forward in their policy documents. For example it states in the Revised National Curriculum Statement, that there is a strategy to nurture a culture of communication and ***participation*** (emphasis mine) in our schools, by working effectively with others as members of a team (RNCS 2002:7-11). Also, as mentioned earlier on page 10 of this report, the Review Committee on Curriculum 2005, chaired by Chisholm, highlight as one of the curriculum's main features "groupwork rather than directive teaching" (Chisholm 2000 chapter 3:2).

There seems little doubt that the reason for education's enthusiasm is that the policy makers believe that co-operative learning through teams will help create the kind of citizen who has "the ability to participate in society as a critical and active citizen" (p. 8) and who can, amongst other things –

- Identify and solve problems and make decisions using critical and creative thinking.
- Organise and manage themselves and their activities responsibly and effectively.
- Collect, analyse, organise and critically evaluate information (Policy Overview C2005, p. 11).

This belief that group work will produce these outcomes is in sharp contrast with my own experience in higher education but ironically not entirely outside my experience within the business community.

To summarise: the concept of some form of collective learning seems to enjoy popularity amongst policy makers because it is believed to be the best method for developing the sort of 'leadership' skills that students will require as citizens in the 'new' South Africa of the twenty-first century. However, from my own experience, although I have had some success in a business environment, I have generally found that working in teams is normally problematic.

For the writer this raises several issues. Is my own experience unusual? Am I the exception rather than the rule? Is co-operative learning through teams the preferred choice of most students and members of the business community?

But what if on the other hand I'm not so unusual? What if most people find working in teams as difficult as I do? Should we persist in pursuit of the concept? And

if so, what then is needed to make the co-operative learning experience more pleasurable and more productive?

Research methodology

Given the above background to my interest in the topic, I was left to consider an appropriate method to take my enquiry further. I decided that I would maximise my learning by largely concentrating on a literature survey that would allow me to explore the topic in more detail from a variety of angles instead of trying to exceed to the demands of this minor dissertation by trying to include an additional small empirical study. I decided to place my own experience against my learnings from the literature review.

My research starts with an investigation of the literature on current learning theory. The objectivism/subjectivism debate and the widespread popularity of constructivism in its various forms are introduced. I looked at these in some detail in order to understand how and why the various theories might support a collectivist approach to learning. During this investigation I realised that not everyone was entirely satisfied with constructivism. Much of the criticism came from quarters that seemed to be influenced by the developments in science particularly those areas that have seemed to developed out of quantum mechanics creating in academia what is now referred to as New science (Wheatley 1992).

In chapter three I look at some of the reasons why constructivism in its present form fails to answer some of the questions raised by the New Science. I then look at the main categories within science that appear to be providing reasons for the questions that are being raised. In this regard I look at quantum theory; evolutionary biology; superstring theory; chaos and complexity and the idea of a unifying force in physics – the Zero Point Field. With this understanding I then investigate two of the new learning theories that have to some extent been motivating by science's recent discoveries namely enactivism and evolutionary educational psychology. I have investigated the underlying principles of these relatively recent theories and how they associate learning with a collective environment.

My research into learning theory, both current and the latest developments, strongly confirm support for collective learning environments albeit for somewhat different reasons which prompts me to suggest that it's not a question of should we

co-operate but how should we co-operate. With this question in mind I end chapter three by offering a distinction for two different types of collective learning environments.

With the knowledge that learning theory was supportive of collective learning environments, I proceeded to investigate the literature on what forms collective learning or organisational learning environments take. In chapter 4, I concentrate on the practice-orientated literature, which refers to all organised collective learning environments as learning organisations. In the case of small collectives these are generally termed groups or teams whereas large collectives such as companies or institutions are termed learning organisations. What is most significant is that the literature, whilst drawing a distinction between learning by the individual within a group and learning by the group, by and large does not distinguish between the principles involved in creating successful learning environments irrespective of size. As a result of this my research does not distinguish either and shows that the principles required for successful student project teams are virtually the same as for successful corporations or institutions.

In chapter 5, my research switches to an investigation of what are possibly the two major motivating factors for the enthusiasm expressed for collective learning by both educational policy makers and management theorists alike. Firstly, the globalised nature of our modern world and the demands that it is making on members who wish to participate economically to be competitive in the production of knowledge. And secondly, the 'new capitalist' order that some theorists believe is responsible for this economic imperative. Both of these phenomena I look at in some detail before investigating the claim of an unholy alliance, which could possibly be one explanation, albeit a most unsatisfactory one (particularly to dedicated educators) for the unlikely enthusiasm expressed for the same learning concept by two former protagonists.

In chapter 6, I tackle the main issue of my research. I try to find some rational explanation why, in spite of all the apparent theoretical, economical and social support for the concept of collective learning environments, do I and from my investigation of the literature, so many others, find teamwork so problematic. An issue, which is well expressed by Hackman (2002:236) – "How can we reconcile the amazing reports from the field about the benefits of work teams with the gloomy

picture that emerges from scholarly research on group performance? And how do teams generate the benefits for their organisations that are claimed for them, or do they not?"

My research on this issue is almost exclusively based on the work that has been carried out over the last thirty years by Argyris and Argyris and Schön. The reason for this is that the literature is inattentive to the difficulties that are posed by the idea of groups learning. It treats the benefits of collective learning as a widely acceptable principle whilst not giving serious consideration to the processes that threaten its validity and to the difficulties of its implementation. Writers on collective learning tend to focus on what the literature refers to as first-order errors whilst selectively ignoring second-order errors which are the behavioural designs that make people systematically unaware of the behaviour that underlies the production and reproduction of first-order errors. I believe that it is these very issues that are at the root of why I and so many others find collective work problematic and it is these very issues which Argyris and Schön have spent most of their lives researching. These matters which are the focus of chapter 6 and which seem to have been selectively ignored in the literature also seem to have been similarly treated by educational policy makers and management theorist alike.

Having found what I consider to be a rational explanation for my own possibly irrational behaviour in respect of working co-operatively, I investigate in chapter 7, some of the circumstances where collaboration is effective and look at some of my own experiences as a means of making this determination. I also look at the issue of how the role of the educator fits into this new popular concept and the contribution the educator is able to make towards creating co-operative learning environments that develop collaboration. I then present what Argyris and Schön believe can be done to help this come about.

Chapter 2 – Towards a concept of co-operative learning

A paradigm shift to the socialisation of pedagogy

There seems to be little doubt of the influence that recent developments in the world of cognitive science are having within the realms of education in our new globalised environment:

> The discipline of psychology has traditionally been responsible for developing viewpoints on thinking and learning and translating these into educational practice. Over the last few decades however, a new 'megadiscipline' has emerged to subsume many of the chores of psychology. This megadiscipline is 'cognitive science' … focused on the nature of thinking and intelligence of animal, human and artificial minds (Gee, Hull and Lankshear 1996:53).

Until fairly recently the most dominant ideology in education was that which Duffy & Jonassen (In Kanuka and Anderson 1999) refer to as 'instructivism' (also known as objectivism). Basically an instructivist/objectivist approach to education is to systematically identify what is to be taught, determine how it will be taught and evaluate the instruction to determine if it was effective. The instructionist position stresses the importance of using an instructional systems design model where the learning objectives are clearly defined. However this methodology has come in for much criticism in recent years in that "students are often unable to make use of their class-room based learning in their lives outside of school" (Davis, Sumara and Luce-Kapler 2000:173).

Gee and his colleagues also supports the perceived inadequacies of the instructional methodology pointing out that students master only basic, rote, low-level skills at best and although they may be able to pass tests and carry out basic computations, they really do not understand in any deep way, what they are doing (Gee et al. 1996:55).

It should also be noted that within this conception, learners are not encouraged to develop their own understandings or interpretations of what they perceive as it is the role of the instruction – that is the teacher and the instructional designer – to interpret it for them. In simple terms objectivism holds that learners are the passive receivers of knowledge (Shoffner, Jones and Harmon 2002:8).

A polarised methodology, which with the support of cognitive science is gaining popularity amongst educators, is that which Kanuka and Anderson (1999) refer to as 'constructivism'.

Constructivist learning theories try to understand how we construct knowledge by addressing three key issues – what does it mean to know something; how do we come to know it; and how does this knowledge influence our thinking processes? The constructivists argue that the systematic processes offered by instructionists are problematic since there is nothing systematic about how we learn or construct knowledge. It is therefore not surprising that most students have little real understanding of what they have learned when in our teaching, we "discount the reality of the ambiguous, complex, and continually changing world in which we live" (Kanuka and Anderson 1999:4-5).

Opposing perspectives

Conceptions of learning, borrowing from the idea of Pratt (1992), are like other conceptions, anchored in cultural, social, historical and personal realms of meaning. To "learn" means different things depending upon one's values, beliefs and intentions – in other words on one's philosophy. This idea is nowhere more evident than in curriculum design. How content will be presented and sequenced is most often determined in response to what type of learning is to take place and in the philosophy of the designer: in other words, how the designer believes people learn (Shoffner et al. 2002:7).

Curriculum design and learning theory, are grounded in the philosophy of knowledge production, which at its roots is a choice today between a traditional instructivist/objectivist view, whereby knowledge exists independently of the learner and a constructivist/subjectivist view, which claims that all knowledge is created by the learner. Perhaps it is necessary to take a look at these opposing ideologies in a little more detail.

Instructivism/Objectivism

As mentioned above at the one end of the knowledge continuum lies objectivism, which according to Shoffner et al. (op. cit.), advocates that the world is completely and correctly structured in terms of entities, properties and relations. They further claim that central to the understanding of objectivism is that meaning, and

therefore knowledge, exists in the world external to the individual and his or her experiences and that the structure of this meaning can be structured for the learner. Although objectivists accept that experience and interpretation may bias an individual's understanding of knowledge, the goal is to strive for complete and correct understanding, and for all learners to gain a similar understanding (Shoffner et al. 2002:7).

Slightly further along the knowledge continuum is cognitivism which Shoffner et al. suggest was the great experiment in instructional design of the 1990s. Educators in wishing to distance themselves from behavioural psychology, which was seen as too controlling, moved towards cognitive psychology, which recognised that most people developed a method of processing information that they integrated into their own 'mental models'. Shoffner et al submit that this development resulted in critical thinking skills becoming of major significance in education. Although the basic ideology remains, in that truths are absolute in terms of what people are supposed to learn, cognitivism provided opportunity as to how learners should arrive at these truths (p. 8).

As Kanuka and Anderson (1999) point out, the instructional model of design can be useful to designers to systematically identify what is to be taught, how it will be taught and be able to evaluate the instruction to judge whether or not it is effective (p. 4). Also critical in this perspective is setting clearly defined learning outcomes after determining what is already known and what is to be learned. Once objectives have been identified they are progressively sequenced from lower order to higher order learning. The learner is therefore assessed equitably with evaluation tools that measure the behaviours described in the stated objectives. Following this system encourages curriculum designers to focus on the needs and abilities of the individual learner resulting in the development of effective learning activities (p. 3-4).

At the opposite end of our spectrum lies constructivism.

Constructivism/Subjectivism

Von Glaserfeld (1989) describes constructivism as an alternative theory of knowing. It is the belief that knowledge is personally constructed from internal representations using experience as a foundation. From a constructivist point of view, meaning is either imposed on the world by the individual or imposed on the individual

by the world, as opposed to the instructivist view in which meaning exists independently in the world external to the individual (Shoffner et al. 2002:8).

Perhaps an even more significant difference between the two paradigms for educators is in respect of content dependency. An instructionist approach to learning design generally focuses on domain-independent learning methodologies whereas constructionists claim that there is no such thing as content-independent knowledge or skills and that all learning must be 'anchored' in some real-world meaningful context. This aspect is emphasised by Rogoff (1990) who regards context as "inseparable from human actions in cognitive events or activities" (p. 27). She also adds that in a 1982 paper she argued:

> In the contextual perspective, meaning and context are not elements that can be handled separately or derived from adding elements together. Context is not so much a set of stimuli that impinge upon a person as it is a web of relations interwoven to form a fabric of meaning (Rogoff 1990:27).

It is much easier for educators, suggests Kanuka and Anderson, to follow an instructivist systems design model, which promises soundness and enduring academic approval, than to grapple with the complexities of our 'ill-structured' world in which we have to function as proposed by the various constructivist ideologies (Kanuka and Anderson 1999:5).

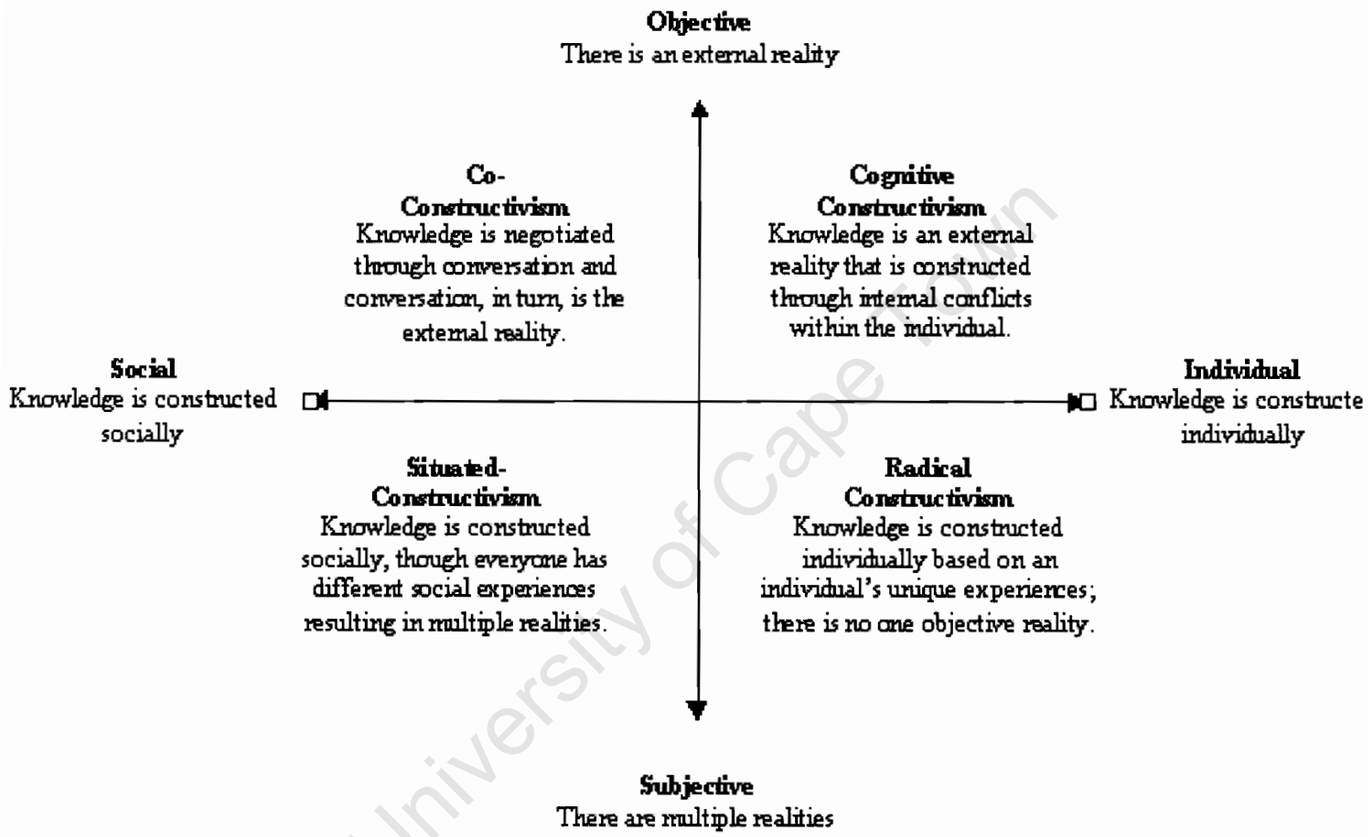
A quartet of constructivist dimensions

The major forms of constructivism fall along two dimensions. The first dimension defines the constructivist position along a continuum between an understanding of reality as being objective at one end, and subjective at the other. Where educators fall in this first dimension will influence not only how knowledge is constructed (i.e., what are we trying to understand?) but also the way educators will facilitate learners to construct these understandings in the learning process.

The second dimension considers that knowledge is either socially constructed or individually constructed and examines the degree to which social, contextual, and cultural factors determine this knowledge construction. As with the first dimension, where educators fall will influence their teaching and learning practices. Specifically, ***assumptions of how we construct knowledge on this continuum will influence the***

emphasis that will be placed on social interaction, group process, and the learning and practising of socio-linguistic skills (emphasis mine)(Kanuka and Anderson 1999:7).

Despite the differences of each position along these two dimensions, they nevertheless have certain key issues in common. For example that we each construct knowledge based on what we already know and that learning is an ***active*** rather than a ***passive*** process (emphasis mine). The following diagram illustrates where each of these positions is located in relation to the other positions and the labels that are frequently applied to each position within the literature.



Constructivism –'flavour of the month' in education

It has been argued, according to Argyle (1991), that co-operation is central to human existence yet educational institutions seem least characterised by co-operative activity. Nevertheless Bennett (1994) claims that in recent years there has been a

developing interest in the use of "co-operative groups" as effective learning contexts. This interest he suggests has largely been fuelled by "the increasing realisation of the link between learning and social interaction" (p. 50). Bennett also claims that it is now "commonly agreed" that the foundation of learning and development is "co-operatively achieved success" (p. 52). The two theoretical perspectives that are motivating this reform are two of the constructivist frameworks which I have discussed above and which are commonly referred to in educational parlance as the "cognitive constructionist approach" of Bruner and Piaget and the "social constructionist approach" of Vygotsky (Bennett 1994:51-52). It is perhaps prudent because of their current claimed dominance in motivating educational policy that I research these and their practical implications in a little more detail.

Cognitive constructivism – a developmental approach from cognitive psychology

Arguably one of the most influential theorists with regards to education, certainly during the last century, was Jean Piaget, who as a biologist and philosopher interested in the study of knowledge, developed a theoretical framework, which he referred to as 'genetic epistemology' but which is probably more commonly known as the "cognitive developmental approach". Piaget's theory is dependent on the claim that learners are active contributors to their own cognitive growth, which according to Lloyd is basically what gave rise to the term constructivist theory (Lloyd 1995:4-5).

Another major contributor to cognitive constructivism is Jerome Bruner, particularly in an American context, where Lloyd claims that he was the most influential cognitive psychologist for the latter part of the twentieth century. Bruner is credited with inventing the term 'scaffolding' since he believes that without the support of concerned helpers, progress for learning will be limited. He also believed that without instruction the learner's spontaneous activities could not be transformed into rational thought since ***"cognitive development is essentially a shared activity"*** (emphasis mine) (Lloyd 1995:28).

What is consistent within cognitive constructivism is that they are concerned with changes that will happen as a result of new information that is inconsistent with current beliefs. They also maintain that there is a true world that we aspire to understand and when we construct knowledge we are developing more adequate

understandings of what the truth must be. Thus as Kanuka and Anderson emphasise, constructing knowledge is an evolutionary process through which reality can be understood and although this view focuses on the individual it does not deny the importance of social interaction (Kanuka and Anderson 1999:9). The evolutionary reference in relation to cognitive constructivism we shall investigate a little later.

Practical implications

Instructional methods in this view try to confront the learner with situations that make the inherent inconsistencies in the learners' naive model plain and challenge the learners either to construct better models or at least to ponder the merits of alternatives presented by the teacher (Perkins in Kanuka and Anderson 1999:9). Based on this assumption, educators need to provide instructional methods such as case studies, debates, individual and group summarising, and team teaching using heterogeneous grouping since it is recognised, claims Kanuka and Anderson, that interaction with peers who have different ability levels and backgrounds are a main source of conflict that can stimulate this process (p. 10).

Social constructivism – an approach from social psychology

The most prevalent form of constructivism, according to Kanuka and Anderson, is social constructivism, the theory of Lev Vygotsky (1896 – 1934) that emphasises the influence of cultural and social contexts in learning (Vygotsky in Kanuka and Anderson 1999:15). The role of instruction for Vygotsky, is the continuation of culture, which requires that the immature person learns and the mature teach. In this regard he coined the term "zone of proximal development" (ZPD), which refers to the level of potential development as determined through problem solving under guidance or in collaboration with more capable peers (Lloyd 1995:21). Thus as Bennett claimed earlier, co-operatively achieved success is at the heart of Vygotsky's thinking.

The social constructivist perspective whilst acknowledging that multiple realities exist, believe it is possible for us to have shared meanings and understandings. This is in line with Vygotsky's view of meaning negotiated through conversation:

> The most significant moment in the course of intellectual development, which gives birth to the purely human forms of

> practical and abstract intelligence, occurs when speech and practical activity, two previously completely independent lines of development, converge (Vygotsky 1987:24).

Thus according to the social constructivist perspective, knowledge of reality is constructed through shared meanings and shared meanings are arrived at through social negotiation using language (Vygotsky in Kanuka and Anderson 1999:16). The process of negotiation according to Kanuka and Anderson is how we construct knowledge and if the process of negotiation results in agreement, then this agreement is our reality (Kanuka and Anderson 1999:16).

Practical implications

Kanuka and Anderson suggest that this position of constructivism provides few specific guidelines for instruction. Understanding occurs through interaction with the environment. What is learned cannot be separated from how it is learned, thus suggesting that knowledge is not just within the individual, but part of the entire context. Based on these assumptions, the emphasis in instruction is on the importance of helping learners engage in `generative' rather than `passive' learning activities (p. 16). Students need to engage in argumentation and reflection as they try to use and then refine their existing knowledge whilst attempting to make sense of alternate points of view (The Cognition and Technology Group at Vanderbilt in Kanuka and Anderson 1999:16).

Since knowledge is constructed through social negotiation, discussion is of prime importance in this instructional methodology. Small group discussions and brainstorming are examples of instructional methods that can allow learners to examine their understandings through other individuals. Learners should also be encouraged to test their ideas against alternative views and alternative contexts (Kanuka and Anderson 1999:17).

Co-operative learning is another method that can provide opportunities for generative learning – "Cooperative learning creates an opportunity to form communities of inquiry that provide learning environments that encourage critical dialogue and, hence, understanding" (Vygotsky in Kanuka and Anderson 1999:18).

Chapter 3 – Learning through the insights of a 'New Science'

Constructivism – not everyone's panacea

In the book "How people learn: Brian, mind, experience, and school", by The National Research Council of America (2000), the claim is made that the revolution in the study of the mind that has occurred in the last three or four decades is having its effect in education. A new theory of learning is coming into focus that leads to very different approaches to the design of curriculum, teaching, and assessment than those often found in schools today. Equally important, they emphasise, is the growth of interdisciplinary inquiries and new kinds of scientific collaborations have begun to make the path from basic research to educational practice somewhat more visible:

> Thirty years ago, educators paid little attention to the work of cognitive scientists, and researchers in the nascent field of cognitive science worked far removed from classrooms. Today, cognitive researchers are spending more time working with teachers, testing and refining their theories in real classrooms where they can see how different settings and classroom interactions influence applications of their theories (National Research Council of America 2000:1).

What the council claims is even more striking is the variety of research approaches and techniques that have been developed and the ways in which evidence from many different branches of science are beginning to converge. They believe that the story we can now tell about learning is far richer than ever before, and it promises to evolve dramatically in the next generation. Some examples they cite are:

- Research from cognitive psychology has increased understanding of the nature of competent performance and the principles of knowledge organisation that underlie people's abilities to solve problems in a wide variety of areas.
- Research on learning and transfer has uncovered important principles for structuring learning experiences that enable people to use what they have learned in new settings.

- Work in social psychology, cognitive psychology, and anthropology is making clear that all learning takes place in settings that have particular sets of cultural and social norms and expectations and that these settings influence learning and transfer in powerful ways.
- Neuroscience is beginning to provide evidence for many principles of learning that have emerged from laboratory research, and it is showing how learning changes the physical structure of the brain and, with it, the functional organisation of the brain. And
- Collaborative studies of the design and evaluation of learning environments, among cognitive and developmental psychologists and educators, are yielding new knowledge about the nature of learning and teaching as it takes place in a variety of settings. In addition, researchers are discovering ways to learn from the "wisdom of practice" that comes from successful teachers who can share their expertise (p. 2-3).

In order to gain a better understanding of these issues I should like to investigate the scientific developments in a little more detail.

A new reality in a paradoxical universe

> In the twentieth century, physicists faced for the first time, a serious challenge to their ability to understand the universe. Every time they asked nature a question in an atomic experiment, nature answered with a paradox, and the more they tried to clarify the situation, the sharper the paradoxes became. In their struggle to grasp this new reality, scientists became painfully aware that their basic concepts, their language and their whole way of thinking were inadequate to describe the atomic phenomena. Their problem was not only intellectual but involved an intense emotional and existential experience.
>
> It took these scientists a long time to accept the fact that the paradoxes they encountered are an essential aspect of atomic physics. … Once this was perceived, the physicists began to learn to ask the right questions and to avoid contradictions … and finally

> they found the precise and consistent formulation of quantum theory.
>
> The effect on the physicists' view of reality was truly shattering. The new physics necessitated profound changes in concepts of space, time, matter, object, and cause and effect; and because these concepts are so fundamental to our way of experiencing the world, their transformation came as a great shock (Capra in Wheatley 1992:3-4).

These early twentieth century revelations cited by Wheatley in the realms of physics are according to Gee et al now causing whole swaths of academic disciplines to retool themselves around common themes: "All are now intensely concerned with unpredictable properties that emerge out of myriad bits and pieces interacting within complex systems" (Gee et al 1996:50).

This view is supported by Marsick and Watkins (1999) who claim that scholars lately have been looking at social systems – organisations, institutions etc. – through the lens of chaos and complexity theory (p. 204):

> Complex non-linear systems like ecologies or organisations are characterised by multiple systems of interaction that are both ordered and chaotic … random disturbances can produce unpredictable events and relationships that reverberate throughout a system, creating novel patterns of change … despite all of the unpredictability, coherent order always emerges out of the randomness and surface chaos (Morgan in Marsick and Watkins 1999:205).

Perhaps we can begin to understand why by first considering briefly from an enlightenment perspective some ideological issues that are raised by relativity, quantum and chaos and complexity theories. For this purpose I draw on the opinions of philosopher John Searle, mathematician Roger Penrose, physicist Brain Greene and scholars Victoria Marsick, Karen Watkins and Victor MacGill.

An atomic challenge to enlightenment thinking

John Searle writes that from the time of the scientific revolutions of the seventeenth century until the early decades of the twentieth, it was possible for an

educated person to believe that he or she could come to know the important things about how the universe works. From the Copernican Revolution, through Newtonian physics, the theory of electro-magnetism and Darwin's theory of evolution, our universe made sense and was becoming even more accessible through the steadily increasing growth of knowledge and understanding. This belief argues Searle required making a distinction between two metaphysical realms namely the mental and the spiritual on the one hand and the physical or material on the other; often referred to as Cartesian dualism (Searle 1999:2-3).

However in the early decades of the twentieth century a number of events, not least the catastrophe of the First World War challenged this enlightenment vision both about the nature of things and about our ability to comprehend that nature. Searle maintains that this challenge came from various quarters. The most pertinent to our discussion seems to be firstly, Einstein's theory of relativity, which challenged our most fundamental assumptions about time and space and matter and energy. Then we had Kurt Godel seemingly striking a blow against mathematics with his incompleteness proof. Godel claimed that although there are true statements in mathematical systems they cannot be proven within the same systems. And finally quantum theory, which seemed to show that physical reality at the most fundamental level is indeterministic and that the conscious observer, in the very act of observation, is in part creating the very reality he or she is observing (Searle 1999:3).

Searle in his criticism of the attack, emphasises the view put forward by Wittgenstein who he claims was arguably the most influential philosopher of the twentieth century. Searle suggests that many take Wittgenstein to have shown that our discourse is a series of mutually untranslatable and incommensurable language games – "We are not engaged in one big game in which there are universal standards of rationality in which everything in intelligible to everyone but rather in a series of smaller language games each with its own inner standards on intelligibility" (Wittgenstein in Searle 1999:4).

Also according to Searle, several anthropologists who have claimed that there is no universally valid rationality but rather that different cultures have different rationalities supports Wittgenstein's idea. This and similar versions of relativism have become common in the intellectual movements known collectively as postmodernism.

Postmodernists claims Searle, see themselves as challenging the enlightenment vision (p. 4).

Searle responds to these challenges against the enlightenment vision by suggesting that the real change since the nineteenth century is not that the world has become more unintelligible but rather that one has to be somewhat smarter and know a lot more. For example to understand contemporary physics you need to know a lot of mathematics. Relativity theory, he continues, is not a refutation of traditional physics but its extension, requiring us to think in "counter-intuitive" ways about space and time. It is worth remembering, Searle emphasises, that Newtonian mechanics also seemed paradoxical in the seventeenth century.

However Searle does concede that quantum theory, especially on some interpretations, appears to present a serious challenge to the enlightenment vision and that he is not technically competent to make a serious assessment of its significance. He does however distinguish between the claim that quantum theory shows indeterminacy in the relationship of micro to macro levels on the one hand and the claim that it shows that reality does not have an existence independent of observers on the other.

Searle believes that we simply have to accept a certain level of statistical indeterminacy in micro-macro relations as a fact about reality since there is nothing in the actual results in quantum physics that forces us to a conclusion that the conscious observer creates in part the reality observed. Such paradoxes are not in the actual results of experiments but in the varying interpretations of the results. He supports his views by citing "Paradox lost: Images of the quantum" by P. R. Wallace (1996).

Quantum theory – a curious state of affairs

Someone else who seems to share Searle's views on quantum theory and who is arguably better informed on the subject, is Roger Penrose, Rouse Ball professor of mathematics at Oxford. Penrose emphasises that phrases such as 'Heisenberg's uncertainty principle' are often invoked to suggest that there is a certain vagueness or even irrationality of behaviour at the quantum level (particles, atoms, molecules, chemical bonds, superconductors, lasers and other similar phenomenon) is in fact highly misleading. There is, according to Penrose, a mathematically very precise description of quantum-level behaviour whereby the quantum description called "the

state vector, or *wave function*, evolves in a completely deterministic – and indeed *computable* – way, in accordance with a well-defined equation, the famous Schrödinger equation" (Penrose 1999:169).

Penrose also clarifies what Searle argued earlier; that the lack of determinism comes in only when a 'measurement' is made, which normally involves the magnification of a quantum-level event to the large-scale "classical" level. Penrose explains that it is at this stage that the rules are changed and that a "probabilistic element" is introduced involving the strange notion of "wavefunction collapse", which Penrose refers to as ***"state-vector reduction".*** But, he emphasises, at the quantum level itself, "determinism and computability hold true – according to the standard procedures of quantum theory" (p. 169). He does however concede that this seemingly odd behaviour is a highly controversial matter even amongst physicists.

As present day physics is presented there are, according to Penrose, two quite different levels of physical description. On the macroscopic level, we have ***"classical"*** physics – the physics of Newton, Maxwell and Einstein. This is, as Penrose points out, a deterministic physics and is computable. Whereas on the submicroscopic level of molecules, atoms and particles, another completely different-looking description takes over, namely ***"quantum"*** physics. "Quantum physics is characterised by the fact that different alternative histories of behaviour seem to coexist in some strange kind of superposition"; this being what Penrose claims constitutes the "state vector or wavefunction". He also claims that these superpositions of alternatives remain superposed so long as the system stays at the quantum level and the evolution of the system is again deterministic and computable taking place in accordance with Schrödinger's equation. The non-determinism of standard quantum theory occurs only when effects get magnified from the quantum to the classical level at which point the state-vector reduction is deemed to take place, whereby the state-vector is considered to "jump discontinuously from one state to another" (p. 170).

Penrose does however stress that there are many different attitudes to this "curious state of affairs". Some physicists – such as Niels Bohr – regard the state vector not as describing any kind of quantum-level reality but as being merely a mechanical convenience useful for making predictions. Others would take the state-vector as actually describing a quantum-level physical reality, but would regard the

reduction phenomenon as some kind of approximation or illusion. Yet others are apparently driven to the logical conclusion that the superposed alternatives must still exist at the macroscopic level, but for some reason "we are not aware of them, there being 'parallel universes' in which all these superposed alternatives (including copies of ourselves) are supposed to coexist" (p. 170).

American physicist Henry Stapp argues that quantum waves collapse when intelligent brains select one among the alternative quantum possibilities as a basis for future action and that "this causal efficacy allows consciousness to serve a biological purpose (Stapp in Papineau 2000:125-126).

And finally, there is the viewpoint to which Penrose himself subscribes and that is that the Schrödinger equation is only an approximation to some yet largely unknown physical theory, which straddles both the quantum and classical levels (Penrose 1999:170-171).

Brain Greene (2000) of Columbia and Cornell Universities believes that a unifying theory already exists, namely "Superstring" theory. And at the risk of causing more confusion than clarity, I shall try, by using the writings of Greene, to give a brief description of the basic idea behind this relatively new concept, which for my research, I believe is important for me to understand.

Superstring theory – a brief description

> String theory as it is generally referred offers a powerful conceptual paradigm in which, for the first time, a framework answering the questions that arise between the quantum and classical levels of physics has emerged. String theory proclaims that if we could examine sub-atomic particles – electrons, protons neutrons quarks etc. – with even greater precision, a precision many orders of magnitude beyond our present technological capacity, we would find that each particle is not in fact a point but instead consists of "a tiny one-dimensional loop". "Like an infinitely thin rubber band each particle contains a vibrating, oscillating, dancing filament that physicists … have named a ***string***" (Greene 2000:14).

Einstein, who found the existence of two distinct forces – gravity and electromagnetism – deeply troubling, is reported to have spent the last thirty years of

his life in search of a "unified field theory" that he hoped would show that these two forces are really manifestations of one grand underlying principle. Well according to Greene, Einstein was simply ahead of his time and now almost a century later his dream of a unified theory has become the "Holy Grail" of modern physics.

From one principle – everything at its most microscopic level consists of combinations of vibrating strands – string theory provides a single explanatory framework capable of encompassing all forces and all matter. String theory proclaims that observed particle properties are a reflection of the various ways in which a string can vibrate. Just as the strings on a violin have frequencies at which they prefer to vibrate, the same holds true for the loops of string theory. Each of the preferred patterns of vibrations of a string in string theory appears as a particle whose mass and force charges are determined by the string's oscillating pattern.

The electron is a string vibrating one way whilst the quark is a string vibrating another and so on. Far from being a collection of chaotic experimental facts, particle properties in string theory are the manifestation of one and the same physical feature: the resonant patterns of vibration – the music so to speak – of fundamental loops of string.

According to Greene the same idea applies to the forces of nature as well; and hence everything, all matter and all forces, is unified under the same rubric of microscopic string oscillations – the notes that strings can play. For the first time in the history of physics we have a framework with the capacity to explain every fundamental feature upon which the universe is constructed (Greene 2000:14-16).

Chaos and complexity

Finally with regard to the theories adding substance to the phenomenon of "the New Science" is that which is referred to by Marsick and Watkins (1999) as "the chaos/complexity metaphor". I should point out that I have learnt from my research that in a scientific context the term chaos has a slightly different meaning than it does in its general usage as a state of confusion. It would appear that in scientific terms, chaos refers to an apparent lack of order in a system, which nevertheless still obeys particular laws or rules:

> Complex non-linear systems like ecologies or organisations are characterised by multiple systems of interaction that are both

> ordered and chaotic … random disturbances can produce unpredictable events and relationships that reverberate throughout a system, creating novel patterns of change … despite all of the unpredictability, coherent order ***always*** emerges out of the randomness and surface chaos (Morgan in Marsick and Watkins 1999:205).

Chaos refers to a special kind of behaviour found in certain physical systems and was discovered at the beginning of the twentieth century by physicist Henri Poincaré (Trump 1998). The two main components are 1) that systems, no matter how complex they may be, rely upon an underlying order, and 2) that very simple or small systems and events can cause very complex behaviours or events. The extreme sensitivity to initial conditions mathematically present in the systems studied by Poincaré has come to be called dynamical instability or simply chaos.

Although Poincaré's work was considered important by some other farsighted physicists of the time, many decades would pass before the implications of his discoveries were realised by the science community as a whole. It was not until the early 1960s that Edward Lorenz, a meteorologist, whilst running computerised equations to theoretically model and predict weather conditions, found that having run a particular sequence and deciding to replicate it, the results were radically different from his first outcomes. Lorenz had not in fact entered precisely the same number, .506127, but had rounded the figure to .506.

According to all scientific expectations at the time, the resulting sequence should have differed only very slightly from the original trial, since measurement to three decimal places was considered to be fairly precise. As the two figures were considered to be almost the same, the results should have been very similar. But repeated experimentation proved otherwise and Lorenz had 'proved' Poincaré's theory that the slightest difference in initial conditions made predictions of past or future outcomes impossible.

For the uninitiated like myself, who might find these milestone theories somewhat confusing, I hope enough has been said to demonstrate the possibility for numerous interpretations that are immediately available to both the conscientious and unfortunately the unscrupulous social theorists, who might ultimately effect policy

decisions in all forms of social organisational and institutional systems, including education.

I should now like to have a look at how some of the ideas initiated by these twentieth century theories have been interpreted by some theorists interested in improving the workings of our "complex" social systems in our new globalised, postmodernist world.

The New Science

Relativity, quantum mechanics and chaos/complexity theories all challenge our thinking about observation and perception, participation and relationships, and the influences and connections that are created across large and complex systems. This is the view of Margaret Wheatley (1992) who it would appear from my review of the literature is a front-runner in her support of "the New Science", especially in what it might achieve if incorporated into organisational or institutional social systems. She further claims that self-organising structures as found in nature; demonstrate new relationships between autonomy and control, showing how a large system is able to maintain its overall form and identity only because it tolerates great degrees of individual freedom (p. xi-xii).

It is because of these ideas that Wheatley is convinced that there is a simpler way to "lead" organisations, which requires less effort and produces less stress than that which is currently practised. She further emphasises that the "layers of complexity", the "sense of things beyond our control" and in fact possibly out of control, are but signals of our failure to understand a deeper reality of organisation or institutional life and in fact life in general. We need to stop seeking after the universe of the seventeenth century and begin to explore what has become known to us in the twentieth century and I hope even more so in the twenty-first (p. 3).

Wheatley proposes that the New Science – where the underlying currents are a movement toward holism, toward understanding the system as a system and giving primary value to the relationships that exist among seemingly discreet parts; where particles come into being and are observed only in relationship to something else and do not exist as independent "things" – provides the answers. These unseen connections between what were previously thought to be separate entities are she believes the fundamental elements of all creation (p. 9-10).

MacGill also emphasises this importance of the interconnectedness of complex systems, claiming that the connections, no matter how obtuse, have several inherent characteristics, which help us understand the world about us and form the foundation of a vision that can greatly enhance human life (MacGill 2004:3).

Morrison (2002) who claims that "complex adaptive systems" cause new elements to form and new phenomena, new structures and new rules of behaviour to occur also takes up this sentiment. The example he gives is emergence:

> the old system is unable to adapt and so it dies, and a new system emerges from its ashes which is better suited to the situation being faced. The efforts to change the system simply by changing its leadership do not work; self-organisation cannot be mandated – it emerges spontaneously and of its own accord (Morrison 2002:22).

Morrison however takes issue with the terminology as it is often referred to in chaos/complexity theory. He questions the term 'complex adaptive system' for its systems driven, cybernetic, mechanistic connotations. The term "complex responsive process", is preferred as it conjures up the idea of human relations, which for Morrison, is at the heart of chaos/complexity theory as it applies to human social systems and combines the agency and mutual influence of individuals and groups. Indeed he points out that thinking of an organisation as a system has to be replaced, within chaos/complexity theory, by thinking of the organisation as "the processes of people relating to, and interacting with, each other over time" (Morrison 2002:12).

The concept of emergence used by Morrison is also emphasised by Wheatley. She cites Prigogine for his work demonstrating the capacity of certain chemical systems to regenerate to higher levels of self-organisation in response to environmental demands. This Wheatley suggests, demonstrates the capacity of living systems to respond to disorder (non-equilibrium) with renewed life, showing that disorder (chaos) can play a critical role in giving birth to new, higher forms of order (Wheatley 1992:11).

Wheatley also believes that the new science is making us more aware that the yearning we have for simplicity is one we share with all natural systems as is "the primacy of relationships". This prompts her to ask the question that if the "physics" of our universe is revealing "the primacy of relationships", is it any wonder that we are

beginning to rethink our ideas about how we manage our lives in relational terms. I would argue from my understanding of the literature that this issue of relationships is of great significance in the New Science (p. 13).

In this regard Wheatley proposes that the phenomena experienced in quantum mechanics, which she believes is the most successful theory ever developed in physics, may also apply to somewhat larger objects – like humans – more than was originally thought. For example, human brain cells are sensitive enough to register the absorption of a single photon and thus according to Wheatley, sensitive enough to be influenced by the whole panoply of odd quantum-level behaviour (p. 31). She also claims that in the quantum world, relationships are not just interesting to many physicists, they are all there is to reality. For example, Stapp describes elementary particles as " a set of relationships that reach outward to other things" (Stapp in Capra 1983:81). Wheatley also points out that particles come into being ephemerally, through interactions with other energy sources (p. 32).

Bateson is another Wheatley reference who speaks of "the pattern that connects", and urges us to stop teaching facts – the "things" of knowledge – and focus instead on relationships as the basis for all definitions. With relationships we give up predictability for potentials:

> Several years ago I read that elementary particles were "bundles of potentiality". I have begun to think of all of us in this way, for surely we are as undefinable, unanalysiable and bundled with potential as anything in the universe. None of us exists independent of our relationships with others. … What is critical is the relationship created between the person and the environment. That relationship will always be different will always evoke different potentialities. It all depends on the players and the moment (Bateson in Wheatley 1992:34).

This causes Wheatley to proclaim that we can no longer, in this "relational universe", study anything as separate from ourselves. Particles remain as fuzzy bundles until they are observed. Only then do they become a thing (At the moment the wave packet collapses, quantum phenomena give way and Newtonian physics re-enters the picture) (p. 36).

On this issue Wheatley also cites Wheeler, a noted physicist, as saying that in a participative universe we do not, as some have suggested, create reality, but instead we are essential to its coming forth. We evoke a potential that is already present. The environment remains uncreated until we interact with it; there is no describing it until we engage with it – "Abstract planning divorced from action becomes a cerebral activity of conjuring up a world that does not exist" (Wheeler in Wheatley 1992:36-37).

To live in a quantum world according to Wheatley, we will need to change what we do. We will need to stop describing tasks and instead facilitate "***process***". We will need to become knowledgeable at how to build relationships, how to nurture growing evolving things. She also emphasises that ***all of us will need better skills in listening, communicating and facilitating groups,*** since these are the skills that build strong relationships and as "the era of the rugged individual has been replaced by the era of ***the team player***" these skills become essential (p. 39).

This issue of essential skills for building relationships discussed by Wheatley is a good example of what Argyris (1999) refers to as one of the "gaps" in the literature on group learning. Whilst prescribing the desirability of these essential skills Wheatley unfortunately makes no reference as to how they are to be acquired. I investigate this critical aspect in chapter 4 of my research report.

The last issue in the New Science to which I should like to draw attention is another issue that Wheatley appears to believe is of significant importance and is derived from what has come to be known as "Field Theory".

Field theory – a social perspective

> Space everywhere is now thought to be filled with fields – invisible, non-material structures that are the basic substance of the universe. … Although we know a great deal about the way fields affect the world as we perceive it, the truth is that no one really knows what a field is. The closest we can come to describing what they are is to say that they are spatial structures in the fabric of space itself (Wheatley and Talbot in Wheatley 1992:40-46).

My research would suggest that this is no longer the case. Lynn McTaggart (2003) in her recent publication "The Field" discusses the search for "a unified theory

of physics" (as described earlier by Greene p. 30 of this report) by "A small band of scientists dotted around the globe … not satisfied to simply carry on with quantum physics by rote" (p. xxi).

McTaggart points out that this "small band" of scientists, requiring better answers to many of the large questions left unanswered, have picked up where the pioneers of quantum left off and are probing deeper. Their particular area of interest is that which is referred to in quantum physics as "the Zero Point Field" – an ocean of microscopic vibrations (see the discussion on Superstring theory p. 30 this report) in the space between things:

> If the Zero Point Field, this ocean of microscopic vibrations, were to be included in our conception of the most fundamental nature of matter, then the very underpinning of our universe would be a heaving sea of energy – one vast quantum field. If this were true, everything would be connected to everything else like some invisible web (McTaggart 2003:xxi).

These same scientists also claim that we all are made from the same basic material; that on our most fundamental level, living things, including human beings, are in fact packets of quantum energy constantly exchanging information with this inexhaustible energy sea. Information about all aspects of life, from cellular communication to the vast array of controls of DNA, relayed through an information exchange on the quantum level. Even our minds, in their opinion, operate according to quantum processes. This would suggest that all human perception occurs because of interactions between the subatomic particles in our brains and the quantum energy sea – the Zero Point Field (p. xxi-xxii).

McTaggart also suggests that fundamentally this group of scientists have provided evidence that "all of us connect with each other and the world at the very undercoat of our being". Added to this she claims that there may be such a thing as a "life force" flowing through the universe – what has variously been called "collective consciousness", an idea borrowed by enactivists, or "the Holy Spirit", a concept which is somewhat more widely accepted (p. xxii).

Wheatley (1992) suggests that an image she has found effective in helping one think about these invisible fields, which exert visible influence, is that of observing

fish. If for example we were unaware of the medium of water in which fish swim, we would probably look for explanations of their movements in terms of one fish influencing another. If however we observed all the fish deflecting in a regular pattern, we might begin to suspect that some other medium was influencing their movements. We could test for the presence of this medium by creating disturbances in it and noting the reactions of the fish (Wheatley 1992:50).

An intriguing concept in biology

Sheldrake according to Wheatley, has created a somewhat controversial and intriguing concept of fields in biology that relates to social organisation. He has postulated the existence of "morphic" fields that govern the behaviour of species. These fields, claims Sheldrake, are built up through the accumulated behaviour of species members. "The form resides in the morphic field, and when individual energy combines with it, it patterns behaviour without the need for laborious learning of the skill" (Sheldrake in Wheatley 1992:51).

As one can imagine this would suggest that field images could become quite significant when applied to social organisations and their members. Or as Wheatley describes it – "quite provocative"!

> We agreed that we could feel good customer service by just walking into the store. We tried to get more specific by looking at visual cues, merchandising layouts, facial expressions – but none of us could explain the sure sense we had (p. 53).

Wheatley also emphasises the point that within any form or size of social organisation the need for organisational clarity about purpose and direction is a wonderful candidate for field theory. It is in linear fashion, she continues, that we have most often conceived of vision as thinking into the future, creating a destination for a particular social group. This is a very strong Newtonian image, but what if, as she suggests, we changed the science and looked at vision as a field? What if we saw a field of vision that needed to permeate social institutional space, rather than viewing vision as a linear progression? If we think of ideas as fields, we will have a better metaphor for understanding why concepts control as well as they do (p. 54-55).

Wheatley is also quite emphatic in stressing why this work of field creation needs to be taken so seriously – "fields give form to our words". If we have not

bothered to create a field of vision that is coherent and sincere, then she believes that people will inevitably encounter other fields; ones that have been created unintentionally or casually. She emphasises the claims of Field theory by reminding us that ***space is never empty*** (emphasis mine). If we say one thing but do another then we create dissonance in the very space of any social organisation in which we participate (p. 56).

The issue of dissonance is one of great significance and one I shall return to in some detail in chapter 6, when discussing Argyris' "theories of practice", a view that I hope will go a long way in explaining why dissonance is so prevalent in all types of relationships.

All of these developments in the study of learning have, according to The National Research Council of America (2000:3), led to an era of "new relevance of science to practice". In my own research I have had the opportunity of looking at some of these new developments and the criticisms of constructivism that have to a large extent prompted their development:

> Constructivists reject mentalist and cognitivist models of personal knowledge that are based on metaphysical assumptions. Instead of describing knowledge in terms of internal models of an external world, constructivists speak more in terms of potentials to action. This point is pivotal. For constructivists, bodily action is not evidence of understanding – it is understanding (Davis 2004:131).

> A number of criticisms of constructivism have arisen and these make some aspects of the theory problematic … These criticisms are not all of equal importance, and nor do they detract from the value of the theory, but they imply that a more encompassing theory of learning is desirable (Begg 1999:3).

> Only the principles of evolutionary educational psychology will be able to provide a much needed anchor for guiding educational learning research and practice since it is the only perspective that readily accommodates basic observations that elude explanation by other theoretical perspectives such as constructivism (Geary 2002:340).

The more "encompassing theory of learning" to which Begg refers, is enactivism, which according to Breen, Agherdien, and Lebethe (2003) comes from the writings of Varela, Thompson and Rosch and is based on the work of Merleau-Ponty and ecological understandings from chaos and complexity theories. Davis who Begg believes has developed the "notions of enactivism" in a practical way has interpreted the work within the context of mathematics education. Begg further emphasises that Davis, having worked with colleagues from other disciplines, makes his work relevant to subjects other than mathematics and since his 1996 publication his ideas have developed further (Davis in Begg 1999).

I suggest that these two somewhat complementary theories, enactivism and evolutionary educational psychology (EEP) are both excellent examples of the "new knowledge about the nature of learning and teaching" that is being produced from the collaborative studies of cognitive and developmental psychologists and educators, working together. I should now like to take the opportunity of looking at these two theories in a little more detail and how they might influence collective learning.

Enactivism – a problem of relationship

In his latest book – "Inventions of teaching: a genealogy", Brent Davis (2004) places enactivism within the framework of what he refers to as "the notion of interobjectivity" (Davis 2004:145). According to Davis this notion is radically different from the notion of objectivity within empiricist science. In fact Davis proposes that interobjectivity can be presented as a direct challenge to the metaphysician's desire for objective or observerless observations. One major conceptual influence for this departure from modernist thought can be traced to phenomenology and the work of Merleau-Ponty (p. 146):

> His principle influence was perception, which he understood as an interface between actor and acted-on. For him a sensory perception was an instance of unification of perceiver and perceived, not a separation (p. 146).

This view supports the claim that Breen et al. (2003) make in that "enactivism attempts to find a middle way between the mental and the physical by suggesting that the body is that which renders the mind and the world inseparable" (Davis in Breen 2003:228).

Within his notion of interobjectivity where enactivism resides, Davis refers to two closely related branches of thought that have risen to prominence – namely "complexity science and ecological discourses" (p. 150). Unlike analytic science, complexity science, according to Davis, is defined more in terms of its objects of study than its modes of investigation. He also points out that the phenomena that are studied by complexity science share two key qualities:

> First, each is adaptive – that is, a complex system can change its own structure in response to internal or external pressures and is thus better described in terms of evolutionary processes than in terms of the laws of physics. More precisely, a complex system embodies its history in its structure. Second a complex phenomenon is self-organising, meaning that it is composed of and arises in the so-called implicated activities of individual agents. It is not the sum of its parts – an object; it is the product of its parts and their interactions – ***an interobject*** (emphasis mine)(p. 151).

Complexity scientists, claims Davis, often describe such adaptive, self-organising phenomena as ***learning systems*** (emphasis mine), where learning is understood in terms of "ongoing, recursively elaborative adaptations through which systems maintain their coherences within dynamic circumstances". Such phenomena, according to Davis, are able to present collective possibilities that are not represented in the individual agents and can arise and evolve without goals, plans or leaders (p. 151).

New ways of talking

As a result of these developments Davis believes that new ways of talking about knowing and knowledge are emerging – "ways that are explicit in their acknowledgement of the biological roots of personal knowing, the cultural roles of collective knowledge and the more-than-human contexts of human activity" (p. 153). Out of this he claims has surfaced enactivism; redefining cognition in terms similar to the scientific definition of complexity. In enactivism, cognition is understood as "ongoing processes of adaptive activity". One implication of this is that thinking is not seen as occurring strictly inside a person but rather that thinking is used to refer to

all "active processes" that are part of a person's ongoing behaviour – "The processes of cognition are the processes of life" (p. 153).

Begg draws attention to how enactivism contrasts with constructivism in that constructivism emphasises knowing rather than knowledge. With constructivism knowledge is viewed as a human construct which Begg suggests is evaluated in terms of whether it fits with the experience of the knower (Begg 1999:12). Begg also cites Davis as emphasising that both radical and social constructivism are based on the modernist separation of self from other and self from world. This Begg claims is because constructivism sees knowledge as something, "an object" as Davis puts it; and therefore it has to be assigned a location (Davis in Begg 1999:13). But Bateson claims that there is no such thing – "it is not knowledge-as-object but knowledge-as-action" (Bateson in Begg 1999:12-13).

This emphasis on "knowledge-as-action" Begg suggests, ties in with the enactivist perspective that "collective action is not for individual sense-making but as a location for shared meanings and understandings" (Begg 1999:13).

Another critical issue of enactivism for Davis is that it rejects the assumption of a "core, essential, inner self". Personal identity is seen to come about in "the complex mix of biological predisposition, physical effect, social circumstance, and cultural context" as a person copes with the "contingencies of existence". Life and learning therefore, are understood in terms of "exploration of ever-evolving landscapes of possibility and of selecting actions that are adequate to situations" (Davis 2004:154).

However the quality of enactivism, which makes it a theory that Davis submits "spans" the gap, albeit a rather small one, between complexivist and ecological sensibilities, is its concern for ***ethical*** action (emphasis mine)(p. 155). Complexity science has managed to maintain aspects of the "detached modern scientific attitude" and as a result tends not to concern itself with questions of meaning On the other hand, an ecological perspective is very much concerned with meaning:

> Departing from most environmentalist discourses, which continue to frame humanity's relationship to the more-than-human in terms of management and overseeing, deep ecology begins with the assertion that life in all forms is inherently valuable. … In other

> words the role of humanity is not understood in terms of stewardship, but of mindfulness and ethical action (p. 156).

Following this line of thought Davis suggests that in being aware of their selves and of nature, humans are one of the means by which nature is conscious of itself. Human thoughts, he continues, are not merely about the cosmos; they are parts of the cosmos – and so the universe changes when our thoughts change. The defining feature of this perspective is for Davis, "an attitude of respect and entanglement" with all living forms. This attitude has been "picked up" in the term "participatory epistemology", which Davis maintains is used to refer to any theory that asserts that all aspects of the world, animate or inanimate, participate with humanity in the ongoing project of knowledge production. "The whole is understood to enfold from and to be enfolded in the part(icipant). In a word, within participatory epistemologies, the central issue is meaning (p. 159-160).

Practical implications

Breen et al. cite Dawson in describing enactivism as "laying a path while walking" (Dawson in Breen et al. 2003:229):

> It is concerned more broadly with the collaborative construction of a collaborative world. Concern is focused on the ecological interface of mind and society rather than on a solitary mind trying to make sense of an ontological given. It involves both of becoming part of an ongoing existing world and the shaping of a new one (Breen et al. 2003:228).

Certainly from this description and what Davis has had to say above, there seems little doubt as to the importance of the concept of participation within the enactivist perspective; an aspect of the theory, which is of particular relevance to the issue of collective learning.

A powerful new way of thinking about identity

Davis claims that both complexivist and ecological discourses, which form the basis of enactivism, might be described as responses to the modern neglect for context. He also suggests that there is ample evidence of this when one considers scientific technologies that are deployed in ignorance of their environmental consequences. For example: in medical practices that are fixed on responses to

disease rather than the support of good health; in legal systems that protect individual rights and ignore collective responsibility; and in educational systems structured around age-appropriate (versus situation – or person-appropriate) standardised curricula (Davis 2004:161).

But another and perhaps more relevant problem, at least for this research, is the long-standing practice of "fragmenting topics into isolated concepts" and teaching the resulting parts in prescribed sequences in the hope that learners will "pull it all together". "This tendency to fragmentation and reduction – whether the human body or a body of knowledge – represents a failure to appreciate the difference between things that are *complicated* and phenomena that are *complex* (Davis 2000:174).

For Davis, complicated systems are those that are fully understood through a knowledge of their parts, such as clocks, car engines and computers whereas complex systems such as climates, the immune system, human beings and societies, cannot be fully understood through examination of their components, largely because their components are similarly alive or dynamic (p. 174).

This recent realisation has brought forth "a powerful new way of thinking" about human identities, which has particular relevance to the concept of working in groups. According to Davis, the thinking includes the belief that "self-identification" is not always about distinguishing between an "I" and a "not-I" but rather that most events are about becoming part of a "we". He also submits that most of one's activities are "framed by the groups and cliques with which one identifies, as are the opinions and perspectives that orient one's interpretations". In this regard he appears to support the view that "attitudinal change seems to be a fluid and non-conscious integration of sensibilities, assumed in much the same way that accents and mannerisms tend to be taken on (or lost)" (p. 174-175).

This phenomenon, Davis submits has often been witnessed by parents and teachers who have observed children undergo dramatic changes in personality as they "hook up" with different groups. In the classroom this is evidenced when groups of "good students" are separated from groups of those less-able and different groups form. When this occurs, different attitudes and different behaviours usually emerge, which Davis claims, gives rise to even larger gaps in ability (p. 175).

Regrettably, research into identity, Davis claims, has been overwhelmingly oriented by the modernist assumption that identity resides in the individual and so there has been relatively little inquiry into how such group identifications occur. But whilst there has been little formal enquiry, Davis believes, that people categorise themselves as an "us" at least as much as they categorise themselves as a "me" and are also able to represent group opinion while still exercising individual choice. He supports this contention by referring to an evolutionary psychology perspective, which suggests that the tendency of humans to identify both as an "us" and a "me" is linked to the fact that humans are social creatures whose survival depends on their capacity to form cohesive collectives (p. 175):

> After the human lineage split from the chimpanzee lineage some six million years ago, the size of human groups began to increase. The increase in group size meant that forming alliances became even more important for survival. For our ancestors, forming alliances and friendships was just as vital as eating the right food. Those that lacked the ability to form alliances and friendships were in as much danger as those who lacked the ability to detect predators (Evans 1999:64).

Classroom contexts

Whilst these ideas challenge the modernist concept that identity is contained in a physical body, rather than part of a more complex "cultural/biological system"; enactivism rather than deny individual consciousness, experience or subjectivity, relies on the uniqueness of individuals:

> In order for complex systems to remain viable, there must be diversity amongst the agents that comprise the system. Tremendous creativity and novelty have been shown to arise from such individuality, as expressed in the context of a larger system (Davis 2004:175-176).

This point as Davis emphasises, is of particularly relevance in classroom contexts. He highlights the debate around whose interests should be served by schooling; the student's or society's, which he claims, places the individual and the collective in conflict. This conflict for Davis is often dramatically and tragically

enacted in the classroom where the educator (cast as the representative of society) is positioned at odds with the students (representing their own interests)(p. 176).

However Davis believes that some educators have demonstrated that a different way of thinking about the relationship between the individual and the collective can support very different classroom experiences. The key to this he suggests "is to work with ***the human predisposition to identify with groups***" (emphasis mine). As an example Davis suggests some sort of shared "project" as a basis for establishing "a sense of collectivity" (p. 176). One can get a better understanding of this aspect suggested by Davis in some of the work being done by educators such as Breen at the School of Education, University of Cape Town. The School has recently introduced a course called "Researching Teaching", which tries to include much of the theory and practice of enactivism as described by Davis.

It is important to note that educational practices from an enactivist perspective begin with the realisation that learning is not so much a deliberate act as it is an aspect of life:

> Every moment of life is a learning event, a creative participation in the complex choreography of existence. Teaching is all about effecting transformation. In encouraging particular sorts of understandings, the teacher is supporting the development of particular worldviews and modes of perception. The associated classroom experiences are biological-and-social events (Davis, Sumara and Luce-Kaplan 2000:178).

Conditions for "complex co-activity to arise" within groups

Davis himself believes that each event of learning entails a "physical transformation of the brain" and therefore a "different brain" meets subsequent events of learning a position that Wheatley (1992) identified with earlier. He also maintains that on a biological level, personal learning is not about acquisition, processing or storing, but rather it's about what he refers to as "emergent processing". From an enactivist perspective to ignore or downplay the biological is to "seriously restrict any discussion of what learning is and how it might happen". Davis however emphasises that "this is not to say that the biological must be given priority, merely that humans are both biological and cultural beings". As an example of this view he claims that

slowed video recordings of people in conversation "reveal a complex choreography of action" of which they are unaware. What he finds surprising is that "this extraordinary process of ***coupling*** one's actions to another's can occur without conscious knowledge" (Davis 2004:165-167).

To Davis, this behaviour demonstrates that we are biologically and not just culturally predisposed to engage with others in ways that he believes can properly be called "teaching". However, such behaviour is rarely apparent from "engagements with a subject matter", but rather from what Davis refers to as "the continuous project of fitting in" – in other words socialisation, an issue which is discussed in more detail in the next section on "educational evolutionary psychology" (p. 168).

What is also of particular interest with regard to group work is that in Davis' opinion "for complex co-activity to arise (within a group) that surpasses the possibilities of agents on their own, there must be a certain level of ***diversity*** among them". It is this variation Davis claims that is the source of "novel responses". He also claims that:

> it is argued to be the reason behind, for instance, the vast amount of unexpressed DNA in the human genome, the range of vocational competencies in a community, and the biological diversity of the planet. When a complex system is faced with a problem, an adequate solution might be found in these pools of diversity (Davis 2004:168).

However what is crucial to the concept that I refer to as collaboration within a co-operative learning environment, is that such diversity, according to Davis, is only useful to the extent that "it can be appreciated by other agents in the system" (e.g. other members of a team). Which brings us to a second key issue for groups – that to which Davis refers as "redundancy":

> To engage in joint activity, to 'structurally couple', agents must have sufficient common ground to be able to interact. In fact in most cases ***they need to be much more the same than different because a system's robustness is linked to its agents abilities to compensate for one another's lapses*** (emphasis mine)(p. 168).

Davis concludes his thoughts on this particular aspect of the enactivist perspective on learning, by emphasising how important a tool the issue of diversity is in the classroom, as highlighted in the cognitive constructivist view of learning above (page 21). But what is of particular significance is that although the condition of diversity will more often than not be met, some work might be necessary to ensure "adequate redundancy":

> To engage in productive discussions, some familiarity with issues or some common experiences would be necessary. Such background – or the provision of opportunities to develop such background – is one important category of pedagogical decision making (Davis 2004:168).

I would submit that from my own experience this is an aspect that is not given nearly enough attention from a "pedagogical decision making" perspective and that Davis' final comment is much more in keeping with the 'constructivist' approach with which I am much more accustomed – "One way of ensuring that complexity will not emerge is to remove all limitations" (Davis 2004:165-169).

I should now like to take a closer look at collective learning as "the continuous project of fitting in" and how the social and biological is emphasised in the second new development that I have investigated – educational evolutionary psychology.

Evolutionary educational psychology (EEP)

Not all cognitive scientists feel comfortable with the role that constructivism plays in the determination of educational policy since it leaves certain important issues unresolved. For example, Jeremy Genovese (2003) claims that constructivists assume that all learning unfolds as part of a developmental process which more often than not, causes them to endorse learner-centred approaches to learning at all levels. He also claims that they assume that "intrinsic" motivation is always possible and as a result "downplay" the importance of acquiring a knowledge base (Genovese 2003:133).

This view is supported by Geary, another cognitive scientist, who proposes that only the principles of evolutionary educational psychology will be able to provide a much needed anchor for guiding educational learning research and practice. It is he

claims the only perspective that "readily accommodates basic observations that elude explanation by other theoretical perspectives such as constructivism" (Geary 2002:340).

Educational principles from an evolutionary perspective

Geary (2002) points out that EEP is the study of the relationship between evolved systems of folk or common knowledge and "inferential and attributional biases" as these relate to academic learning in today's society. He also claims that the principles of natural and sexual selection are increasingly being used to guide theoretical and empirical work both in the behavioural and social sciences. Nearly all of this research, according to Geary, has focused on social behaviour and cognitive mechanisms that are thought to be features of our behaviour, which are evident in all cultures, a classic example being language (p. 317).

But this search for universal adaptations has generated both controversy and substantive theoretical and empirical advances, whilst at the same time drawing attention away from an equally important issue – the relationship between evolved social and cognitive biases and the expression and acquisition of culturally specific behaviours and cognitions (Finn in Geary 2002:317-8). What is of particular relevance to our modern society claims Geary, is ***the relationship between evolved social and cognitive biases and a learner's motivation and ability to learn*** (emphasis mine)(p. 318).

Premises and principles of EEP

EEP claims that natural selection has resulted in us having an evolved motivational disposition that attempts to gain access to and control of the resources that have "covaried" with our survival and reproductive outcomes during the evolution of our species. Geary claims that these resources fall into three broad categories – social, biological and physical. He also claims that our cognitive systems have also evolved to process information in these domains and to "guide control related behavioural strategies". This combination of cognitive, inferential and attributional systems defines that which we refer to as "common sense knowledge of psychology, biology and physics". As a result of this, EEP claims that ***people are biologically biased to engage in activities that recreate the ecologies of human evolution*** (emphasis mine). The accompanying experiences interact with inherent

cognitive systems, which define our common sense knowledge of psychology, biology and physics and flesh out these systems so that they are adapted to our local ecology (p. 328).

Thus, according to Geary, the EEP principles that have been developed as a result of these basic premises are as follows:

1. Scientific, technological and intellectual advances emerged from the above mentioned premises which resulted in gaps between the common sense or folk knowledge and the theories and knowledge bases of the associated sciences and disciplines.

2. Centres for learning are likely to emerge in societies in which scientific and technological advances create gaps between common sense knowledge and the competencies needed for successful living (e.g., employment) in the society. ***The function of these learning centres will be to organise the activities of learners so that they acquire the competencies that close the gap between common sense knowledge and the occupational and social demands of the society***. These academic competencies EEP refer to as **"*biologically secondary abilities*"** and are built from the primary (i.e., evolved) cognitive systems that comprise common sense knowledge, as well as other evolved domains such as number.

3. Learners are innately curious about and motivated to actively engage and explore social relationships and the environment, biases that are directed towards information and activities associated with common sense knowledge. ***But the motivation to engage in activities that will develop common knowledge will often conflict with the need to engage in activities that will lead to the mastery of academic competencies.***

4. The inherent cognitive systems and learner initiated activities that foster the development of primary abilities, such as language, will not be sufficient for the acquisition of secondary abilities such as reading and writing. It is therefore predicted that ***the need for instruction will be a direct function of the remoteness of the secondary ability to the supporting primary systems*** (all emphasis mine)(p. 328).

Practical implications

For many constructivists, as I have already mentioned above, intrinsic motivation is always possible and they downplay the importance of acquiring a knowledge base. Iran-Nejad for example calls for classroom activities that "permit multiple sources of control to interact with the ***natural*** (emphasis mine) learning process that creates knowledge" (Iran-Nejad in Genovese 2003:133). Whilst Pulaski asserts that "the ability and eagerness to learn is our greatest educational resource (Pulaski 1971:205), and Senge who expresses this issue even more strongly – "not only because it is our nature to learn but we love to learn" (Senge 1994:4). These views are in sharp contrast to the supporters of an evolutionary perspective. Pinker for example believes that:

> Education is neither writing on a blank slate nor allowing the learner's nobility to come into flower. Rather, education is a technology that tries to make up for what the human mind is innately bad at. Learners don't have to go to school to learn to walk, talk, recognise objects, or to remember the personalities of their friends, even though these tasks are much harder than reading, adding or remembering dates in history. They do have to go to learn written language, arithmetic and science because these bodies of knowledge and skill were invented too recently for any species-wide knack for them to have evolved (Pinker 2002:222).

Genovese (2003) points out that if this evolutionary perspective is correct then we would expect that as learners move through their compulsory schooling and from a curriculum centred on concrete operational/biologically primary abilities to one centred on formal operational/biologically secondary abilities that student motivation would shift from intrinsic to extrinsic. This according to Genovese is exactly the pattern that we find. He cites Steinberg as claiming "we know that early on children are highly intrinsically motivated and naturally curious, and they need little in the way of extrinsic rewards to motivate them to participate energetically in classroom activities" (Steinberg in Genovese 2003:134).

But Steinberg also notes that regardless of what parents and teachers wish, intrinsic motivation plays a relatively small role in motivating student performance in

adolescence and beyond. In a survey that Steinberg conducted, he points out that the most common reason given by students for trying hard was not a genuine interest in the material but getting good grades in order to get into college (Steinberg in Genovese 2003:134).

Genovese however does concede that constructivist theorists have contributed many useful ideas to make instruction more interesting and meaningful. Nevertheless since they fail to distinguish between ***biologically primary abilities*** and ***biologically secondary abilities*** they do not recognise that there are situations where these techniques may fall short. He criticises the fact that constructivists have erred in accepting an inadequate understanding of how cognitive skills develop and that they have made the mistake of elevating a delimited set of instructional techniques into an overarching philosophy of teaching. On the other hand, a pedagogy informed by evolutionary psychology will, Genovese believes, try to root teaching in a modern evolutionary understanding of cognitive development and recognise that much academic learning will continue to be "hard work" requiring serious extrinsic support (p. 134). "A family, peer group, and culture that ascribes high status to school achievement may be needed to give a learner the motive to persevere toward effortful feats of learning whose rewards are apparent only over the long term" (Pinker 2002:223).

This culture advocated by Pinker does not unfortunately appear to be in vogue at present certainly not amongst students. Geary (2002) claims that surveys of learner's attitudes indicate that they value achievement in sports much more than achievement in any academic area. This result he also claims is hardly surprising as learners, especially males, spontaneously organise their social activities around group-level competition, such as team sports. But the motivation for this behaviour has unfortunately got ***little to do with co-operation*** (emphasis mine) as constructivists might suggest but rather, "is a reflection of an **evolved** (emphasis mine) motivational disposition that results in the practice of **group-level warfare"** (p. 339). This non-academic activity, as Geary points out, is in line with EEP's forth principle, which claims that "student's inherent motivational and activity biases will often conflict with the goals of academic learning" (p. 334).

Geary also emphasises that the instructional implications are especially important in societies such as ours where near-universal education is a major

objective. Firstly as both he and Pinker suggest, the need to learn many academic competencies must come from the demands of the wider society and not the inherent interests of the learner. A second implication and one that seems significantly contrary to radical constructivism in particular, is that learning and instructional activities must, to some degree, be responsible for organising the behaviour of learners so that they engage in activities that they would otherwise not engage in.

In essence, ***instructional materials, lesson plans and teachers/lecturers/facilitators must organise and guide the learner's academic development since it cannot be assumed that student's "natural curiosity" will result in an interest in all academic domains or the motivation needed to engage in the activities that will foster the mastery of these domains*** (emphasis mine) (Geary 2002:334).

And so the question is not should we; but how should we?

There seems little doubt that a social perspective is considered indispensable in current learning theory and not just by the two most popular constructivist theories – cognitive and social constructivism – but by their critics as well. The cognitive theorists submit that instructional methods that employ case studies, debates, group summarising and team teaching using heterogeneous groups are appropriate methods of instruction. They further support any interaction with peers of different ability levels and backgrounds claiming that these environments often create conflict, which provides opportunities for learning.

On the other hand their social constructivist opponents emphasise generative/active learning environments rather than passive ones where discussion is equally of prime importance. Small group discussions together with brainstorming are two of their most popular examples. The social constructivists also opt for "co-operative learning", which they submit is another method that provides opportunities for generative/active learning to take place.

While constructivists support co-operative environments as providing opportunities for learning, enactivists, as I believe is evident from my discussion on pages 40-41 above, consider it as having a somewhat more important role to play:

> Collective action is not for individual sense-making but as a location for shared meanings and understanding … instead of seeing learning as "coming to know", one envisages the learner and the learned, the knower and the known, the self and the other, as co-evolving and being co-implicated (Davis in Begg 2000:12-13).

However whilst there may seem to be little difference towards the importance of co-operation in creating learning environments between constructivism and enactivism in spite of their ideological differences, this is not the case with EEP. Although EEP also seems to support the concept of socialisation it does so from a perspective of a motivational tool rather than a learning one. Nevertheless the social aspect is once more considered of significance.

But in all of this research, with the possible exception of the enactivist perspective, the emphasis has been on individual learners co-operating with each other to develop their own individual learning abilities within a social context. There has been little reference to groups of learners working together to achieve an objective for the group rather than for each individual within the group. It would appear that the co-operative context is associated with a collection of individuals working independently within a group environment on their own learning and using other members of the group as a resource for that learning. Contexts such as small group discussions, brainstorming, debates, group summarising and even case studies amongst peers and/or together with more knowledgeable others, are environments where the various constructivist learning theories, such as Vygotsky's ZPD, Burner's idea of scaffolding or Collins, Brown and Newman's (1989) concept of cognitive apprenticeship are in theory, able to be practised. The objective in most if not all of these contexts is to help develop individual learning independently of other learners.

But if we are to give any credence to what the EEP theorists have to say then the creation of these types of co-operative learning environments, whilst being enthusiastically received by learners, will merely provide opportunities to develop what Geary refers to as our "biologically primary abilities", since "people are biologically biased to engage in activities that recreate the ecologies of human evolution" (Geary 2002:328). Some of these ecologies are listed by Evans (1999) as; forming alliances and friendships, reading other people's minds, communicating with other people and selecting mates" (of particular relevance to adolescents) (p. 48-49).

But these same contexts will not necessarily provide effective learning environments if they are expected to develop "biologically secondary abilities", which EEP supporters claim need to be acquired in a formal education environment such as the more traditional 'instructivism' mentioned at the beginning of chapter 2: "the motivation to engage in activities that will develop common knowledge will often conflict with the need to engage in activities that will lead to the mastery of academic competencies" (Geary 2002:328).

How then will this play out when the focus of the learning in a social context is not for the benefit of the individual learner directly but rather indirectly as a member of a group, where the learning required of the individual is for the ultimate benefit of the collective?

In evaluating this aspect of learning theory I will investigate how the literature differentiates between a social environment, which encourages each individual learner to 'co-operate' with other learners to develop independently and a social environment where individual learners 'collaborate' to achieve a learning outcome for the group as a whole.

Co-operation or collaboration – a distinction

As pointed out by Southwood and Kuiper (2003) in their paper "A journey towards collaboration", the choice and understanding of the terms that are used to describe the different forms of collective work are all too often not attended to. Since the two key terms co-operation and collaboration can be used differently in various cultures and languages I am also aware that the terms are often used interchangeably. It is therefore important for me to define the way in which I now understand and use these terms in the rest of my research since their distinction is critical. As Southwood and Kuiper point out that whilst there is little doubt that co-operation is necessary for collaboration to occur, not all co-operation is necessarily of a collaborative nature. Thus it is possible to co-operate without collaborating but on the other hand it is not possible for collaboration to occur without co-operation (Southwood and Kuiper 2003:12).

In my research, the term co-operation is used when referring to learning within a social context, such as a group or team, when the purpose is the development of each individual member using the context as a learning tool as

emphasised by constructivist ideology outlined above. In this concept the group benefits through the collective improvement of the group members. All members of the group help one another and are able to work towards a common purpose but in a context where the primary motivations of each group member are not compromised, even unintentionally, at the expense of greater group effectiveness.

This behaviour I submit is widespread and for most of us perfectly normal. It can be witnessed daily in almost all social contexts whether it be sport; the arts and entertainment; business; community service or academia. As Pinker points out in his book "The Blank Slate", human co-operation is rooted in the logic of reciprocity:

> The idea that people are instinctively communal is an important precept of the romantic doctrine of the Noble Savage. It figured in the theories of Engels and Marx that primitive communism was the first social system; in the anarchism of Peter Kropotkin; in the family-of-man utopianism of the 1960's and in the writings of contemporary radical scientists such as Lewontin and Chomsky (Pinker 2002:255).

However the real alternative to "romantic collectivism", according to Pinker, is the recognition that social generosity comes from a complex collection of thoughts and emotions, which he emphasises, gives it a very different psychology from the communal sharing practiced by "social insects, human families and the cults that try to pretend they are families" (Pinker 2002:255),

According to Pinker this suggestion was originally proposed by Trivers who showed that a deceptively simple principle – follow the genes – can explain the logic of each of the major kinds of human relationships. On this premise Trivers argues that a person's desire to benefit the group at the expense of the individual is unlikely among people who are not related as it is open to abuse by "cheaters" who are able to benefit from others without contributing in return (Trivers in Pinker 2002:255).

However, Trivers also showed that a measured reciprocal altruism ***can*** evolve amongst reciprocators who have helped others who have helped them and who shun or punish others who have failed to help them. In this regard Pinker claims that humans are well equipped for the demands of reciprocal altruism. They remember each other as individuals (perhaps with the help of a dedicated region of the brain),

and have an eagle eye and a flypaper memory for cheaters. But the tragedy of reciprocal altruism, as Pinker points out, is that "sacrifices on behalf of non-relatives cannot survive without a web of disagreeable emotions such as anxiety, distrust, guilt, shame and anger" (p. 256). Yet it is these very emotions, as we shall see later in chapter 6, that according to Argyris, are at the root of our Model 1 theories of action.

This view illustrated by Pinker is supported by Jones who refers to this phenomenon quite simply as "the WIIFM" or "what's in it for me factor" (Jones 1996:81).

Collaboration on the other hand, I use to refer to a social context, in which the purpose of the learning that takes place is for the development of the group as a whole. The purpose of individual development is to improve the individual's ability to contribute to improving the greater efficiency of the group. I submit that this type of learning will only come about when the individual group members come to accept and/or believe that ultimately the greater effectiveness of the group/team will be to each individual member's benefit. The most significant difference between my interpretations of the two terms is that whilst the behaviour required for co-operative learning is, as described by Pinker (2002), completely 'natural' to us as a species – collaboration is not. Collaboration involves behaviour, which for most of us needs to be learned. To illustrate this critical distinction between individual and group learning within a social context and some of the issues that this distinction highlights, I should like to recount a personal experience in sport from a high school environment that I hope will emphasises these various issues:

> The year my eldest daughter commenced high school I was asked if I would be prepared as a parent to contribute to the activities of the school by coaching some of the senior girls' "field" hockey. Reluctantly I agreed and was rewarded by being given the schools' third and forth teams to coach. Most of these young women being senior scholars with only one or perhaps two more years of schooling to complete, had accepted the fact that they were unlikely to ever achieve higher honours on the hockey field than their current level. In fact most gave the impression that they had reached their peak and played the game more as a social activity than as a means

of achieving satisfaction by being a member of a highly 'successful' hockey team.

However as a coach and a bit of a perfectionist, not to mention egoist, I had a somewhat different agenda. Although it was a voluntary position and at a very different level to that to which I was familiar; as an educator I was still determined to try and facilitate the most effective team environment possible.

After our first practice game, which I used to familiarise myself with the girls various skills, namely – individual hockey skills; knowledge of the rules of the game of hockey and last but by no means least, their team collaboration skills – I realised that if they were to develop as an effective hockey team a lot of work was necessary.

I think the girls realised how serious I was about the game and my coaching assignment when I told them that no matter what the weather was like – rain, hail or snow – there would be hockey practice. Their standard up to that point was a fair weather one.

My approach to coaching the teams was to concentrate on three aspects of training. Basic skills for individuals; the rules of the game; and the development of team skills, which were at that stage almost non-existent. I soon realised that the main reason for this were the 'traditional' methods of coaching adopted by the school. These I had witnessed whilst watching the first and second teams who were coached by the school's HOD; a position the incumbent at the time had held for many years. There was little doubt in my mind that team selection was based almost entirely on a girl's individual abilities with little or no regard for her team contribution skills.

In the game of field hockey, as is the case in many similar types of sport, there is a belief that the ball can usually travel a lot faster than the players can run with the ball. So the adage is – let the ball do the work. Most players, when asked, are quick to support this adage but

when one observes their behaviour on the playing field one could be forgiven for thinking that they had never heard of it!

However my own experience had been that the more a team practiced this adage the more effective the team would be. But to carry out this concept, individual players ***basic skills*** – pushing the ball; hitting the ball; stopping the ball and passing the ball to a fellow player accurately – needed to be in place and the better these basic skills are, the better chance one has of being a more effective team member. The first part of our training sessions therefore, was always devoted to developing these basic skills.

The second part of training was devoted to developing knowledge of the rules of the game and finally, of paramount importance, the development of team participation/collaboration skills.

At this point I can honestly say that improving basic skills and knowledge of the rules of the game, although hard work presented little problem. But developing team collaboration skills was a whole new story.

At first I tried just "telling" the girls what to do. For example I would say – "Don't run with the ball. Stop and pass it". But no matter how many times I said it, it just didn't make a difference. These girls had been playing this game for at least five years and they were skilled at the way they played it even if the way they played was not skilful! They had learnt the game and the rules according to the more traditionally accepted practice as demonstrated by the first team coach. So what was I to do? Their seemed to be only one option – change the rules. Make it illegal to play the game the way they were skilled at playing it.

If I wanted these young women to use the ball and not to run with it I chose the rules of another sport of which most them were familiar – netball. In netball it is illegal to move when you have the ball and it is also illegal for you to tackle the person with the ball. One tries to prevent the distribution of the ball by blocking the player and

encourage distribution by moving into empty space where you are able to receive the ball. Funnily enough similar ideology espoused in hockey but oh so rarely practiced. Hence, we started playing hockey according to 'netball rules'.

It took a few weeks and a lot of whistle blowing and "free hits" but eventually their previously entrenched behaviour changed and a team started to emerge. When the official season started the team's success was on a small scale but as confidence grew in their new-found team collaboration skills, the level of the team's success became enormous. So much so that in a challenge match between the third team and the school's first team, the third team won! But in spite of this not one 'third team' member was considered for promotion or selected for representative hockey since there were no 'third team' players with outstanding individual skills just a highly efficient team that broke every hockey record for the season.

With this relatively simple example of the distinction within learning theory let us now take a closer look at what the literature has to say about learning that is for the ultimate benefit of a group, team or any other form of an organised social environment.

Chapter 4: On organisational learning

The work that has been done on group or organisational learning as it is most commonly referred to in the literature, can be divided, according to Argyris (1999), into two main categories: the practice orientated, prescriptive literature of "the learning organisation" and the predominantly sceptical literature of "organisational learning" produced by academics. Although they differ in certain respects they do come together over key issues such as what makes organisational learning "desirable" or "productive"; the nature of the threats to productive organisational learning and their attitudes as to whether and how such threats may be overcome (Argyris 1999:1).

But before investigating these issues in more detail I should like to look at how the literature describes the most commonly referred to entities that comprise organisational learning. We start with arguably the most frequently used term when referring to collective environments – teams.

Teams – "a practice in group level warfare" (Geary 2002)

As mentioned earlier, Geary (2002) suggests that young people, especially males, spontaneously organise their social activities around group-level competition such as "team" sports. He also submits that this is as a result of an evolved motivational disposition, which results in the practice of group-level warfare (p. 339). I have to admit that having watched a game of international rugby at Cape Town's Newlands Rugby Stadium recently, this "practice" does not seem to be limited to young people.

Watching the rugby after having been involved with my research for several months I found it interesting to observe the behaviour of the various players in respect of learning theory. There appeared to be constant conflict amongst the individual players with regards to them behaving in a way that was beneficial to their team and behaving in a way that would possibly bring personal glory. The team's objective was to score as many points as possible by performing certain procedures, which required each team member to behave in a certain manner in order to complete the procedure to the team's benefit. However it was quite evident that many team members could not resist, on numerous occasions, the opportunity of behaving in a way that if successful would bring credit to them personally. But as I suspected, in most

instances, their attempts at personal glory were not only unsuccessful but were to the detriment of the team.

One view in the literature that defines the concept of "team" as being distinct from other social groups is that of Richard Hackman (2002): "Teams are groups whose task requires them to work together to produce something – a product, service, or decision for which members are collectively responsible and whose acceptability is potentially accessible" (p. 42).

Hackman emphasises the distinctive nature of teams by pointing out that members of groups, who perform their work alongside each other with the only thing they share being a supervisor or facilitator, are not teams but what he refers to as ***co-acting groups***. Although each member has an individual job to do, the job's completion is not dependent on what is done by other members of the group. As a result, a great deal of work today is performed by sets of people who are called teams but who are in fact co-acting groups.

Hackman suggests that the reason for this is that those in control "harbour the hope that they can harvest the widely touted benefits of teamwork while continuing to directly manage the behaviour of individual members". This hope however for Hackman is misplaced; he suggests that if you want the benefits of teamwork, you have to give the team the work. Either design the work for a team or design it for individuals. If done well either strategy, according to Hackman, can yield fine results (p. 42).

This view of Hackman's is elaborated on by Kormanski and Mozenter (1987:255) who also claim that "some work groups technically are not teams". Citing Reilly and Jones they note that there are four essential ingredients that need to be present for team behaviour to exist:

1. The team members must have mutual goals or a reason to work together.
2. Members must perceive a need for an interdependent relationship.
3. Individuals must be committed to the team effort.
4. The group must be accountable to a higher level (Reilly and Jones in Komanski and Mozenter 1987:255).

There is a subtle but nevertheless significant difference between these two views. On the one hand Hackman describes a team as a group that is defined by a common purpose, whereas Komanski and Mozenter are defining a team by certain types of behaviour. If one supports Hackman's view that the criterion for identify a team is collective purpose, then we open the door to a large variety of possible team performances. On the other hand if we accept Komanski and Mozenter's view then we are limiting teams to groups that perform in a particular way.

In defence of Hackman's view, I would suggest that all of us at one time or another have been members of a team where not all of the members behaved according to the criteria suggested by Komanski and Mozenter but we still believed we were part of a team – even if it was a rather poor one.

In support of their argument Komanski and Mozenter cite Karp's example of a sports team as I myself did earlier. The team's reason for working together is defined by the goals and overall purpose of the team. Whilst individual members have specific assignments for which each is independently responsible; each team member must depend on all other members in order to complete their assignments. Lack of commitment to team efforts creates dissension and reduces overall effectiveness. Finally the team is usually operating within a higher structure such as a league (Karp in Komanski and Mozenter 1987:255).

Once again I draw your attention to the sports event at Newlands Rugby ground that I mentioned above and the numerous occasions whereby team members acted in their own interests to the detriment of the team. Nonetheless a team they were, in spite of their reduced effectiveness. This difference of opinion regarding definition is of particular significance when it comes to our next concept – a learning organisation.

Great teams – learning organisations

"Most of us at one time or another have been part of a great team … what we experienced was a learning organisation". So says Peter Senge, widely regarded as the person who popularised the term that is currently used throughout both the popular and academic literature when referring to an effective co-operative learning environment – a learning organisation (Senge 1994:4). What is of significance in Senge's statement is that although the concept of a team is not dependent on size, the

concept of a learning organisation or what is perceived, as a "great team", is most definitely dependent on performance. For example, an organisation that has a common purpose of satisfying the public with whom it deals might well be considered a team, but unless it performs in an exceptional manner it cannot as Senge has determined, be considered a learning organisation. So perhaps Komansky and Mozenter's method for defining teams would be more appropriate in defining effective teams or learning organisations.

The position that Senge adopts, that a learning organisation can be any size; from a basketball team to a university; with its qualification entirely dependent on how it functions, is the position that I have adopted in this research report. That is that the criteria to 'reach for' that are stipulated in the literature to achieve team effectiveness, are the same criteria that define learning organisations, and vice-versa.

Having looked at how the literature on organisational learning defines learning organisations I shall now consider how the literature views the key issues that make organisational learning "desirable" or "productive"; the nature of the threats to productive organisational learning and whether and how such threats may be overcome (Argyris 1999:1).

A culture of transcendent values

In their paper "Communities of Commitment: The Heart of Learning Organizations", Kofman and Senge (1993) claim that developing new organisational capabilities requires deep reflection and testing. It also raises certain questions, which they submit have been at the heart of their work for many years and are the driving force behind a new vision of organisations capable of thriving in a "world of interdependence and change". The sort of organisation they have come to refer to as learning organisations (p. 14).

However, when they talk about a learning organisation they are not describing an external phenomenon but are "taking a stand for a vision"; for creating the type of organisation that they would truly like to work in and which they feel will be able to thrive in our modern world. With this idealistic approach the principles in which they believe learning organisations should be grounded are hardly surprising:

(1) a culture based on transcendent human values of love, wonder, humility and compassion;

(2) a set of practices for generative conversation and coordinated action; and

(3) a capacity to see and work with the flow of life as a system (p. 28).

It would appear that Kofman and Senge are not alone in their thoughts of a 'visionary' approach. Guille and Young cite Easterby and Smith in claiming that the literature has an action orientation and is geared towards creating an ideal type of organisation in which learning is maximised (Easterby and Smith in Guile and Young 1998:2-3). Or as Zuboff cited by Matthews and Candy expresses it – "The truly successful organisation is a learning organisation, and one of its principle purposes is the expansion of knowledge … that comes to reside at the core of what it means to be productive" (Zuboff in Matthews and Candy 1999:49). Matthews and Candy expand on this interpretation using the words of Ford:

> A learning organisation is one where individuals, teams and the organisation itself are continually learning … In a world characterised by multi-dimensional and often multi-directional changes, the long-term survival of enterprises is increasingly dependent on their ability to continually meet old and new customer demands; to learn how to effectively use new technologies; to learn to develop new work organisations; and to learn how to change their balance of skills and knowledge (Ford in Matthews and Candy 1999:59).

Matthews and Candy also claim that it is apparent that conventional views of learning are inconsistent with the development of learning organisations, especially those views that consider learners as isolated individuals without a social context. Accordingly they propose six principles of a humanistic/socialistic nature, which they claim need to be ***practiced*** (emphasis mine):

1. Individuals must be thought of and treated as purposeful beings.
2. It is important to see individuals within their social context.
3. It is important to acknowledge and accept that learning takes place within communities of practice, through sharing knowledge and through conversation (a very social constructivist point of view).
4. There is merit in viewing organisations almost as living entities.

5. It is vital to see our knowledge society as needing to be grounded in democratic principles which value and invite the contributions and influence of all citizens for the "common good".

6. And finally the inextricable interconnectedness and reciprocal relationships between and among different levels of learning (1999:60-61).

A similar but perhaps slightly more practical definition is given by Garvin (1993) who states that a learning organisation is one that is skilled at creating, acquiring, and transferring knowledge and at modifying its own behaviour to reflect new knowledge and insights. In order to accomplish this, it is necessary for an organisation to be continuously engaged in five main activities, which he lists as follows:

1. Systematic problem solving, which rests heavily on the philosophy of the "quality movement" whose underlying ideas include – relying on the scientific method, rather than guesswork for diagnosing problems; insisting on data rather than assumptions as background for decision making; and using simple statistical tools for organising data and drawing inferences.

2. Experimentation with new approaches, which involves the searching for and testing of new knowledge and unlike problem solving, experimentation is usually motivated by opportunity and expanding horizons, not by current difficulties.

3. Learning from past experience entails organisations reviewing their successes ***and*** failures and recording the lessons learned in a manner that employees find open and accessible.

4. Learning from others since not all learning comes from reflection and self-analysis.

5. Transferring knowledge quickly and efficiently throughout the organisation in order for learning to be more than a local affair (Garvin 1993:78-91).

Garvin does however concede that this is a surprisingly stringent test for it rules out a number of obvious candidates as learning organisations such as many universities, for although they have been effective at creating or acquiring new knowledge they are notably less successful in applying that knowledge to their own activities (Garvin 1993:78-91).

This view is also raised by Freed (2001) when she quotes Marchese as commenting that "an organisation full of learners doesn't add up to a learning organisation" (Marchese in Freed 2001:16). Freed adds that there are many obstacles to colleges and universities undergoing the kind of organisational transformation suggested by people like Garvin and Senge, not least of which is the scepticism among faculty, staff and administrators about the value of doing so. The main reason for this scepticism, according to Freed is how a paradigm that was embraced by commercial organisations as a strategy for staying competitive can be applied in a non-commercial environment in which the mission goes way beyond serving a customer and staying profitable. Freed does however concede that although most people in higher education might see the value of staying competitive, most would agree that it can't be at the expense of the central mission to build knowledge in a variety of fields and improve learning for all students.

Freed also argues that although these concerns of academia are understandable, they grow more out of a lack of understanding about what it really means to be a learning organisation than out of informed evaluation of what the principles of learning organisations have to offer. She admits that she and Klugman discovered in their research that "rather than undermine the mission of higher education, principles of organisational quality and learning can greatly enhance the ability of colleges and universities to fulfil their missions" (Freed 2001:16).

The principles that Freed believes can be attributed to learning organisations, were revealed in their research when they looked at the work of Collins and Porras (2000). According to Freed Collins and Porras discovered "several timeless qualities" that identified exceptional institutions. They are:

- They have core values that form solid foundations that don't change because of fads.

- They are driven by more than making money. Although money is necessary for an organisation's survival it is not their primary objective.
- They focus on continually improving themselves rather than beating the competition.
- They learn from their failures (Collins and Porras in Freed 2001:16-17).

Learning from failure reminds us that there are those in the literature that are wary of the threats to productive organisational learning and whether and how such threats may be overcome (Argyris 1999:1).

Group learning – a category mistake?

Guille and Young, whilst acknowledging that the concept of "the learning organisation" has increasingly been presented to both private and public sectors as a way for companies and other organisations to come to terms with global economic and social changes, it has all too often been presented as a "management tool" for developing the inner cognitive abilities of employees, rather than as an aspect of any social interaction. They point out that this latter view of learning would involve quite different questions being asked about what it means for an organisation to treat learning as its major priority (Guille and Young 1981).

They are also critical of the literature on learning organisations in that it is "notoriously diffuse and lacking systematic conceptualisation" and that there have been few attempts to subject "the vast range of conceptualisations" to any form of analysis or to produce criteria to discriminate between learning organisations and non-learning organisations (p. 2-3).

Guille and Young agree with Argyris in that the concept of learning, in the learning organisation literature, is largely descriptive and prescriptive and is frequently being used to describe the achievement of a desirable end result and to establish a link between generating change and identifying the process and nature of that change (Garvin in Guille and Young 1998:4). As a good example of this, they cite Senge's work in which he argues, that transforming organisations involves leaders building and sharing "mental models" of how a group must develop and

encourage all participants to constantly develop their capacity for learning and innovating, and to adapt their behaviour and understanding to this "mental model" (Senge in Guille and Young 1998:5). They also claim that one of the "great strengths" of Senge's work is its recognition that representation is not exclusively individual and private but is also shared in cultural patterns of thought and action. However they also point out that Senge, albeit unintentionally, has reinforced the idea that learning is an individual process analogous to information processing and therefore not involving changes in social relationships (Guille and Young 1998:5).

Argyris picks up on this aspect of the learning organisational literature when he claims that some writings on "the learning organisation" – like those of Schein, Senge, and the "sociotechnical theorists" – whilst making significant contributions as "guides" to the kinds of organisational structures, processes, and conditions that may function as "enablers" of productive organisational learning, are ***"inattentive to 'the gaps' emphasised in the arguments of the learning sceptics"*** (emphasis mine). Argyris also submits that writers on the 'learning organisation' tend to focus on what he refers to as "first-order" errors and tend to be selectively inattentive to "second-order" errors. Second order errors are due to the organisational designs that make people "systematically unaware" of the behavioural phenomena that underlie the production and reproduction of "first-order" errors. Examples that are cited by Argyris are "defensive routines, mixed messages, taboos on the discussability of key issues, games of control and deception and organisational camouflage":

> ***Reflection on such phenomena and the "theories-in-use" that underlie them is essential, to both the task of explaining the limitations of organisational learning and to the design of interventions that can overcome those limitations*** (emphasis mine)(Argyris 1999:6).

To the writer, it is these very issues that seem to be neglected if not in fact ignored not only in the literature as emphasised by Argyris himself but also in the practice of collective learning. This issue I hope will become more evident from my research.

Guille and Young also emphasise that social and cultural accounts of individual and organisational learning process, although rare in organisational

literature, sometimes do occur. They cite one "celebrated" example as that of Nonaka who argues that knowledge production involves learning to master a "spiral process" whereby tacit knowledge becomes codified and then re-integrated into practices where new kinds of tacit knowledge is developed (Nonaka in Guille and Young 1998:5). This is of course a very Vygotskian and subsequently social contructivist concept, causing Guille and Young to further argue that the problem with individualistic conceptions of learning is they neglect the extent to which learning is "first and foremost" a human activity and therefore about social relations and people participating in different types of community. They cite Lave to emphasise this contention: "Psychological theories of learning, which conceive of learning as a special mental process, ultimately impoverish and misrecognise it". This invariable results in groups blaming individuals for their failure to learn (Lave in Guille and Young 1998:6).

Tacit knowledge and community participation are also issues raised by Matthews and Candy (1999). They believe that the distinction, which is able to be made between individual knowledge consciously held and that which is tacit or implicit is of particular relevance in the study of groups, since there is "social knowledge", which can also be considered as either explicit or tacit. For example, much workplace knowledge Matthews and Candy submit is collective, taken for granted, yet at the same time socially shared:

> Collective knowledge is embedded in social activity in ways that are relatively hidden from, or invisible to, the actors involved. This invisibility often makes it difficult for individuals to talk about and to share consciously what they know. Spender notes that dynamic concepts are not only held collectively but also generated and applied collectively within a pattern of social relationships (Spender in Matthews and Candy 1999:54).

It is these social relationships that are referred to by Lave (1996) as "communities of practice".

Matthews and Candy also point out that much of the process of generating, distributing and applying knowledge, actually occurs in group settings, wherein a group creates knowledge for its members and for itself as a system. They argue that

although learning is viewed as an activity of people within organisations, some authors including Choo (1995), de Geus (1997), Dixon (1992), Hedberg (1981) and Huber (1996) have come to the view that organisations, including teams or groups within organisations, are capable of learning. They do however admit that to embrace such an idea is to some extent an "affront to common sense" since they seem to believe that in the final analysis "only ***people*** can actually learn". They are however unable to leave it at that and add that "there is no denying that groups of people (including organisations) can change … and accordingly it is appropriate to use the term 'learning organisation' to refer to such entities" (Matthews and Candy 1999:54-59).

Matthews and Candy's thoughts are echoed by Argyris:

> When we begin by assuming that individuals are the only proper subjects of learning and that we know what we mean when we say that individuals learn, then we are likely to be puzzled and disturbed by the notion that learning may also be attributed to groups or organisations. Indeed some researchers have argued, as Geoffrey Vickers did, that if the term, "organisational learning", means anything, it means learning on the part of individuals who happen to function in an organisational setting. From this perspective, to say that an organisation learns is to commit what philosopher, Gilbert Ryle, called a "category mistake" (Argyris 1999:7).

Yielding to the phenomenon we refer to as organisational learning

The final comments on the concept of organised collective social environments such as groups, teams, organisations and institutions being capable of learning I have reserved for Argyris. From the literature I have researched I find his views to be the most appropriate as to how I have come to understand this somewhat controversial issue.

Argyris maintains that contemporary researchers in the fields of organisation and group theory seem relatively untroubled by sentences in which "group or organisation" is the subject and "learning" is the predicate. Fiol and Lyles (1985) define learning, whether undertaken by individual or group agents, as "the process of improving actions through better knowledge and understanding" (p. 803). Leavitt and

March (1988) claim that groups learn when they "encode inferences from history into routines that guide behaviour" (p. 319), and Huber (1989) proposes that "an organisation or group has learned if ***any of its components*** have acquired information and have this information available for use, either by other components or by itself", on behalf of the organisation or group (p. 3).

According to Argyris a research tradition, which is becoming increasingly influential in group learning theory (as it appeared to be in individual learning theory), is the work of Campbell (1969) and Nelson and Winter (1982), which draws on the language of evolution, adaptation and natural selection. Researchers in this tradition see organisational or group learning as a process in which whole organisations or their component groups adapt to changing environments by generating and selectively adopting different organisational or group routines. It should be noted that the agents who generate and select internal variations are collective entities variously labelled as teams, departments, etc.

However, Argyris claims that it is of significance, in any of the theories on group or organisational learning, whether the entities defined are taken to be uniquely appropriate, or at least sufficient, for the study of group or organisational adaptation and learning, or whether they are seen as needing to be complemented by a view that reveals how individuals enter into these processes. Many researchers, according to Argyris, particularly those who are sociologically orientated and who see group learning as a "intraorganisational" phenomenon, avoid the difficulties of "bridging the gap" between individual and organisational phenomena, by consistently treating agents and processes of group learning at "a relatively high level of social aggregation" (Argyris 1999:7-8).

In contrast to this, Argyris insists that a theory of group or organisational learning ***must take account*** of the interplay between the actions and interactions of individuals and the actions and interactions of higher-level group or organisational entities. Unless a theory of group learning satisfies these criteria, Argyris believes that it cannot contribute knowledge that is useful to practitioners nor is it able to explain the limitations to group or organisational learning:

> Although the meaning of the term "learning" remains essentially the same as in the individual case, the learning process is fundamentally

> different at the organisational level. A model of organisational learning has to resolve somehow the dilemma of imparting intelligence and learning capabilities to a non-human entity without anthropomorphising it (Kim in Argyris 1999:9).

Argyris also believes that anyone who adopts such a position faces the rather daunting task of explaining how the "fundamentally different" processes can interact to produce the phenomenon that we have come to recognise as group or organisational learning.

For Argyris a key concept to achieve this is that of inquiry:

> the intertwining of thought and action carried out by individuals in interaction with one another on behalf of the organisation to which they belong in ways that change the organisation's theories of action and become embedded in organisational artefacts such as maps, memories, and programmes (Argyris 1999:8).

He further argues that it is possible for individuals to think and act on behalf of a team because teams are political entities in the fundamental sense of the term. This occurs when they are able to meet three constitutional capabilities: to make collective decisions; to delegate authority for action to an individual in the name of the team; and to say who is and who is not a member of the team. Under these circumstances it makes conceptual sense to say that individuals can act on behalf of a group or organisation.

But what is even more important for Argyris, is that it also makes conceptual sense to say that "on behalf of a group or organisation individuals can undertake learning processes that can in turn yield learning outcomes as reflected in group or organisational theories of action and the artefacts that encode them" (Argyris 1999:8-9).

Having gained a much better understanding of current learning theory and of the overall concept of co-operative learning in particular, I shall now investigate, in my next section, issues that I believe are affecting the enthusiasm shown for the concept of co-operative learning by management theorists and educational policy makers alike. I shall also investigate what evidence there is available that might in some way justify this enthusiasm and why two former antagonists – business and

education – seem to have joined forces in support of cognitive sciences' promotion of the concept of co-operative learning.

Chapter 5: Globalisation and the 'New Capitalism' – in support of collective learning

Recent events of historic import

Trying to gain a better understanding for the enthusiasm of business and education for the concept of collective learning, suggested that I look at some of the developments, which have taken place in our global society in the recent past.

My research highlighted events emanating from two distinct sources during the twentieth century. On the one hand there were the new theories emanating from the world of science, which I investigated in chapter 3, some of which are being seen in various circles as providing possible solutions to some of the questions raised by one of the century's most significant events in the world of international politics – the collapse of Soviet style communism.

In 1989 when the Cold War between Western capitalism and the extreme socialist systems of the Soviet Union and its Eastern Block allies came to an end, providing the momentum for a new global system, which we have now come to know as "Globalisation". And on the other hand, we have the ideas that have been emanating from the world of science. New scientific theories such as relativity, chaos, quantum and complexity, all contributing to what is now referred to as "New-age science" or more simply "the New Science" (Wheatley 1992).

Globalisation

In a UN press release at the turn of the 21st century, globalisation was described as 'one of the most talked-about issues of the late twentieth century and the new millennium. The article also states that this phenomenon has attracted more significant global attention than perhaps any other issue in recent memory' (UN press release June 15, 2000).

In their book 'Defining Globalization', Stromquist and Monkman make a similar claim that the concept has entered the consciousness of most people and describes it as a phenomenon, which comprises multiple and drastic change in all areas of social life. They do however emphasise that its meaning varies depending on "the angle" that is adopted when defining it (Stromquist and Monkman 2000:3).

Thomas Friedman (2000) in his book "The Lexus and the olive tree" refers to a full-page advertisement that was placed by Merrill Lynch in major newspapers throughout America in October 1998. The advertisement claimed that the world is ten years old and that it was born when the 'Wall' fell in 1989. The 'coming down' of the Berlin wall marked the end of the slow, fixed and divided Cold War system that had dominated international affairs since 1945 and its replacement by a new, very greased inter-connected system, called globalisation.

Friedman claims that there has been a large body of literature, which has tried to define the post-Cold War world. Each of these works he believes became prominent because they each tried to capture the one big thing, the one central event that would drive international affairs in the post-Cold War period. He has a different argument suggesting that if you want to understand the post-Cold War world, you have to start by understanding that a new international system has succeeded the Cold War system and that new system is globalisation. If we didn't fully understand that in 1989, when the Berlin Wall came down, then surely, as Friedman points out, we understood it a decade later. It was this point that Merrill Lynch wished to drive home, that prompted them to run their ad on October 11 1998 at the height of the global economic crises. The advertisement stressed, "It was no surprise that the world's youngest economy – the global economy – is still finding its bearings". It also emphasised that the intricate checks and balances that stabilise economies are only incorporated with time and that many world markets are only recently freed, governed for the first time by the emotions of the people rather than by the "fists of the state" (Friedman 2000:xvi).

In trying to understand how this relatively recent phenomenon is influencing learning theory I shall start by looking at the phenomenon itself in a little more detail; how various authors describe it and what appears to be its most significant features. I hope that this will help create a platform for understanding the roles of knowledge and learning in this new world or new work order and how this is impacting and might continue to impact on learning institutions and the development of 'learning organisations'.

A variety of views

> Globalisation has been applied to cover debates centring on convergence/divergence, homogenisation/heterogenisation, and local/global issues. Despite its ability to capture, in its unfolding changes, the involvement of the entire world in one way or another, globalisation remains an inexact term for the strong, and perhaps irreversible, changes in the economy, labour force, technologies, communication, cultural patterns, and political alliances that it is imposing on every nation. (Stromquist and Monkman 2000:3).

However as might be expected, despite Stromquist and Monkman's words there are still some observers who are quick to argue that external forces have always impacted on the world's nations but as Stromquist and Monkman point out, most people recognise that the degree on interconnectedness and speed brought about by current technologies, economic actors, and economic production, vastly surpasses such previous exchanges on this planet (p. 3). This view is supported by Friedman who emphasises that whilst the Cold War system was characterised by one overarching feature – division; globalisation's overarching feature tends to be – integration:

> The world was divided up and both your threats and your opportunities tended to grow out of – from whom you were divided … The world today has become an increasingly interwoven place with your threats and opportunities being derived from – to whom you are connected (Friedman 2000:8).

Gibson-Graham presents a similar opinion whilst restricting it to a purely economic environment:

> A set of processes by which the world is rapidly being integrated into one economic space via increased international trade, the internationalisation of production and financial markets, and the internationalisation of a commodity culture by an increasingly networked global telecommunications system (Gibson-Graham in Stromquist and Monkman 2000:4).

Or as Friedman quips – "During the Cold War we reached for the 'Hotline' whereas now we go 'On-line'" (Friedman 2000:8).

Gonzalez Casanova on the other hand, sees the term globalisation as hiding the effects of economic policies, which he submits, are creating major social problems in many of the developing countries. This opinion is supported by Amin, who claims that not only does globalisation effect trade, productive systems, technology and financial markets, but many other aspects of social life. So far, because there are people outside the modern economy, globalisation has not affected the lives of every person in every country, but it appears that ultimately, all groups will be brought into conformity with the structure and goods of the globalised society (Casanova and Amin in Stromquist and Monkman 2000:4).

Another supporter of the economic dimension is Harris. He submits that the economic dimension is the centrifugal force of globalisation, a force sufficiently powerful that other dimensions of globalisation are subsidiary. (Harris in Walters 2000:198). Walters also cites Giddens in a slightly different approach to the subject – "Globalisation is really about the transformation of space and time. It diminishes space and time dimensions of physical geography, thereby permitting, encouraging, and sometimes requiring new kinds of human interaction." (Giddens in Walters 2000:199). Castells describes these new kinds of human interaction as global, informational and based on networks (Castells 2000:2).

Walters (2000) herself has her own definite views on the matter. Globalisation she feels is shorthand for describing a global capitalist economy. It reflects processes in which social relations, are not only linked at the economic level, but also permeate the political, social, cultural, and environmental spheres that impact on everyday life. However she introduces a totally new element into the understanding of the term by claiming that there is an argument from "people on the left", which describes at least two perspectives of globalisation. One is a "competitive globalisation" and the other "co-operative globalisation". Walters argues that any debate on globalisation cannot be separated from a debate on development and that in this context competitive globalisation is about the accumulation of capital and has a top-down approach. Co-operative globalisation on the other hand, has the accumulation of human capacities as its objective and has a bottom-up approach to development, which is shaped by the basic needs of the planet's inhabitants. (Walters 2000:197-199).

Friedman (2000) echoes Walters' thoughts on the dualism of the phenomenon suggesting that – "What is new is the system; what is old is power politics, chaos, clashing civilisations and liberalism. And what is the drama of the post-Cold War world is the interaction between this new system and all these old passions and aspirations. It is a complex drama, with the final act still to be written" (p. xxi).

Friedman also supports Walters in her assessment of a "global capitalist economy". Globalisation he emphasises is not just some economic fad or a passing trend, it is an international system – the dominant international system that has replaced the Cold War system with its own rules and logic that directly or indirectly influences the politics, environment, geopolitics of virtually every country in the world and whose driving force is free-market capitalism (p. ix).

Someone else who supports this view is Castells. In his 1999 paper "The social implications of information and communications technologies", Castells claims that we are certainly living in a capitalist economy. Indeed he believes that for the first time in human history, the entire planet is working along the lines of a capitalist economic system. However for Castells it is a new brand of capitalism, it is global, it is informational and it is based on business networks (Castells 1999:7).

Irrespective of the variety, it seems clear that the driving force behind globalisation is American style free-market capitalism, which for Friedman simply means that the more you let market forces rule and the more you open your economy to free trade and competition, the more efficient and flourishing your economy will be. He also claims that the centrally planned, non-democratic alternatives – communism, socialism and fascism were tested out on the world stage from 1917 to 1989, and for Friedman, there is only one thing to say about these alternatives – they didn't work. So when it comes to the question of which system today is the most effective at generating rising living standards, the historical debate is over. The answer is free-market capitalism. Other systems may be able to distribute and divide income more efficiently and equitably, but none can generate income to distribute as efficiently as free-market capitalism. Today, as Friedman emphasises, there is only free-market vanilla and North Korea. You can adjust your society to it by going faster or slower. But if you want higher standards of living in a world without walls, the free market is the only ideological alternative left. "One road, different speeds, but one road" (Friedman 2000:104).

Friedman further emphasises that when your country recognises this fact and recognises the rules of the free market in today's global economy and decides to abide by them then it puts on what he describes as the "Golden Straightjacket" (p. 104).

To fit into the Golden Straightjacket a country must either adopt or be seen to be moving toward, the following golden rules:

- making the private sector the primary engine of economic growth
- maintaining a low rate of inflation and price stability
- shrinking the size of its state bureaucracy
- increasing exports
- privatising state-owned industries and utilities
- deregulating capital markets
- making its currency convertible
- opening its industries, stock and bond markets to direct foreign ownership and investment
- deregulating its economy to promoting as much domestic competition as possible
- eliminating government corruption, subsidies and kickbacks as much as possible
- opening its banking and telecommunications systems to private ownership and competition and allowing its citizens to choose from an array of competing pension options and foreign-run pension and mutual funds.

When you stitch all of these pieces together you have the "Golden Straightjacket" and for Friedman the "Golden Straightjacket" is pretty much a "one size fits all" (p. 105).

Today's global market system, the Fast World and the Golden Straightjacket were produced by large historical forces that have fundamentally reshaped how we communicate, how we invest and how we see the world. If a country chooses to resist these changes then that is that country's choice. But if a country thinks that it can resist these changes without paying an increasingly steep price, without building an

increasingly high wall and without falling behind increasingly fast, then as Friedman points out, "they are deluding themselves" (p. 109).

I believe that this ideology is not only being applied rigorously to products and services but to all factors included in the production process, and this includes human beings. It is this aspect of globalisation that is producing a powerful backlash to the system from the people who are brutalised or left behind. Walter's (2000) argument, regarding 'competitive globalisation' and 'co-operative globalisation', as discussed above, is certainly one to consider in respect of this critical issue.

Since the onset of globalisation, different countries and communities have seesawed between being attracted to the system's benefits and repelled by its negatives. Up until now, in the ebb and flow between globalisation and the backlash against it globalisation has consistently come out on top in every major country that has 'plugged' into the system. But according to Friedman it will be our ability to strike a balance between globalisation's inherently empowering and humanising aspects and its inherently disempowering and dehumanising aspects, which will determine whether or not it will be a passing phase or a fundamental revolution in the evolution of human society (Friedman 2000:433).

A New Capitalist order for conceptions of learning

In 1976 Bowles and Gintis attempted to demonstrate the ways in which conceptions of learning were closely involved and interrelated with structures of production. They submitted that specialised learning institutions and their curriculum, structure learning, so as to produce "good workers" who will fill various socially stratified occupations, thereby maintaining class-based inequities and benefiting the means of economic production and profit. They wrote:

> The structure of social relations in education not only inures the student to the discipline of the workplace, but develops the types of personal demeanor, modes of self-presentation, self-image, and social class identifications which are the crucial ingredients of job adequacy. Specifically, the social relationships of education – the relationships between administrators and teachers, teachers and students, and students and students, and students and their work –

> replicate the hierarchical divisions of labour (Bowles and Gintis, 1976:131).

Now more than a quarter of a century later it is worth reflecting on the deliberations of Bowles and Gintis when considering Friedman's view in regard to the question of the alignment between conceptions of learning, globalisation and fitting into the Golden Straightjacket.

Friedman asks the question "Is your country or company harvesting its knowledge"? We have moved from a world where the key to wealth is how you seize, hold and exploit territory to a world where the key to wealth is how your country or company amasses, shares and harvests knowledge. The pursuit of wealth is now largely the pursuit of information and its application to the means of production. In the next few decades the attraction and management of intellectual capital will determine which institutions and nations will survive and prosper, and which will not (Friedman 2000:219-220).

In 1999 a fellow countryman of Friedman's, Castells, Professor of Sociology and Professor of City and Regional Planning at UCLA at Berkeley prepared a paper for UNESCO's World Social Science Report, 1999. The report examined the social implications of globalisation in regard to new information and communication technologies and their interaction with social and economic structures and cultural and political structures (Castells 1999). The report shows the emergence of a new form of social and business organisation based upon networks and tooled by communication technologies. Castells claims that education is the key element in making it possible for societies and individuals to reap the benefits from this new system. However he does emphasise that technology is not the answer. ***Education must be reformed and pedagogy transformed*** to be apt to the task of achieving what is required by the new system. And that is ***providing an education that will produce creative, flexible and autonomous individuals*** (emphasis mine). Globalisation demands that our societies move faster, work smarter and take more risks. In order to achieve these things they need the sort of people that Castells describes.

Castells is by no means alone in this opinion. Much has been written in recent times regarding educational reform and it comes from a pretty broad spectrum of society. It is by no means an opinion that is exclusive to American education. Michael

Barber writing in the New Statesman about the British government's green paper – "Teachers: Meeting the challenge of change" – believes that the goals of education systems in this era of globalisation are broadly shared across the developed world (Barber 2000:1).

Another Englishman who confirms Castells views is Yorke, the director for the Centre for Higher Education Development, Liverpool John Moores University in England. In relating education to the labour market he notes that the pace of change in national and international economies requires education to encourage the development of people who can act effectively in turbulent circumstances (Yorke 1999:16). The British view is however slightly different to that of Castells in that Yorke uses Reich's four fundamental competencies which include collaboration – communication and team-working skills – as a fundamental.

Barber (2000) gives the British government's view on the subject in their determination to achieve a world-class education system for all British children. Barber records that every pupil should become literate, numerate, well informed, confident, capable of learning throughout life and able to play an active part in the workforce and the community. The government is also determined that all pupils should have the opportunity to become, in line with what Castells says, creative, innovative and capable of leadership. For this they will need education for a world of rapid change in which both flexible attitudes and enduring values have a part to play (p. 1).

Similar attitudes amongst policy makers here in South Africa seem to add weight to Barber's view, as mentioned above, that the goals of education systems in this era of globalisation are shared across the developed world. According to Moore (2003), education in South Africa has been subject to a series of policy initiatives, which seek to reconstruct the field in various ways. There are two broad imperatives: a response to global developments and the changing role of higher education internationally, and a local concern for economic development, social reconstruction and development. Moore also points out that education is seen as a means of helping to integrate South Africa into the global economy on the one hand and as a vehicle for correcting the social and economic imbalances from apartheid on the other. It should also be noted, according to Moore, that these new policies imply an impetus for change from traditional individualistic approaches to curriculum design, delivery and

management to more concerted and co-ordinated practices, in other words towards more ***co-operative learning practices*** (emphasis mine)(Moore 2002:124).

Breier (1998) cites the "Programme for the Transformation of Higher Education" produced by the South African Department of Education in 1997, which lists as one of the major national goals of higher education the production of graduates with certain skills and competencies including "critical, analytical, problem-solving and communication skills as well as the ability to deal with change and diversity" (p. 76). The country's Minister of Education at the time Kadar Asmal in the Revised National Curriculum Statement (RNCS) submits that this approach is in line with "our idea of ourselves as a society and our vision as to how we see the new form of society being realised through our children and learners" (RNCS 2002:1).

Considering the views expressed above, it is hardly surprising that there are educators who claim as Stromquist and Monkman (2000) do, that education reform is being argued only in terms of ***preparing students for the workplace***, or as it is more usually termed in South Africa – ***developing human resources*** (emphasis mine), which will render curriculum an additional form of contemporary cultural production through which the concept of new capitalism is expressed (p. 12).

These same educators also submit that the criteria employed in companies for efficiency and productivity are being extended to schooling, and the focus has shifted from learner-centred curriculum to economy-centred vocational training, a trend which Walters argues is already evident in leading nations such as Japan, the United States, the UK, Germany and Scandinavian countries and also in important new players such as China and Russia (Walters 2000:200-202).

Perhaps, because of this situation, people such as David Holcberg (2002) hold the view that government should not be in the education business. As a political institution and not an educational one, its function is ***to protect people's rights to pursue an education not to provide them with one***.

Muller would seem to support this line of thinking, suggesting that the global economy and a rise of neo-liberal consensus demands not only a new relevance from educational provision but also a new accountability on the part of educators to globalisation's new public good – innovation. What skills are relevant to competitive

advantage and what skills are required for economic innovation is according to Muller, the insistent refrain for the focus of education (Muller 2000:41).

Edwards (1997) also joins this debate by suggesting that there has been a shift in public policy from conceiving learning as part of the social domain, to constructing it more specifically as an aspect of the economy. But claims Edwards; this 'shift' is not just about conception. What is more significant is that it is about responsibility:

> Nation states are losing effective and exclusive 'control' of their economies and cultures, and their ability to use this control politically for the fulfilment of collective goals of social betterment. This redrawing of relations between the state and civil society has been marked by a shift towards the market rather than the state as responsible for the provision of learning opportunities (Edwards 1997:89-93).

Stromquist and Monkman do however point out that most discussions about the state under globalisation are typified by very divergent views. Some they agree support Edwards' view that the state is rendered powerless and obsolete as the market economy progressively fulfils the state's function; but other observers consider that although new capitalism/globalisation is bringing a change to the role of the state, it will nevertheless remain an important player. Castells for example suggests that – "The State does not disappear. It adapts and transforms itself by building partnerships between nation states, and sharing sovereignty to retain influence." (Castells 1999:10).

But sharing sovereignty with whom? Castells seems convinced that the state in the New World order will be a networked State, made out of a "complex web of power-sharing and negotiated decision making" between international, multi-national, national, regional, local and non-governmental, political institutions (p. 10).

Stromquist and Monkman clarify this view by arguing that the unfolding dynamics of globalisation has brought some new players into the economic and political decision making process, not least of these being the transnational corporations (TNC's) with indisputable roles in the market and politics (Stromquist and Monkman 2000:4-5). According to Stromquist and Monkman, some forty thousand large companies qualify today as transnational corporations (Moghadam in

Stromquist and Monkman 2000:6), and it is estimated that just ***four hundred*** (emphasis mine) of them own two thirds of the planet's fixed assets and control 70% of world trade. These somewhat awesome statistics are indeed supported in other literature; Simmons (1995) for example states that today's free market is largely dominated by a handful of private companies the 100 largest of which control over one third of all foreign investment and 40% of world trade (Simmons 1995:15).

It is therefore not surprising that the emergence of TNC's as major players in the New World order has, as Stromquist and Monkman point out, "implications for education". They suggest, in line with Friedman's views, that the State is now disciplined by international markets and with business and profitability as the main referent, social and public service interests are devalued. At local levels there is an increased presence of business in co-operation with learning institutions, determining what constitutes quality and what is needed (Stromquist and Monkman 2000:6).

Stromquist and Monkman also claim that TNC's are already making broad demands on universities for engagement in research and development. In a situation where universities will be linked more to the market and less to the pursuit of truth, it is likely that the definition and establishment of quality will become the prerogative of managerial rather than academic enterprise (Cowen in Stromquist and Monkman 2000:14).

Whilst in support of these views, Gee et al. (1996) take an even stronger position. In their book "The new work order: behind the language of the new capitalism", they suggest that talk of networks, connections, interconnections and the breakdown of hierarchy is now all-pervasive within society and as such is having a significant impact on current ideas about conceptions of learning and knowledge and educational reform. What they suggest can only be described as an 'unholy alliance' – "Basically our claim is this: … there is a growing alignment between the business world in the new capitalism and various non-business spheres of interest, including schools and academic disciplines promoting educational reform efforts" (Gee et al 1996:49).

Gee and his colleagues believe that distributed systems – with complex interactions, flexible adaptation to the 'outside world', and little top-down control – constitute now and will progressively do so in the future, a grand theme around which

alignments across various domains such as business, science, politics and education can and will emerge (p. 52).

Historically, for them, the discipline of psychology has been largely responsible for developing viewpoints on thinking and learning and then translating these into educational practice. But more recently a new "megadiscipline" has emerged – cognitive science, which is influenced in many ways by the ideas emerging from the 'New Science' that I investigated in chapter 3. These fundamental features, Gee et al. argue, are fast becoming "major motifs" of a new common sense about education (p. 53).

Whilst supporting Bowles and Gintis' (1976) view that specialised learning institutions and their curriculum, structure learning, so as to produce 'good workers', Gee et al emphasise that education has always represented broader issues such as social justice, cultural integrity, citizenship and critique. They also point out that an academic discipline such as cognitive science, which seeks to control curricula and pedagogy in education, has complex issues of its own. These issues they contend partly conflict with the interests of other sectors such as business, churches, government and indeed teachers and learning institutions, "all of which can broadly be seen as competing to educate people and to define what counts as knowledge worth having" (Gee et al. 1996:54).

But let us return to the argument presented by Gee and his colleagues of the 'unholy alliance' between two former antagonists – business and education – and their idea that cognitive science currently influenced by the 'New Science' provides "the glue" for such an alliance.

An "unholy alliance"?

"Whole swaths of academic disciplines are retooling themselves around common themes. All are now intensely concerned with unpredictable properties that emerge out of myriad bits and pieces interacting within complex systems". So say Gee et al. (1996) in their book – "The new work order: behind the language of new capitalism", in which they suggest that old-style systems based on authoritarian hierarchy, which we once thought we wanted in our organisations and institutions, are out. And in are systems with non-authoritarian hierarchy where self-controlled local units can act in fluid, flexible and sometimes ephemeral combinations while being

assisted by a 'top' that cannot directly control them and their actions. It should be noted claims Gee et al, that in new capitalist businesses this 'top' is sometimes the boss/coach, sometimes the consumer and/or the market, and sometimes both. Gee et al refer to such non-authoritarian hierarchies as "distributed systems" in which control is distributed throughout the system and not centred in any entity that monopolises power, knowledge or control (p. 50-51).

A very simple example used by Gee et al to illustrate the sort of intelligence and control that can be found in a distributed system is that of a robot designed to collect beer and cool drink cans in a lab at MIT. The "mobot", as it is referred to, has no central brain but rather intelligence and decision-making capacities are distributed throughout its mechanical body. It simply roams around until its video camera spots the shape of a can. This signal triggers the wheels of the mobot and propels it in front of the can. The arm of the robot is wired to its wheels so that when it sees that the wheels are not moving it must be in front of a can. The arm reaches out and picks up the can. If the can is heavier than an empty can it is left. If it is light then it is collected. The mobot then roams until it comes across the recycling station. Then it stops its wheels in front of the station. The arm looks at its hand to see if it is holding a can; if it is it drops it. If not it begins to wander again until it spots another can. The mobot is interesting because it demonstrates that distributing control over many parts rather than in a central brain can lead to a system that behaves as if it has some centralised intelligence when in fact it doesn't (p. 51-52).

Their contention therefore is that – "Contemporary educationally relevant cognitive science, and many related educational reform efforts, are in the process of aligning themselves more and more with the themes and interests on the new capitalism" (p. 54).

A two-pronged approach

Their argument as to how this is "playing out" is twofold. Firstly in what constitutes knowledge and real understanding and secondly the nature of control, objectives and values in distributed systems whether these are in new classrooms or new workplaces.

Contemporary cognitive science, claim Gee et al, has replaced an earlier critique of learning institutions, based on the disproportionate failure of many lower

socioeconomic and minority students, with a new and somewhat initially startling critique: that "it's not just minorities that fail, but in actual fact all students do" (Bruer and Gardner in Gee et al. 1996:54-55).

They also emphasise that students in traditional learning institutions master only basic, rote, low-level skills at best. While such students may be able to pass tests and carry out basic computations, they really do not understand in any very deep way what they are doing. This opinion is substantiated by Davis et al. (2000) in "Engaging Minds: Learning and Teaching in a Complex World":

> A range of studies has demonstrated, for example, that students are often unable to make use of their classroom based learning in their lives outside of schools. In fact, it seems that many students are not even able to generalise their learning from one course of study to another – or even from one topic to another in the same course (Davis et al. 2000:173).

Gee and his colleagues find it interesting to note that new capitalism offers much the same critique of its traditional workers. These two "symmetrical critiques" they argue are part of the process of alignment between the two projects. But it is over the issue of what constitutes 'real understanding' that they claim that one can best trace current processes of alignment (p. 55).

They cite Gardiner, a leading educational cognitive scientist, as claiming to have diagnosed the problem with today's students. Gardner believes that even though they are able to answer tests correctly their school-based knowledge falls apart in the face of their well-entrenched, but unexamined, "folk theories" when they are moved to a slightly different problem or to a new domain. Gardiner proposes that only experts can avoid this so what learning institutions must do is produce students who learn to think and act like disciplinary experts:

> … the disciplinary expert (or skilled person) [is] an individual of any age who has mastered the concepts and skills of a discipline or domain and can apply such knowledge appropriately in new situations. Included in the ranks of the disciplinary experts are those students who are able to use the knowledge of their physics class or their history class to illuminate new phenomena. Their knowledge is

> not limited to the usual text and test setting, and they are eligible to enter the ranks of those who 'really' understand (Gardner in Gee et al. 1996:55-56).

To Gee and his colleagues, this would suggest that cognitive science has come to believe that there is no such thing as 'good thinking' in general; rather good thinking is tied to deep experience of specific domains and differs from domain to domain. To think well is to have in one's head the same sort of mental representations as a disciplinary expert.

Breier (1998) points out that research carried out by cognitive science on the games of grand master chess players showed that their tactics depended on an enormous knowledge base of important patterns. She also claims that these experiments in chess led to similar studies in a number of areas with parallel findings, which led to a general profile of expertise, which entailed –

(a) a large knowledge base of domain-specific patterns;

(b) rapid recognition of situations where these patterns apply, and

(c) reasoning that moves from such recognition directly toward a solution by working with patterns.

Work in artificial intelligence also showed that "generic programmes were not helpful in complex problem-solving domains whereas programmes designed specifically for those domains scored significant successes" (Breier 1998:79).

However as both Breier and Gee et al point out, cognitive science has progressively shifted its notion more recently away from disciplinary or academic expertise to a broader notion more compatible, according to Gee, with the worldview of the new capitalism. This somewhat cautious return to a more generalist approach to good thinking has rendered the convergence of cognitive science and the new capitalism closer and more overt.

Bereiter and Scardamalia claim that people must become "expert at becoming experts" by developing the ability to work in non-routine ways on ever more demanding problems in whatever domain they are confronted with. They connect their ideas directly with the notion of 'quality' that plays such a prominent role in the new capitalism (Bereiter and Scardamalia in Gee 1996:57).

Gee and his colleagues also believe that the same sort of progression can be seen in the work of Perkins. Perkin's view of intelligence they claim, is almost entirely in business-orientated terms and his view of reflective, strategic intelligence as the goal of education is entirely in keeping with the goals of the new capitalism with its emphasis on efficient problem solving, productivity, innovation, adaptation and non-authoritarian distributed systems (Perkins in Gee et al 1996:58).

But the convergence is certainly not yet finished according to Gee et al. Bereiter they claim has begun to question the mental, internal and individual focus of education. In the new capitalism it is not really important what individuals know on their own, but rather what they can do with others in a ***co-operative*** way (emphasis mine) to effectively add value to the enterprise. As Gee et al point out the emphasis in new capitalism is on distributed systems as demonstrated above, whereby knowledge and productivity should be distributed across 'teams' so that they need not reside inside any one entity that can control the process. In fact if they did reside too heavily inside individuals then those individuals could take their knowledge and sell it to the highest bidder – a real fear according to Gee and his colleagues in the new knowledge-driven capitalism (p. 58-59).

Because of the distributed nature of knowledge in the new capitalism Bereiter distinguishes between 'learning' where the goal is to change and assess individual minds – the traditional goal of education – and knowledge building:

> [Knowledge building's] … objective is not to influence the contents of students' minds but to produce immaterial objects – explanations, theories, solutions, algorithms. Students are expected to learn something in the process, and this may well be evaluated at some time. But the actual work is not directed at improving their minds but toward ***improving the knowledge*** that is being collectively created. The important point is that their focus is outward on the objects themselves and the world they relate to, rather than on their own mental states and social roles. They feel a kinship with scholars and scientists, but it is a kinship based on shared goals, not on similarities of practice (Bereiter in Gee et al 1996:59).

Here we see, according to Gee et al, a movement away from education as reproducing the identities and practices of disciplinary experts, away form education as producing individually 'smart people'. They see rather ***a movement towards people who can work co-operatively in teams*** (emphasis mine) to produce results and add value through distributed knowledge and understanding. Such students are better suited, emphasises Gee et al, to be parts of a "smart mobot"; better suited to be modules in a distributed non-authoritarian system than are traditional students (p. 59).

But Gee and his colleague's point out that non-authoritarian distributed systems run into the problem of what will make teams work in the service of the whole? This question suggests that they do not believe that collaboration is something which students do naturally. Ants in an ant colony behave in the interests of the colony because evolution has programmed them to do so. But what plays the role of evolution, asks Gee et al, in colony-like businesses and classrooms? This collectivist ideology as espoused by Marxism is now, as Pinker (2002:296) points out, almost universally recognised as an experiment that failed. In fact the verdict of the world's leading expert on ants E. O. Wilson is – "Wonderful theory, wrong species" (Wilson in Pinker 2002:296).

Competing solutions

Considering the issues discussed above, Gee and his colleagues suggest that there are two competing answers to this problem. One being "new-style visionary leadership" whilst the other is "the creation of core values", the internalisation of which would ensure that everyone will work in the best interests of the group as a whole. It is perhaps a little hard to understand why Gee and his colleagues consider these answers as competing. One might argue that it requires "visionary leadership" to help establish "core values", which can be internalised within any type of group – "Enlightened business leaders around the globe intuitively understand the importance of timeless core values" (Collins and Porras 2000:xvi).

Both of the answers advocated above involve forms of indirect control, an approach that according to Gee et al can easily take on the tones of manipulation. In fact they stress that this is what they believe to be the core dilemma of the new capitalism: how to control empowered partners in the absence of visible overt top-down authority. They submit that classrooms inspired by cognitive science run into

exactly the same problem. However, cognitive science has a "particularly attractive" solution to the problem and one that just happens to be quite compatible with the new capitalism. In fact they argue that such classrooms may easily become sites at which the new capitalism will seek to solve its dilemma (p. 60).

Communities of practice

To illustrate their claim Gee and his colleagues use as an example a classroom application of cognitive science directed by Brown and Campione. According to Gee et al, Brown and Campione create "learning communities" based on the idea that knowledge does not reside in the minds of individuals but rather "is situated in activities and is distributed" (Brown and Campione in Gee et al 1996:61). Or as Lave expresses it – "stretched over – not divided among – mind, body, activity and culturally organised settings" (Lave 1988:1). This of course is what Gee et al claim to the theme of distributed systems.

Brown and Campione's classrooms, according to Gee et al., use a wide variety of methods to ensure that knowledge and understanding is public, co-operative and distributed. Attempts to clarify problems occur opportunistically using skills such as questioning, summarising and predicting; core components as identified by cognitive science. This they suggest is similar to 'quality circles' used in the new capitalism where teams are made to publicly display and share knowledge for the benefit of the group (p. 61).

Also according to Gee et al., all elements of the classrooms used by Brown and Campione are put in place to "subserve" what they take to be both the crucial concept behind their classrooms and their most important tie to the new capitalism. Namely Vygotsky's (1987) concept of the 'zone of proximal development' which was discussed earlier in chapter 2.

Gee and his colleagues believe that it is this notion, which allows Brown and Campione to offer a solution to "the core dilemma of the new capitalism". Their classrooms are designed so that "learners can mutually appropriate beliefs, skills and practices from the activity in the classroom zone of proximal development" (p. 62).

Although Vygotsky's notion of a zone of proximal development and the focus on social cognition, co-operation and dialogue are often associated with liberal pedagogical theories and explicitly opposed to conservative or traditional ones; Gee

and his colleagues are able to see how they can be used as devices "to manipulate people" into accepting, trusting and committing themselves to the goals and values of the leader (teacher) and the organised social system in which the leader operates.

They also believe that Brown and Campione's classrooms are "a way station" towards a system, in which core values and goals are "seeded" into social practices, activity systems, technologies and flexible roles of the participants, as well as into the vision of non-authoritarian leaders (coaches), to be internalised as part and parcel of one's very participation in the overall system. In fact they specifically point out that the "real source of goals and values" is not the teacher, but the "invisible cognitive scientists who have seeded the whole system with goals, values and 'knowledge structures' to be 'mutually appropriated'" (p. 64).

In the end, what Gee et al claim and what seems of utmost importance; is the way that immersion into a 'community of practice' can allow individuals or 'teams' to internalise values and goals. And that often this is happening without a great deal of negotiation or reflection and without the exercise of very much top-down authority:

> Given the core dilemma of the new capitalism, such notions as 'communities of practice', learning communities, and mutual appropriation of thought, belief, skills and practices from a rich flow of activity in a zone of proximal development are central themes around which cognitive science and the new capitalism will align to their mutual benefit (p. 64-65).

It would appear that this view is rather similar to the claim made by Davis et al., that "a child adopts the prevailing opinions of a social group not by giving into peer pressure but rather by a fluid and non-conscious integration of sensibilities, assumed in much the same way that accents and mannerisms tend to be taken on (or lost)" (Davis et al. 2000:174-175).

A final caution from Gee and his colleagues on the issue of knowledge. They contend that in communities of practice, whether in the classroom or in new-capitalist workplaces, people develop what Nonaka, Konno and Toyama (2001:14) refer to as "tacit" knowledge. This knowledge is not always easily expressed and generally can only be learned through immersion in 'communities of practice'. However, empowered knowledge workers can take their knowledge and sell it to the highest

bidder. The trick of business claims Gee et al is how to capture this knowledge in a way that makes it increasingly accessible to other people in the organisation, whilst retaining it when workers change or leave. They believe that the solution is to distribute the knowledge across people and technology in such a way that no individual has any large part of it but rather that each person functions as part of a "knowledge system" (smart mobot). It is because of this, that Gee and his colleagues maintain the new capitalism will focus more and more on "***sociotechnical practices***", rather than on people:

> The new capitalism makes full contact with sociocultural theories of language, learning, and literacy theories of the sort that in one guise underpin the work of people like Brown and Campione; theories that are very close to our own hearts, as all three of us have worked to help develop them. Both the new capitalism and sociocultural theory alike disown the idea of knowledge and learning as locked into and 'owned' by private minds. They both – for different reasons – argue that knowledge and learning are social and distributed across people and technology – beyond individual minds and bodies. But the connections between the new capitalism and sociocultural theories run deeper yet: ***both of them … advocate educational reform centred on co-operative learning with a stress on communication skills*** (emphasis mine). … As educators we must ensure … that all students come to understand the formation of social identities and the nature of social practices in their full cultural and historical contexts. By so widening the frame we allow our students to understand the complex systems of the new world in a deeper sense than the new capitalism might care to endorse (p. 67).

With these concluding words of Gee and his colleagues I hope that my research will show in the next two chapters what all educators need to know when it comes to the practice of implementing and running organised collective learning environments.

Chapter 6: Team dissatisfaction – explaining the "gaps"

"There can be no happiness if the things we believe in are different from the things we do" (Freya Stark).

In the previous sections of this research report I have tried to gain a better understanding as to the current enthusiasm of both management theorists and educational policy makers alike for co-operative learning. I have looked at current thinking on learning theory as well as investigating what I have considered to be some of the fundamental issues that possibly underlie the present thinking of the bodies mentioned, whilst also considering the argument of a possible "unholy alliance" between two historically opposed camps – business and education.

In spite of all the evidence in support of co-operative learning why is it that much of my experience with groups leaves me feeling "disappointed or frustrated" (Schwarz 2002), and usually in environments where the educational authority professes to be "learner-centred"? Evidently I'm not alone in my frustration – "We have seen roommates stop speaking to one another as a result of project teamwork" (Gundry & Buchko 1996:64).

In this section I believe that my research will provide at least one possible explanation why this could be so. The explanation I present is essentially based on the simple premise as quoted above by Freya Stark; that there can be no happiness; no consillience; no learning; no justice; in fact little of anything positive, which can take place if "the things we believe in are different from the things we do".

In providing this explanation I intend concentrating on the work of Chris Argyris and Donald Schön. Their work on "theories of practice" is, according to Smith (2001), a very significant development that has important implications for educators. However despite this significance it has gone largely unnoticed, according to Smith, in the various fields of education. This is as a result, in part, of rather blinkered reading by professionals and academics within these areas, and also because Argyris and Schön did not address education directly but rather focused on more formally structured institutions and the world of business management (Smith 2001:13).

In the beginning

Robert Putnam a long-time colleague of Chris Argyris has a slightly different slant on Smith's claim:

> In the '70s when Chris moved from Yale to Harvard he had a co-appointment in the Business School and the School of Education, where he was when we worked with him. He thought that if you could change school systems, and therefore educate young people in Model II, you could really change the world. Unfortunately he found the education system impenetrable. It was enormously difficult to get traction with school system administrators and faculty. The business world was much more receptive to him (Putman in Creelman 2003).

It is my contention as I discussed earlier in this report that the majority of the work done by Argyris and Schön although largely focused on corporate "learning organisations"; is nevertheless applicable to groups of any size. This is the premise on which I have based the findings of my research:

> Human beings have 'theories-in-use' that will make it likely that they will inhibit their own and other's double-loop learning. If individuals reflected on their actions correctly (which is unlikely because of their theories-in-use), they would become aware of the counterproductive aspects of their actions. … Human beings are not unaware of the inconsistencies in other's behaviour, but they are programmed to withhold feedback on this lest they be held responsible for upsetting others (Argyris and Schön 1978:27).

Argyris and Schön – issues of significance

Argyris and Schön 's work over the past thirty years has, according to Anderson (1997) and Smith (2001), been concerned with examining conscious and unconscious reasoning processes particularly in relationships between individuals and organised groups to produce more "effective" learning environments. In the opinion of Argyris and Schön (1978) the more efficient an organised group is at learning the more likely it is that they will be able to detect and correct errors, and to see when they will not be able to do so (p. 1).

However, Argyris and Schön have also shown that learning is particularly difficult when the problems faced are seen to be difficult, embarrassing or threatening. This is as a result of the reasoning processes that they suggest are crucial to effective learning namely – causal reasoning, which they describe as "the key to everyday life" and productive reasoning which "subjects its conclusions to continual tests in the world of practice" (p. 2). For Argyris and Schön, making effective use of productive reasoning can become a problem when the advice and actions that are advocated are seen as embarrassing or threatening. Under these circumstances people resort to what they refer to as "defensive reasoning". When defensive reasoning is activated the organisational defences build to protect the defensive reasoning which helps to ensure that little learning will occur that questions the causal reasoning (p. 3):

> I think that it is fair to say that we are intentionally creating a world full of self-reinforcing, anti-learning processes that will overprotect the players so that it will be difficult to detect and correct difficult and embarrassing problems. … Social science should not only describe reality as accurately as possible, it should also pay attention to producing knowledge about virtual worlds that provide liberating alternatives that endow human beings with competencies that reverse and undo these self-fuelling, anti-learning, overprotective processes (p. 3-4).

Smith (2001) suggests that it is out of this work that the ideas regarding "theories of action" can be seen to have grown. These theories are based on the belief that people are designers of their own actions. In the words of Argyris and Schön – "people hold maps in their heads about how to plan and implement their actions and they design action in order to achieve intended consequences and monitor it to learn if their actions are effective". Argyris himself argues that few people are aware that the maps they use to take action are not the theories they explicitly espouse and even fewer people are aware of the maps or theories they do use (Argyris and Argyris and Schön in Anderson 1997:2).

The most significant aspect of what is being suggested is not merely that there is a difference between what people say and do but that there is a theory consistent with what people say and ***a different theory*** consistent with what they do. The distinction therefore is not simply between ***theory and action*** but between ***two***

different "theories of action"(emphasis mine)(Argyris, Putnam & McLain Smith, 1985:82).

Another significant aspect of their work is highlighted by Robinson who suggests that the research in the field of co-operative learning has two quite distinct strands each with its own variations and that the work of Argyris and Schön "straddles both strands" (Robinson 2001:58). Robinson distinguishes between what she terms on the one hand the "descriptive strand" with its roots in social psychology and increasingly, as suggested earlier, in cognitive and neuropsychology; pursuing the sorts of issues that would reveal more about the nature of groups and organisations and organising. On the other hand is what she describes as the "normative strand" of research, which is more commonly referred to as research on the learning organisation and is less concerned with how groups learn than with their capacity to direct their learning in ways that bring them closer to their stated objectives (p. 58).

It seems pretty evident, as Robinson points out, that there should be a close connection between the two strands. However, in practice she claims that there is little scholarly exchange between the two. Conversely whilst Argyris and Schön's commitment to the improvement of practice places them in the "normative" camp, Robinson believes that they have "breached the partition in the field by their methodological commitment to the development of theory that is both rigorous and of high quality" (Robinson 2001:58). A belief, which I hope, is supported by the content of my own research.

Theories of action: theory in use and espoused theory

"A theory of action is first a theory: its most general properties are properties that all theories share, and the most general criteria that apply to it – such as generality, centrality and simplicity – are criteria applied to all theories" (Argyris and Schön 1978:4). The distinction that Argyris and Schön make between the two contrasting theories of action is between those theories that are implicit in what we do as individuals and those ideals or core values in which we claim to believe. The former are described by Argyris and Schön as our "theories-in-use" and they govern our actual behaviour. These tend to be tacit structures and their relationship to action is rather like "the relation of grammar-in-use to speech; they contain assumptions

about self, others and the environment – these assumptions constitute a microcosm of science in everyday life" (Argyris and Schön 1978:30).

On the other hand when someone is challenged as to how they might behave under certain circumstances, the answer they usually give is their "espoused theory" of action. This conveys what a person believes they would do or what they would have other people think they would do, in any given situation. This is the theory of action to which we claim allegiance and which upon request we communicate to others. But the theory that actually governs our actions is our theory-in-use (Argyris and Schön 1978:6-7):

> All theories of human nature are based upon a thesis of rationality or reasonability. Human beings are rational in that they keep their actions in consonant alignment with their beliefs and they co-ordinate their actions and expectations in the light of the best information they have. … There is rationality in the espoused theories and in the theories-in-use but what makes understanding rationality more complex is that the rationality embedded in the theories-in-use is often counter to the rationality embedded in the espoused theories (Argyris and Schön 1978:44).

Anderson (1997) points out that Argyris and Schön believe that these theories of action determine all deliberate human behaviour. But what is critical to this belief is that they also believe that ***all human behaviour*** (emphasis mine) is deliberate. An example from Argyris' own research may serve to clarify the distinction between the two theories of practice:

> When asked about how he would deal with a disagreement with a client, a management consultant responded that he would first state his understanding of the disagreement, then negotiate what kind of data he and the client could agree would resolve it. This represents his espoused theory (or the theory behind what he says), which is of joint control of the problem. A tape recording of the consultant in such a situation however, revealed that he actually advocated his own point of view and dismissed the client's. This indicated his theory-in-use (or the theory behind what he did), which more

> closely approximates his unilateral control of the problem and a rejection of valid information exchange (Argyris 1987:93).

Argyris and Schön claim, as I mentioned earlier, that one reason for insisting what people do is consistent with a theory, is that what people do is not accidental. People design the action they take and are therefore responsible for the design:

> Fundamental to the theories of action that people use are their reasoning processes which are those activities by which we create premises which are assumed, or are proven, to be valid and from which we draw conclusions about how to act. Popper (1969) has suggested that it is these reasoning processes that are at the core of how individuals construe reality (Argyris and Schön 1978:7).

However, although people design the action they use they are often unaware of the design of that action and of its difference from their espoused theory – "We become unaware of the programmes in our heads that keep us unaware" (Argyris 1999:57).

In response to this issue Anderson raises the question that if people are unaware of the theories that drive their action (their theories-in-use), then how can they effectively manage their behaviour (Anderson 1997:3)? In response to Anderson, Smith (2001) suggests that we do so by asking questions of ourselves about the extent to which our behaviour fits our espoused theory and the extent to which our inner feelings become expressed in our actions. In other words, is there congruence between the two?

Argyris' contention is that effectiveness in life results from developing such congruence between our theory-in-use and our espoused theory (Argryis in Anderson 1997:3), which compliments Freya Stark's view on happiness with which I opened this section of my research.

The models and conceptualisations developed by Argyris and Schön are for the purpose of helping people make more informed choices about the action they design and implement. To this end, according to Anderson (1997), they have developed models, which seek to explain the processes, which create and maintain people's theories-in-use.

Models of theories-in-use

The construction Argyris and Schön developed in order to explain theories-in-use is shown in figure 1 (Anderson 1997).

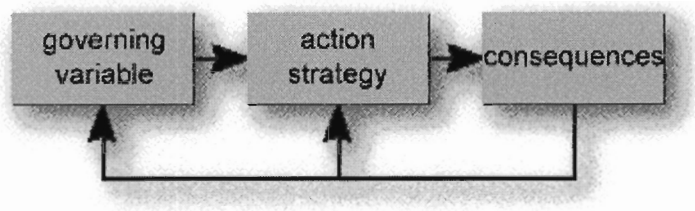


Figure 1. Model explaining the process of developing theories-in use.

Governing variables are values, which a person is trying to keep within some acceptable range. We all have many governing variables and any action we choose is likely to impact on a number of these variables. ***Therefore any situation may necessitate a trade-off between our governing variables*** (emphasis mine).

Action strategies are strategies used to keep our governing values within the acceptable range. These strategies will have consequences, which are both intended and unintended. An example illustrates this point:

> A person may have a governing variable of suppressing conflict, and one of being competent. In any given situation she will design action strategies to keep both these governing variables within acceptable limits. For instance, in a conflict situation she might avoid the discussion of the conflict situation and say as little as possible. This avoidance may (she hopes) suppress the conflict, yet allow her to appear competent because she at least hasn't said anything wrong. This strategy will have various consequences both for her and the others involved. An intended consequence might be that the other parties will eventually give up the discussion, thereby successfully suppressing the conflict. As she has said little, she may feel she has not left herself open to being seen as incompetent. An unintended consequence might be that the she thinks the situation has been left unresolved and therefore likely to recur, and feels dissatisfied (Anderson 1997:4).

To sum up, we can see that there are a number of elements to Argyris and Schön's model, which help explain how we link our thoughts to our actions. These elements are:

Governing variables (or values);

Action strategies;

Intended and unintended consequences for ourselves;

Intended and unintended consequences for others; and

The effectiveness of our action strategy.

These conceptual frameworks have implications for our learning processes. As mentioned previously, the consequences of any action may be intended or unintended. When the consequences of the strategy employed are as the person intends, then there is a match between intention and outcome. Therefore the theory-in-use is confirmed. However, when the consequences are unintended, and more particularly when they are counterproductive to satisfying their governing values, then there is a mismatch. Argyris and Schön suggest two possible responses to such a mismatch. These responses are represented in their concepts of "single and double-loop learning".

Single-loop learning

"Single-loop learning – Whenever an error is detected and corrected without questioning or altering the underlying values (variables) of the system (be it individual, group, intergroup, organisational or interorganisational)" (Argyris and Schön 1978:7).

The first response to a mismatch between intention and outcome is to search for another strategy, which will satisfy the governing variables (Argyris, Putnam & McLain Smith in Anderson 1997:7). For instance in the example that was used above, a new strategy to suppress conflict might be to reprimand the other people involved for wasting time, and suggest they get on with the task at hand. This may suppress the conflict and allow feelings of competence as the fault has now been passed on to the other party for wasting time. In such a case the new action strategy is used in order to satisfy the existing governing variable. The change is in the action only, not

in the governing variable itself. Such a process is an example of ***single-loop learning***. See Figure 2.

Another possible response would be to examine and change the governing variables themselves. For example, the person might choose to critically examine the governing value of suppressing conflict. This may lead to discarding this value and substituting a new value such as being open to inquiry. The associated action strategy might be to discuss the issue openly. Therefore in this case both the governing variable and the action strategy have changed. This would constitute ***double-loop learning*** (Anderson 1997:7). See Figure 2.

Double-loop learning

"Double-loop learning – When questions are asked as to why; or the underlying values of the system are altered" (Argyris and Schön 1978:8).

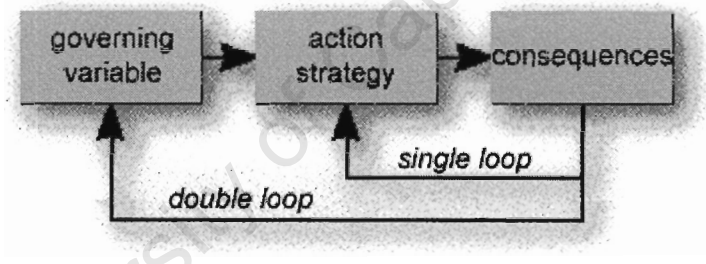


Figure 2. Single and double-loop learning

Anderson suggests that in this sense, single and double-loop learning bear close resemblance to what Watzlawick, Weakland and Fisch call First and Second Order Change. First Order Change exists when the norms of the system remain the same and changes are made within the existing norms. Second Order Change describes a situation where the norms of the system themselves are challenged and changed (Watzlawick, Weakland and Fisch in Anderson 1997:8).

It would appear that both 'First and Second Order Change' and 'Single and Double Loop Learning' are related to how Argyris comments in his criticism of the literature on the learning organisation in that:

> Writers on the learning organisation tend to focus on first-order errors, due to mistaken or incomplete action strategies and assumptions of the sort that practitioners ordinarily detect and try to correct. They tend to be selectively inattentive to second-order errors, which are due to the organisational designs that make people systematically unaware of the behavioural phenomena that underlie the production and reproduction of first-order errors (Argyris 1999:6).

There seems little doubt that Argyris (1999) believes that double-loop learning is the more effective way of making informed decisions about the way we design and implement action; consequently the focus of much of his research has been to explore how groups are able to increase their capacity for double-loop learning. He emphasises that it is double-loop learning, which is necessary if individuals and groups are to make informed decisions in our current "rapidly changing and often uncertain contexts" (Argyris 1974; 1982; 1990):

> The underlying theory, supported by years of empirical research, is that the reasoning processes employed by individuals in organizations inhibit the exchange of relevant information in ways that make double-loop learning difficult – and all but impossible in situations in which much is at stake. This creates a dilemma, as these are the very organizational situations in which double-loop learning is most needed (Edmondson and Moingeon in Smith 2001).

Unfortunately, as Argyris and Schön are quick to point out, ***human beings have theories-in-use that make it likely when working in groups that they will in fact inhibit their own and other members double-loop learning*** (emphasis mine). If individuals reflected on their actions correctly, which they believe is unlikely because of their theories-in-use; they would become aware of the counterproductive aspects of their actions. They further claim that we are not unaware of the inconsistencies in other people's behaviour, but we are programmed to withhold feedback on this in case we are held responsible for upsetting other people (Argyris and Schön 1978:27).

However what would appear to be even more disturbing in Argyris and Schön's research and critical to the whole concept of co-operative learning, is that:

> ***To date all individuals that have entered learning environments that are specifically designed to facilitate double-loop learning and who are aware of their theories-in-use and who have learned about a theory of action that can in fact facilitate double-loop learning and who have chosen to learn according to it and who try to do so under supportive conditions, are unable to do so when left to their own devices*** (emphasis mine) (p. 28).

Model I and Model II

Argyris and Schön have developed two models that describe features of theories-in-use that on the one hand inhibit double-loop learning and on the other enhance it. It should be noted that it is their belief that all people utilise a common theory-in-use in situations, which are either threatening or embarrassing or may become threatening or embarrassing. This theory-in-use they describe as Model I and it can be said to inhibit double-loop learning.

On the other hand Model II is where the governing variables/values associated with theories-in-use enhance double-loop learning. It should be noted that whilst Argyris has demonstrated through his research that there is a large variability in people's espoused theories and action strategies, there is almost no variability in their theories-in-use (Argyris 1999:56).

So the governing values associated with our theories-in-use can be grouped into those, which inhibit double-loop learning (Model I) and those, which enhance it (Model II). Let's now look more closely at these two models.

Model I theories-in-use

Model I, the group that Argyris identifies as inhibiting double-loop learning, has been described as predominantly competitive and defensive (Dick & Dalmau, 1990). As was mentioned above, all individuals in the studies that Argyris has carried out over the years have operated from theories-in-use consistent with Model I and as also emphasised, Model 1 ensures that individuals construct their positions, evaluations, and attributions in ways that will inhibit enquiry by the use of independent logic. The consequences of these Model 1 strategies, Argyris submits, are likely to be "defensive reasoning, misunderstanding, self-fulfilling and self-sealing processes" (Argyris 1999:57).

Argyris also believes that as human beings we learn our theories-in-use early in life and therefore, the actions that our Model I theories-in-use produce are highly skilled. They are also produced without our being conscious of them since any conscious attention might inhibit our producing them effectively. As a consequence of this we have become "unaware of the programmes in our heads that keep us unaware" (p. 57).

It is also important to note that according to Argyris, Putnam and Mc Lain-Smith (1985), most of our social systems are driven by Model I theories-in-use (p. 89). This assumption implies predictions about the kinds of strategies people will employ in a social environment, and about the resulting consequences. These predictions have been tested repeatedly by Argyris and not been unconfirmed (Argyris, 1982:Chap. 3), although neither Anderson (1997) nor Smith (2001), to name but two researchers, are aware of studies by anyone other than Argyris, which have tested these predictions.

The defining characteristics of Model I are summarised in Table 1.

Table 1. Model I theory-in-use characteristics

The governing values of Model I are:

- Achieve the purpose as the actor defines it
- Win, do not lose
- Suppress negative feelings
- Emphasise rationality

Primary strategies used to achieve these governing values are:

- Control environment and task unilaterally
- Protect self and others unilaterally

Usually operationalised by:

- Unillustrated attributions and evaluations, e.g. "You seem unmotivated"
- Advocating courses of action, which discourage inquiry, e.g. "Lets not talk about the past, that's over."

- Treating ones' own views as obviously correct.
- Making covert attributions and evaluations Face-saving moves such as leaving potentially embarrassing facts unstated.

Consequences of these include:

- Defensive relationships
- Low freedom of choice
- Reduced production of valid information and
- Little public testing of ideas (Argyris, Putnam & McLain Smith 1985:89).

Argyris and Schön believe that this Model I world view has the effect of restricting a person to single-loop learning with the result that being unaware of what is driving one's behaviour may seriously inhibit the likelihood of one's increased effectiveness in the long-term (Argyris and Schön in Anderson 1997:9-10). As mentioned previously, the primary action strategy of Model I is unilateral control of the environment and task, and unilateral protection of self and others. This underlying strategy of control over others inhibits communication and is likely to produce defensiveness. Defensiveness is the main mechanism used to protect the individual and Model I theories-in-use inform individuals how to design and use defensive reasoning unilaterally, whether to protect themselves or others (Argyris in Anderson 1997:10). Holmer describes this issue as follows:

> Because defensive routines have their roots in tacit, untested assumptions, psychological defences, and norms of undiscussability, they are insidious in that their dysfunctionality is often unrecognised or is accepted as normal. Defensive routines result in what Argyris calls 'skilled incompetence', in which people used learned skills to produce unintended and undesirable results. … People achieve skilled incompetence when their well-practised and culturally acceptable behaviour cause them to produce the very consequences they intend to avoid (Holmer 2001:591-592).

So in order to protect themselves, individuals must distort reality and such distortion is usually coupled with defensive routines that are designed to keep

themselves and others unaware of their defensive reaction (Argyris in Anderson 1997:10). Furthermore, the more that people expose their thoughts and feelings the more vulnerable they become to the reactions of others. This is particularly true if these others are also programmed with Model I theories-in-use and therefore also seeking to achieve the same objectives.

In summary, Model I has been identified as a group of characteristics which inhibit double-loop learning. It is seen as being predominantly defensive and competitive, and therefore unlikely to allow an honest evaluation of a person's motives and strategies, and less likely to lead to personal growth. Defensiveness protects individuals from discovering embarrassing truths about their incongruent or less-than-perfect behaviour and intentions. It also protects the person by reinforcing conditions such as ambiguity and inconsistency, which further helps to mask a person's incongruence from themselves and others. Becoming aware of this incongruence is difficult, as is doing something about it. According to Argyris this is due to the strength of the socialisation of Model I and the fact that the prevailing culture in most social systems is Model I. An added complication is that anyone trying to inform someone of the incongruence in his or her Model I behaviour is likely to use Model I behaviour to do so, and therefore trigger a defensive reaction (Dick and Dalmau in Anderson 1997:11).

Despite all the evidence, which suggests that peoples' theories-in-use are consistent with Model I, Argyris (1999) has found that most people hold espoused theories, which are inconsistent with Model I. In fact, most people espouse Model II theories, the defining characteristics of which are summarised in Table 2.

Model II theories-in-use

The underlying objectives of Model II are to help people produce valid information, make informed choices and develop an internal commitment to those choices. Embedded in these values, Argyris argues, is the assumption that power – the power for double-loop learning – comes from having reliable information, from being competent, from taking on personal responsibility and from monitoring continually the effectiveness of one's decisions (Argyris 1977:122).

He further emphasises that Model II is not the opposite of Model I. For example, its governing values are not to accomplish a purpose as others see it, or to

give control to everyone, or to de-emphasise the intellectual and emphasise the emotional aspects at the expense of problem solving (p. 122). He also recognises that some significant misunderstandings have arisen in our society because the distinction between Model I and Model II was not taken seriously.

Since Model I over emphasises ideas and rationality, many people in organisational learning go to the other extreme and emphasise the expression of feelings even to the point of suppressing ideas. Not only does Argyris believe that this polarisation is ineffective, he believes it misses the point that "feelings have meanings and meanings are intellectual phenomena". Without focusing on meanings he believes that it's not possible to ascertain whether feelings are valid or productive (p. 122).

Another example Argyris cites of a "misplaced emphasis" is the recent push towards participation by employees in organisations; citizens in communities; and by ***students in educational institutions***. The idea he submits is to give these groups more power in the decision-making process. It was assumed, according to Argyris, that students or employees could enhance the effectiveness of the decision-making process (an assumption that I believe I have been guilty of myself). But this policy, according to Argyris, overlooked the fact that "***such participation would probably increase the number of people with Model I assumptions, which, in turn, would create even more complicated learning systems***" (emphasis mine).

If students and employees had genuinely different views, neither they nor their managers or administrators would deal with them effectively. Argyris claims that we are now coming to realise ***"participation should be related to competence to solve problems effectively; and such competence in turn is related to internal assumptions, not to whether people are superiors or subordinates, male or female, young or old or members of a minority or the majority***" (emphasis mine) (p. 122-123).

I strongly suspect that it is this particular issue that may be at the root of my own frustration and dissatisfaction and possibly the frustration and dissatisfaction of many other students when it comes to working co-operatively in teams. I wonder if Holmer might agree:

> There were five of us comprising our term project team. … We had been given no guidelines or instructions for how to function as a

> team or any process management tools. … After it became clear that one member of our group was not contributing to the group product in a manner acceptable to the rest of us, our "team" quickly degenerated into a frustrating, painful and guilt-ridden exercise in human frailty. … The pedagogical and interpersonal incompetencies that were at work in this scenario persist in the classrooms and workplaces of today (Holmer 2001:590).

For Argyris, a key result of using Model II is the ability to combine the skills of advocacy with those of encouraging enquiry and confrontation of whatever is being advocated and that "embarrassment and threat are not covered up, they are engaged" and the end result should be increased learning effectiveness (Argyris 1977:123).

> Every significant Model II action is evaluated in terms of the degree to which it helps the individuals involved generate valid and useful information (including relevant feelings), solve the problem in a way that it remains solved, and do so without reducing the present level of problem solving effectiveness. (Argyris 1976:21-22)

Model II theory-in-use characteristics

The governing values of Model II include:

- Valid information
- Free and informed choice
- Internal commitment

Strategies include:

- Sharing control
- Participation in design and implementation of action

Operationalised by:

- Attribution and evaluation illustrated with relatively directly observable data
- Surfacing conflicting views
- Encouraging public testing of evaluations

Consequences should include:

- Minimally defensive relationships
- High freedom of choice
- Increased likelihood of double-loop learning (Anderson 1997:12).

Anderson claims that whilst Argyris offers no reason as to why most people espouse Model II, the challenge for him and I hope for many other concerned educators, is to help individuals transform their espoused theories into theories-in-use by learning a new set of skills and a new set of governing values (Anderson 1997:13). Since many individuals espouse Model II values and skills, these traits are not totally new to them. However, as Argyris is quick to point out "the empirical fact to date is that very few individuals can routinely act on their espoused values and skills; yet they are often unaware of this limitation" (Argyris 1999:60).

Regrettably this premise is rarely more evident than when we get together to work in organised groups or teams.

Working effectively in teams – a cognitive enterprise

Argyris and Schön (1978) suggest that each member of a team constructs his or her own image of the theory-in-use of the team as a whole and that the picture they construct is always incomplete. As a result of this, team members are continually working to add information in order to get a better picture of the whole in order to help them get to know their place within the team. In order to emphasise my contention that the work of Argyris and Schön is equally applicable to organised groups of any size I have taken the liberty of substituting the word team in the following extract of their work.

> A team (organization) is like an organism each of whose cells contains a particular, partial, changing image of itself in relation to the whole. And like such an organism, the team's practice stems from those very images. Team is an artefact of individual ways of representing teamwork.
>
> Hence, our inquiry into team learning must concern itself not with static entities called teams, but with an active process of

> teamwork which is, at root, a cognitive enterprise. Individual members are continually engaged in attempting to know the team, and to know themselves in the context of the team. At the same time, their continuing efforts to know and to test their knowledge represent the object of their inquiry. Teamwork is reflexive inquiry....
>
> [Members] require external references. There must be public representations of team theory-in-use to which individuals can refer. This is the function of team maps. These are the shared descriptions of the team, which individuals jointly construct and use to guide their own inquiry....
>
> Team theory-in-use, continually constructed through individual inquiry, is encoded in private images and in public maps. These are the media of team learning (Argyris and Schön 1978:16-17).

Smith (2001) claims that from these writings one can see how Argyris and Schön connect the world of the individual team member with that of the team; their focus being on individual and team interactions and defences rather than on systems and structures. Also, according to Smith, by looking at the way people jointly construct their "maps", it is possible to talk about team learning – the detection and correction of error – and a team's theory-in-use (Smith 2001:10). For as Argyris and Schön point out, for team learning to occur, "'learning agents', discoveries, inventions, and evaluations must be embedded in organizational memory" (Argyris and Schön 1978:19). If it is not encoded in the images that individuals have, and the maps they help construct with others, then "the individual will have learned but the organization (team) will not have done so" (Smith 2001:10).

But as one might suspect the greatest problem with regard to team or group learning is, as Argyris and Schön (1978) emphasise, that members programmed with Model 1 theories-in-use, impose these theories-in-use on any team or group in which they participate (p. 29). In order to differentiate organisational or group theories-in-use from individual theories, Argyris uses the term OI to refer to "organisational

Model I theories-in-use". I shall take another liberty in my research by using the term GI to refer to "group or team Model 1 theories-in-use" (p. 29).

This condition is further aggravated by what Argyris refers to as the change models currently in good currency that are being used by many in the field of organisational and group learning, both in the commercial and public domains:

> For twenty years or more institutional leaders have believed that the key to better performance is better communication and have used a score of communication tools to convey and gather the information needed to bring about change. … What ***is*** news is that these familiar techniques, used correctly, ***will actually inhibit learning and communication*** (emphasis mine)(Argyris 1994:77)

Argyris submits that these models being used have serious "gaps" in them. These he lists as follows:

1. The old model (of organisational learning) assumed that individuals had the skill to learn new behaviour, or at least the skills to learn new skills. It now appears that this is not necessarily the case for double-loop learning.

2. The pervasiveness with which individuals are unaware that they do not have the skills that they may value. This lack of awareness may not simply be due to some void or missing knowledge, but may actually be tacitly designed, largely automatic, and hence, a highly skilled action.

3. The third gap is related to the belief held by many of us dealing with experiential learning that unawareness is primarily related to some form of repression, especially of feelings. This is partially valid but incomplete. It appears that the basis for human beings not being in touch with their feelings or being reluctant to express them, is not simply defensiveness or resistance. Rather, human beings may use reasoning processes that unknowingly distort the necessity to be in touch with and express their feelings. In order to express feelings we must first alter our reasoning processes.

4. A forth gap is the assumption that one can understand the values that individuals have by asking them to express them. If individuals do not

> behave consistently with the values they espouse, then that is usually seen as an error to be corrected. It now appears that a somewhat more complex interpretation is more valid. If such errors are not errors then they must be the consequence of some design. If this is so then there must be some sort of map, schemata, or micro-theory that they use to inform their design. Since this design or theory is different to their espoused theory, a differentiation must be made between espoused values and theory on the one hand and the theory-in-use (Argyris 1999:70-71).

As with individuals, the better groups are at learning the more likely it is that they will be able to detect and correct errors, and to see when they will not be able to do so (Argyris and Schön 1978:1). However Argyris and Schön emphasise that double-loop learning will not occur naturally in groups with a Model 1 theory-in-use of "unilateral control, win-lose competitive dynamics, and a focus on rationality of ideas to the exclusion of rationality of feelings" (p. 28).

An example of this would be a situation where the requirements of the group's Model 1 theories-in-use are contrary to the group's technical requirements. A conflict occurs and the automatic response of the group members is to hide the conflict and play the Model 1 "political games" that the group members have learned in order to "cover themselves". In other words they activate their "defensive routines" (p. 29).

Defensive routines

Culturally ingrained defensive routines that operate below the level of conscious awareness to produce learning and performance barriers such as pretended agreement, unresolved power struggles, social loafing, cultural incompetence, and so on:

> Because defensive routines have their roots in tacit, untested assumptions, psychological defences, and norms of undiscussability, they are insidious in that their dysfunctionality is often unrecognised or is accepted as normal. Defensive routines result in what Argyris calls 'skilled incompetence', in which people used learned skills to produce unintended and undesirable results (Holmer 2001:591).

Defensive routines, Argyris reminds us, discourage reflection in yet another significant way. Since we practice these strategies for most of our lives, we are all highly skilled at carrying them out and since highly skilled actions are automatic we rarely reflect on what we take for granted:

> In studies carried out on more than 6000 people, I have found this kind of defensive theory-in-use to be universal, with no measurable difference by country, age, sex, ethnic identity, education, wealth, power or experience. All over the world, in every kind of business and institution, in every kind of crises and dilemma, the principles of defensive reasoning encourage people to leave their own behaviour unexamined and to avoid any objective test of their premises and conclusions (Argyris 1994:81).

It is this defensive reasoning or group defensive routines as they are referred to in a collective environment; that according to Argyris, inhibit genuine learning taking place within a team. As with our personal master programmes or mental modules; group defensive routines consist of all the policies, practices and actions that prevent people from having to experience embarrassment or threat within a group. At the same time they also prevent them from examining the nature and causes of that embarrassment or threat (p. 81).

Argyris and Schön emphasise that apart from being one of the richest hunting grounds for paradoxes, group defensive routines differ in other important ways from our personal psychological defensive routines. They list these differences as follows:

1. group defensive routines are taught through socialisation;
2. they are taught as strategies to deal with threat or embarrassment;
3. they are supported by the culture of the group; and
4. they exist over time even though the individuals move in and out of the group (Argyris and Schön 1978:41).

A typical example of a group defensive routine is "mixed messages". Mixed messages contain meanings that are, at the same time, ambiguous and clear and

imprecise and precise and Argyris and Schön suggest four rules that are used in designing and implementing such messages:

1. Design a message that is inconsistent.
2. Act as if the message is consistent.
3. Make the inconsistency in the message and the act that there is no inconsistency undiscussable.
4. Make the undiscussability of the undiscussable also undiscussable.

Argyris and Schön believe that group defensive routines can take on a life of their own in that they maintain, reinforce and proliferate themselves causing them to eventually become unmanageable (p. 42). The simple explanation for such paradoxes they claim is found in the governing variables of Model 1 and G-1 theories-in-use which they describe in a little more detail than was given above:

- Human beings seek, in an interaction, to control the relationships in such a way as to attain their intended consequences.
- The theory of control embedded in Model 1 and reinforced by G-1 is one of unilateral control. We gain control by taking it away from others. No one should be able to use the reciprocal of Model 1 theory-in-use and design actions that are consistent with Model 1.
- Acting in ways to control that takes away the control of others triggers the defensive routines of others. These in turn protect the parties involved, and at the same time, blunt the defensive routines or inhibit the attempts of individuals to act effectively. All parties now use defensive routines that escalate error, and create self-fulfilling and self-sealing processes.
- The result of mutually reinforcing defensive routines is to combine wishful thinking with anticipatory face-saving which, in turn, results in systematic distortions. These distortions result in paradoxical consequences because, as we have seen, they result in conditions where individuals (or social entities) are effective and ineffective; they experience success and failure; the consequences are productive and unproductive (p. 44).

With these issues in mind I should like to investigate two of the mistakes that Argyris believes are made when trying to create and implement organised collective learning environments.

Mistakes made in creating learning environments for groups

Argyris himself maintains that most organised social entities in trying to create more effective learning environments make two mistakes. Firstly they define learning too narrowly as mere "problem-solving", so the focus is on identifying and correcting errors in their external environment. Whilst he agrees that solving problems is important he stresses that if learning is to persist, participants in group learning situations should firstly look within themselves. People need to reflect critically on their own behaviour and try to identify ways in which they may be contributing to their group's problems, and then change how they act. In particular he emphasises that "they must learn that the very way they go about defining and solving problems can be a source of problems in its own right" (Argyris 1991:99-100).

The second mistake is the assumption that getting people to learn is largely a matter of motivation and when people have the right attitudes and commitment, learning automatically follows. As a result of this attitude, groups tend to focus on creating new structures that are designed to create motivated and committed group members. But as Argyris points out, effective double-loop learning is not simply a function of how people feel, it is a reflection of how people think – that is, "the cognitive rules or reasoning they use to design and implement their actions" (p. 100).

As a result of this, "defensive reasoning can block learning even when the individual commitment to it is high, just as a computer programme with hidden bugs can produce results exactly the opposite of what its designers had planned" (p. 100). But the good news is that organised groups can learn how to resolve this learning dilemma by making the way group members think about their behaviour a focus of group learning and improvement programmes – "Teaching people how to reason about their behaviour in new and effective ways breaks down the defences that block learning" (p. 100).

Despite its strength, Argyris and Schön believe that organised groups can break out of this viscous circle of defensive reasoning. People, in their opinion, genuinely strive to produce what they intend. They value acting competently and their

self-esteem is intimately tied to behaving consistently and performing effectively. They also believe that groups can use these ***universal human tendencies*** (emphasis mine) to teach group members how to reason in a new way – in effect, to change the master programmes in their heads and thus reshape their behaviour (Argyris and Schön 1978:94).

However, having said that, Argyris himself admits that in his experience changing how we behave is just about as difficult as learning how to play the piano or the game of tennis reasonably well. It is this aspect which I shall now investigate – what needs to be done in practice in order to maximise the likelihood of effective learning environments being created when we decide to promote "collaborative learning through teams"?

Chapter 7: Learning to collaborate in co-operative learning environments such as student project teams (SPT)

Although the concept of collaboration, as I have identified it, is highly acceptable from a social perspective and highly desirable in the "new-age" global workplace; it would seem from my research that the practical implementation of the concept, particularly in circumstances that involve second-order errors and double-loop learning, is much more problematic than given cognisance by policy makers and management theorists alike:

> Over the years we've discovered that giving everyone brief training, even when it starts at the top, is not a good approach. People do the workshops, find the tools (for working collaboratively) easy to understand, and assume that good intentions are all it takes to use them. But they look around and see that others that have had the same programme still get frustrated and in the heat of the moment make the same imperious, unilateral moves that they have learned to hate. Then they say, "See, the stuff doesn't work", and it falls into disuse (Putnam in Creelman 2003:3).

My research suggests (as outlined in chapter 2:55-57), that one reason for this is that working collaboratively is not something that comes naturally, instinctively or spontaneously to our human species as does co-operation; collaboration, whilst appearing to contain aspects of co-operation, moves much more towards what Breen refers to as "a collegial and consultative framework" (Breen 2000:100): "Collaboration assumes the development of a model of joint planning, joint implementation and joint evaluation where responsibility and authority for basic policy decision making is shared" (Breen 2000:100).

One condition that now seems abundantly clear to me, is that this distinction, between what Pinker refers to as the logic of reciprocation – co-operation and collaboration, is not always evident in the literature, be it academic or popular. In fact it is not unusual for the terms to be used interchangeably. I however have adopted the position in my research that what the literature refers to as co-operative /collaborative or even collective learning can be divided into two categories. On the one hand are situations where groups are created to develop learning environments, which help to

improve the skills and competencies of the individual members within the group. An example of this would be where group members practice these individual skills and competencies within a competitive environment such as team sports.

In this type of learning environment individuals are rewarded for the competence they show in the performance of their individual skills and the team's performance is deemed to be as a result of the sum of the individual skills of the team's members. There is little recognition for the team's performance but rather for the performance of the team's members. Also in this method of practice, if team members change there will be little difference to team performance provided that the team can acquire the services of an equally individually skilled member. This category I classify as a co-operative learning environment.

Olson suggests that a good example of this co-operative learning environment is "getting an education" in a higher learning institution such as a university, where there is a transfer of information between lecturer and student to the benefit of both (Olson in Breen 2000:96). This co-operative approach would appear to be by far the most prevalent form of group work currently practiced across most fields of endeavour from the business world to academia.

On the other hand is the method of practice where groups are formed with the purpose of developing group learning. From the example I used on page 57 of this research report from my own experience of coaching hockey, this approach can also be achieved using a competitive environment. When this is done the emphasis is not on the development of skills that improve the competence of the individual, but rather on each member learning and developing the skills required to improve the group functioning more effectively as a team. In this environment the team is judged as a unit and not by the abilities of its individual members since the members display collaboration skills as a priority over and above individual skills. Also, in this environment, when a member leaves, the team is significantly affected unless a new member can be found who has the collaboration skills, which fit in with the rest of the team. It is this category to which I reserve the distinction of collaboration.

Recognising current behaviour

One of the most critical issues to being successful in such circumstances is that the team members themselves need to recognise that their present behaviour; the

behaviour with which they are familiar; the behaviour that they know and feel safe with; the behaviour that comes naturally to them: is not the behaviour required to achieve success collaboratively as a team.

In the example of my hockey experience, the learners truly believed that the only way that their teams would improve was for them, as individuals, to become more skilled at playing hockey. But this they were unable to do since most of them believed that they had reached their hockey-playing peak, as individuals. Now to be told by a new, middle-aged, male coach that what they had previously learned was at best only of limited value to them if they wanted to improve as teams was understandably somewhat difficult for them to accept.

But it is these very issues, which my research suggests are the most significant, if one wishes to achieve collaboration. Yet it is these very issues, ***awareness*** and more importantly ***acceptance*** that our current behaviour, motivated by our ingrained Model I theories-in-use, is at best, of only limited value in being more effective at achieving collaboration in any co-operative learning environment. And it is these very issues, which remain so neglected, so understated in the literature, which Argyris (1999) in his review of both "the practice-orientated, prescriptive literature, mainly promulgated by consultants and practitioners; and the predominantly sceptical scholarly literature … produced by academics" (p. 1); highlights as two of the gaps" he discovered "in the models of learning currently held in good currency" (p. 69):

1. The models assume that individuals have the skill to learn new behaviour, or at least the skills to learn new skills. It now appears that this is not necessarily the case for double-loop learning.
2. The pervasiveness with which individuals are unaware that they do not have the skills that they may value. This lack of awareness may not simply be due to some void or missing knowledge, but may actually be tacitly designed, largely automatic, and hence, a highly skilled action (p. 70-71).

It was this discovery that caused Argyris to further comment as to how "authors speak of the importance of double-loop learning but without serious attention to the ***behavioural conditions for its achievement***" (emphasis mine)(Argyris 1999:19). I shall now look at what these behavioural conditions might be.

A paradigm shift needed in the acquisition of new behaviour

Argyris points out that we are already in possession of many of the theoretical tools required by the new behaviour needed for collaboration. They are embedded in our espoused Model II theories of practice as illustrated in chapter 5. But although we may have some understanding of the concept – valid information, free and informed choice, sharing control and participation in design and implementation – how familiar are we with the behaviour that accompanies these theoretical tools? According to Argyris we are not:

> To date all individuals that have entered learning environments that are specifically designed to facilitate double-loop learning and who are aware of their Model 1 theories-in-use and who have learned about a theory of action that can facilitate double-loop learning and who have chosen to learn according to it and who try to do so under supportive conditions, are unable to do so when left to their own devices (Argyris 1999:83).

In spite of the critical nature for the need to "learn" new behaviour to improve practice; the literature prefers to emphasise such abstractions as attitude changes; developing new concepts; and paradigm shifts; but has very little to say on the more practical aspect of teaching new behaviour. Or for that matter exactly what the new behaviour should be or how one should go about acquiring it. This situation it would appear goes beyond the literature.

In his paper "Re-searching teaching: changing paradigms to improve practice", Breen (2000), having explored "the traditionally accepted options available through higher education " has found nothing that he believes meets the teacher's "real needs" in regard to improving practice. He concludes that "the problem for the teacher wanting to improve her own practice is that the theoretical tools (the content) are foregrounded rather than the classroom practice" (the behaviour) (p. 96). Perhaps it is the widespread prevalence of this condition that is the cause of the claim that Davis et al. (2000) make in that "students are often unable to make use of their classroom-based learning in their lives outside of schools" (p. 173). They have failed to acquire the behaviour that needs to accompany the theoretical tools.

Breen proposes a methodology which he refers to as "becoming more experienced" that he has based on Mason's "Discipline of Noticing" (Mason in Breen 2000). This proposed methodology is dependent on participants forming objective "accounts-of" events for consideration by colleagues (fellow teachers). This is done, according to Breen, so that colleagues can give "differing possible interpretations". The ultimate aim of this exercise being to "increase the number of possibilities for a teacher to act in the moment". The teacher therefore becomes more aware of what he or she does in the moment and also more aware of the different possibilities offered by colleagues since choices are limited to his or her experience of life and by allowing others to enter the story, "creates the possibility for different possibilities" (Breen 2000:101).

But Argyris (1993) argues that "the type of data used as the learning vehicle is crucial". In order to get at participants theories-in-use and their defensive reasoning, the narrative must be as directly observable as possible – "Data that are inferences from talk do not activate the theories-in-use. Moreover, generalized stories of what happened are inadequate, in that these do not provide data from which the listeners can make up their own minds as to what was said" (Argyris 1993:8-9).

If we are to accept Argyris' (1999) argument that "everyone seems to create diagnostic frames that contain the same features that they tell everyone else not to use" (p. 80), then generalised stories are inadequate, since all participants' behaviour is motivated by their Model I theories-in-use and all that is likely to be gained from the stories of other colleagues are slightly different strategies that have been used to achieve the same Model I objectives.

Mason (2002), in support of Argyris, emphasises that professional development is about "changing habitual reactions, which were developed in order to cope in certain situations" (p. 1). In other words "***changing practices*** (emphasis mine) by choosing to act differently" (p. 17). There seems little merit in adopting a colleagues Model I behaviour whilst retaining one's own Model I theories-in-use?

Varela, another author to whom Breen refers, makes a similar appeal – "We have failed to pay attention to the extent to which our actions and observations are ruled by our habits, which in turn are an integral part of our structures" (Varela in Breen 2001:37). Davis another enactivist supporter elaborates on these views:

> Thomas Kuhn used the word paradigm to refer to the webs of belief and assumption that prompt researchers in a particular discipline to agree on the issues within that discipline. A paradigm might be described as the commonsense of an era or setting. It consists of the entrenched habits of association that render some ideas sensible, other silly, and still others unthinkable.
>
> This tacit accord is understood in large part rooted on the prevailing language, which imposes on speakers already established sets of interpretations and associations. ***Hence for knowledge to evolve language must change. We must learn to speak differently – to invent new words or appropriate old words – to open new interpretative possibilities*** (emphasis mine) (Davis 2004:140).

These sentiments from Mason, Varela and Davis would seem to support the conclusions drawn by Argyris and Schön that co-operative groups will be unlikely to learn because the participants are ruled by their Model 1 theories-in-use, which create Model I (G-I) learning systems, which in turn, requires or sanctions Model 1 theories-in-use. This further creates a circular, self-reinforcing system that leads to "self-fulfilling, self-sealing, escalating error whenever double-loop issues are involved" (Argyris and Schön 1978:33).

Argyris and Schön also stress that none of these error-escalating processes they have identified, appear to be due to any unconscious or deep personality factors. They believe that they are related to skills and people can learn new skills. However they do support the contention that co-operation is a necessary condition for creating environments for collaborative learning to occur and that as people learn the collaboration skills of Model 2, they necessarily create a Model 2 group learning system, which feeds back to reinforce the new theory-in-use (p. 33).

The process that Argyris and Schön believe is required to help teams become collaborative learners is firstly, as we have already discussed above, they need as individuals to become aware of their Model 1 theories-in-use and automatic reasoning processes that lead to their current "counterproductive skilled responses" (p. 33). Secondly, team members need to be made aware how they create and/or maintain features of Model I learning systems, which in turn feed back to sanction their own

Model 1 theories-in-use. They also need to understand that in order to learn a new set of skills to help them behaviour collaboratively – which for Argyris and Schön is Model ll theory of action – individuals don't discard Model 1. Quite the contrary – "They develop rules that state under what conditions Model 1 and Model ll. theories-in-use would be preferable" (p. 34-35).

One aspect Argyris and Schön emphasise that is critical in implementing the process into a team, irrespective of its size, is that collaborative learning within any co-operative environment must begin with the individual and then spread to the group. This assumption they claim implies that it should not be possible to alter Model 1 theories-in-use and Model I group learning systems by intervening at a group level with a new structure or policy (p. 35). "Structural changes that are congruent with Model II and G-II will not work until they become part of the theory-in-use of individuals and until people act in ways to create conditions congruent with G-II learning systems" (Argyris 1999:85).

But if we are to support these ideas as proposed above what then is the role of the teacher and teaching in this critical issue of learning new behaviour in order to improve our ability to behave collaboratively?

> Research on intervention suggests that it is possible to help individuals learn new theories-in-use and to create new learning systems. The intervention requires the creation of a dialectical learning process where the participants can continually compare their theories-in-use, and the learning systems in which they are embedded, with alternative models. This requires that interventionists make available alternative models with significantly different governing values and behavioural strategies (Argyris and Schön 1978:37).

Teaching to improve collaboration

"If we are sincere in our interest to improve and develop learning then we need to shift our gaze towards teacher and student activities and actions. We need to put the teacher-student relationship at the centre of learning" (Gunter 2001:140). This view of Gunter's is hardly an isolated one and is supported by many theorists in the field of education. Ramsden for example, believes that academic staff will need to

learn **new skills** (emphasis mine) and that their time will be spent differently. It will also mean, he continues, that some lecturers will have to make a radical shift in their orientation from a view of teaching as transmitting information and ideas to one of directly attending to "the process of learning" in their students (Ramsden 1998:18). Breen might add that it's not just about attending to "the process of learning" as referred to by Ramsden but perhaps even more importantly, attending to the practice of learning.

This research is targeted at those who are concerned specifically with the issue of "student project teams" (SPT's) and particularly faculty members who wish to "shift their gaze towards teacher and student activities and actions" and consider using SPT's, either because of their own personal convictions towards them, or due to the dictates of some higher authority. However as Jones (1996) points out, irrespective of the authority, there should only be one reason for the use of SPT's and that is to improve the process – and I would argue the practice – of education; so as to increase the likelihood of students reaching their educational goals.

One of those goals I would submit, if today's students take any cognisance of the expectations of their social environment and the economic imperative, is likely to be to achieve competency in the skills required for working and living co-operatively. In their recent book "Developing management skills 5th edition", Whetten and Cameron claim that almost eighty per cent of Fortune 1000 companies reported that they used "self-managing" work teams, with an incredible ninety-one per cent reporting that "employee work groups were being utilised" causing them to conclude " that the most desired skill of a new employee today is the ability to work in a team" (Whetten and Cameron 2001:456-457).

This would suggest that the educator who is considering the use of SPT's needs to have little doubt that their use will make a significant contribution in helping students acquire a reasonable degree of competency in the skills required for collaboration so that they can work effectively in co-operative learning environments.

However in order to have a chance at achieving such change, both in attitude (espoused theories) and behaviour (theories-in-use), it is imperative that one is convinced of the merits of collaborative work, which Senge et al (1994) describe as – "the most challenging of disciplines – intellectually, emotionally, socially, and

spiritually" (355). They also advise that one should not even think of starting this work until its implications have been thought through, since the process of learning collaboratively is so unfamiliar and "***most of us have had no previous practical training in the concept*** (emphasis mine)(p.355). In this regard Senge et al. believe that SPT's can develop these skills faster if they have the benefit of a facilitator who is trained in the "techniques for building reflection and inquiry skills as well as dialogue facilitation" (p. 355). According to Schwarz (2002), these facilitation skills are increasingly becoming a core competency for anyone who works with groups (p. x).

Judging by these opinions it seems mandatory that if one wishes to fulfil the role of teacher – facilitator or coach – effectively with respect to SPTs, then that person needs to become competent in the facilitation/teaching skills necessary to ensure that the use of SPTs will indeed "improve the process and the practice of education". This issue is of particular relevance in South Africa where according to Louw (2003):

> The PEI (The President's Education Initiative Research Project) research reports and the submissions to the Review Committee indicate clearly enough that the way in which group work is practiced in most classrooms (in South Africa) works to the detriment of all learners achieving the learning outcomes and in the final analysis ***achieving the long term goals of education*** (emphasis mine) (Louw 2003:80).

I should remind the reader that the long term goals referred to as expressed by the Minister of Education at the time, Kadar Asmal, were to develop learners who are "knowledgeable and multi-faceted" and are able "to respond to and act upon the many challenges that will still confront South Africa in the twenty-first century". This would be achieved in part by "nurturing a culture of communication and participation" in the country's learning institutions (Policy Overview 2002:1-7).

But a word of caution from Hackman (2002). Even in those circumstances where the prerequisite criteria are in place, he advises that before making the final decision to use teams, one still needs to be very clear about certain issues, some of which he cites as follows:

> Constraining technologies or team-unfriendly institutional values occasionally can make it nearly impossible to form stable teams that have a compelling direction, an enabling structure and a supportive context. When this is the case, even highly skilled coaching cannot make much difference in team performance. … ***I would rather not use teams at all than risk inviting the kinds of problems that so often develop when one forces the formation of teams in circumstances where they cannot be designed or supported well*** … even when the conditions are reasonably favourable; creating, supporting and leading teams well, requires no small measure of knowledge, skill, and political savvy" (emphasis mine) (Hackman 2002:254-255).

Favourable conditions

From the comments made above by Hackman, it would seem that the first and possibly most significant responsibility of a teacher/facilitator is to ensure that certain favourable conditions are and remain in place; not as any guarantee of good performance but merely to increase the probability of a team being effective (p. 237). In this regard Hackman cites five criteria, which he believes will increase the chances that a team will achieve and sustain a higher level of effectiveness.
Teacher/facilitators need to:

1. Ensure that the team is a real team rather than a team in name only.
2. Provide a compelling reason for the team's work.
3. Ensure that the team's structure facilitates rather than impedes collaboration.
4. That the team can operate within a supportive context.
5. That the team has available to it ample expert coaching in learning the skills of collaboration (p. 31).

It is this collaborative aspect, Schwarz (2002) argues, which is the critical issue for SPT's effectiveness – "At the heart of improving group effectiveness lies the

ability of group members to reflect on what they are doing, to create the conditions necessary to achieve their goals" (p. 5). Schwarz also believes it is because groups find it so difficult to "openly examine behaviour on their own" that they need a teacher/facilitator to help with this process (Schwarz 2002:5).

This need of groups to openly examine their behaviour is, as Argyris and Schön emphasise – "to help individuals become aware of their automatic reasoning processes that lead to counterproductive skilled responses" (Argyris and Schön 1978:34). Hackman (2002) in support of Argyris and Schön and Schwarz adds that if there is to be any substantial improvement in the effectiveness of SPTs, it requires a fundamental "recasting" of member's "theories-in-use" (p. 204).

Holmer adds her weight to this argument by suggesting that without coaching and encouragement in the practises of self-awareness and skilful honesty, students will, she believes, instinctively resort to learned, culturally ingrained habits of avoiding discomfort. Rather than risk being wrong or being seen as uncooperative, students will dismiss perceptions that the group is, for example, not doing the assigned task. Holmer also makes the point that the failure of students to see their own complicity in group dysfunction, contributes to a sense of helplessness and cynicism about SPTs in general (Holmer 2001:594-595).

In line with Holmer's claim, Argyris recognises that many students' sense of competence, self-confidence, and self-esteem are indeed highly dependent upon their Model 1 theories-in-use and defensive reasoning. But this dependence he argues, practically guarantees that when those same students are acting to learn, the consequences will be skilfully counterproductive, because the Model 1 theories-in-use motivating their behaviour will not allow Model 1 governing values to be changed. It is this behaviour to which Argyris refers as "skilled incompetence" (Argyris 1999:59-60).

Model II behaviour has as its basis productive reasoning as opposed to the defensive reasoning of Model I. Understanding productive reasoning, according to Argyris, means that "the premises are explicit; the inferences from the premises are also made explicit; and finally, conclusions are crafted in ways that can be tested by logic that is independent of the group member" (p. 60). What is also important is that embarrassment and threat are not "covered up – they are engaged" (p. 60).

"What can be done" (Argyris 1999:143)

Most experiential learning, at its best, helps individuals change their behaviour without changing the defensive reasoning or their theories-in-use. This can be accomplished, according to Argyris (1999), by helping individuals behave in the opposite manner to the way they presently behave. For example, if a person is dominant they learn to become more passive. If they talk most of the time they learn to listen more. But being passive or listening more is not a change to a new theory-in-use. It occurs by suppressing the old behaviour and as Argyris points out, such changes usually "wash out the moment the individual is bewildered, threatened or feels betrayed" (p. 65).

Research can begin, Argyris continues, with identifying either the theories-in-use or the defensive routines. It does not matter which because one will necessarily lead you to the other. One must make the choice "on the basis of which of the two is most likely to generate the participants' internal commitment to the research and to the eventual intervention" (p. 61):

> Even the most 'anti' applied researchers value a society in which they are free to conduct research. Such societies would have to value experimentation and learning, which if truly unfettered, would also require the valuing of risk-taking and trust. Such a society is unlikely to come to exist without human beings who are willing to accept responsibility for their actions (p. 429).

Before closing this chapter I should like to cite an example of how Argyris helped a group of 'faculty' (who had expressed a desire to be helped) develop new behaviour with suggestions for its practice so that they might improve their competence in teaching/facilitating their own student project teams. And whilst Argyris himself admits how difficult the conditions for collaboration are to create; that one of the most promising strategies for their development is student project teams (Argyris 1999:108).

The case study

> *As we know, faculty learns a lot by talking directly to students. Often the outcome is so rewarding that faculty members wonder why they never thought of doing it before. But what are the*

institutional and personal defensive routines that prevented them from talking to students in the first place? What norms did people learn that would blind them from the obvious (Argyris 1999:143)?

In this case a group of faculty members at a higher learning institution decided to begin to change their own group defensive routines by beginning with the ones that they create in their own meetings. The first step towards change was a two-day session away from the institution. The agenda of the sessions were the cases that faculty were asked to write ahead of time. The purpose of the case was two-fold. Firstly they allowed the organisers to develop a collage of the kinds of problems thought to be critical to the group. In this particular instance the participants wrote on issues related to course content versus student affairs. Secondly the cases provided a window into the prevailing rules and routines used by the faculty.

The form of the cases was as follows:

1. In one paragraph describe a key faculty problem as you see it.
2. Assume you could talk to whom ever you wish to begin to resolve the problem. Describe in a paragraph or so, the strategy that you would use in this meeting.
3. Next split your page into two columns. On the right hand side write how you would begin the meeting; what you would actually say (word for word). Then write what you believe the other(s) would say. Then write your response to their response. Continue writing this scenario for two or so double spaced type written pages.
4. In the left-hand column write any idea or feeling that you had that you would not communicate for whatever reason.

In short the case includes: a statement of the problem; the intended strategy intended to begin to solve the problem; the actual conversation that would ensue as envisioned by the writer and the information that the writer would not communicate for whatever reason. The faculty members reported that they became highly involved in writing the cases. Some said that the very writing of the case was an eye opener.

The cases, crafted and written by the faculty members themselves become outstanding examples of skilled incompetence. They vividly illustrate the skill with which each faculty member tried not to upset the other and to persuade them to change their position. They also illustrate the incompetence component since the results by their own analysis, were to upset the others and make it less likely that their views would prevail.

The cases are also extremely important learning devices since it is so difficult for anyone to slow down the behaviour they produce in milliseconds during a real meeting in order to reflect upon it and change it. The danger is that others might grab the airtime and run with it. Moreover it is difficult for the human mind to pay attention to the interpersonal actions and to the substantive issues at the same time.

Reflecting on the cases – In analysing the left-hand columns of their cases, the faculty members found that they blamed others for the difficulties that existing within their group and that they all used the same reasons:

> You do not *really* understand the issues.
>
> If you persist in your position, you will harm the morale that I have built.
>
> Don't give me that line. You know what I'm talking about.
>
> It upsets me when I think how they think.
>
> I'm really trying hard but I'm beginning to feel this is hopeless.

These results illustrate once more the features of skilled incompetence. Crafting the cases with the intention not to upset others while trying to change their minds requires skill. Yet we have seen that the skilled behaviour that they used in the cases had the opposite effect. The others in the case became upset and dug in their heels about changing their minds.

I can now add an additional finding. These individuals and all the others we have studied to date should not be able to prevent the counter-productive consequences until and unless they learn new skills. Nor will it work to bypass the skilled incompetence by focusing on the academic problems although several faculty members in this group did not agree.

"What surprises me " said one faculty member, "is how these cases have captured the issues beautifully. That's us and that's what we must work on".

"No, I do not agree with you", responded another member. "if we are not to waste these two days, we ought to focus on something concrete. We ought to focus on the practical and urgent matters we have and create a solution that will unite us".

The group was split and their view represented by another member who said: "But how are we ever going to listen to each other if we hold the views that we have about each other and if we talk the way we talk to each other the way we do in the cases"?

Note that the members are recreating the dynamics that get them into difficulty. I intervened and suggested that they try to answer the questions about what kind of working environment they wished to have and what should they do to achieve this.

The next requirement at the two-day session was to redesigning their actions as written – faculty turned to their cases and each selected an episode that they wished to redesign so that it would not have negative consequences. As an aid to their redesign, faculty were given some handouts that described a different set of behaviours.

One technique that was used was that each faculty member crafted by himself a new conversation to help the writer of the episode (An approach that seems similar to what Breen (2000) is attempting in his "Researching teaching:changing paradigms to improve practice"). After taking some time they shared their designs with the writer of the episode. In the process of discussing these; the writer learned much about how to redesign his words. But the designers also learned much as they discovered the bugs in their suggestions and the way they made them (p. 147).

This dialogue according to the participants was very constructive, co-operative and helpful. But what is of vital importance is that the new language that has been developed for a particular instance has to be practiced. Practice is important. Most people required as much practice as is required to play a not-so-decent game of tennis. But it does not need to occur all at once. The practice can occur in actual meetings when they set aside some time to reflect on their actions and to correct them. An

outside facilitator could help them examine and redesign their actions just as a tennis (or hockey) coach might do.

There are several consequences to this type of change programme. The faculty members begin to experience each other as more supportive and constructive. People still work very hard during meetings, but their conversation begins to become additive; it flows to conclusions that they all can own and implement. Crises begin to be reduced. Soon **the behavioural change leads to new values, and new structures and policies to mirror the new values** (emphasis mine) (Extract from "What can be done" Argyris 1999:143-147).

Argyris – Some final thoughts

Argyris (1999) is quick to admit that it is not clear to him as to why most people are able to produce advice easily, yet are unable to follow their own advice when they write their scenarios for his case studies and why they appear unaware that this is the case. He suggests that it may be because people are unaware that their advice involves a "very high level" of inference. Another possible answer is that there is so little variance in the reasoning processes and actions that most people use that:

> All individuals must distance themselves from the relatively directly observable data in order to design and manage their actions. It is not possible to react in an organised manner without first extracting from, and organising from, what occurs. This is what is meant by 'constructing or enacting reality'. High levels of inference are necessary because they make possible on-line management of reality (Argyris 1999:80).

In this regard, Argyris cites the work of Simon and Miller who both suggest that:

> The environment is more complex than the human mind can deal with directly and that beyond the relatively small number of bits of information that it can process simultaneously, new and more abstract concepts are needed which subsume the lower level units of information; suggesting that there is a hierarchy of concepts which makes it possible to organise, make sense out of, and enact reality. … It may well be that the human mind must use concepts requiring

> high levels of inference from the raw data (Simon and Miller in Argyris1999:80).

It therefore seems perfectly logical to Argyris that people must hold theories in their heads about effective action, which they bring to bear on any given situation; since it is unlikely that they are able to design complex actions for every event that occurs (p. 81).

Einstein believed that nature would not play tricks on the physical world by permitting two theories to be valid that contained fundamental views about physical reality that were contradictory. However although nature may not play tricks Argyris believes that we human beings are perfectly (or imperfectly) capable of creating "social universes" that do (p. 429-430).

Chapter 8: Conclusion – collaboration: great idea wrong species.

"We should distrust any formula for changing society from the top down" (Pinker 2002:289).

From the outset the most compelling issue motivating my research has been to try and find a logical explanation, which in some way might account for the dissatisfaction that I have often found when asked to work in groups as opposed to the apparent enthusiasm for this form of educational practice expressed by educational policy makers and management theorists alike. I asked myself if perhaps my own experience was unusual and was I the exception rather than the rule? Could it be that co-operative learning through teams was in fact the preferred choice of most students and members of the business community or did most people, most of the time, find working in teams as difficult as I did? And finally if the latter was the case what then is needed to make my co-operative learning experience both more pleasurable and more productive?

In trying to find satisfactory answers to these questions I begin my research in chapter 2 by looking at what the literature had to say about learning theory – what is currently in vogue and how supportive it is of the use of collective learning environments. Almost without exception I found that there was significant support for the benefits this method of instruction produced. However I also found that the most popular forms of current learning theory are not without their critics.

This aspect I investigate more thoroughly in chapter 3, where I introduce two new theories on learning – enactivism and evolutionary educational psychology – that have developed as a result of the criticisms of current constructivist ideologies. My research suggests that many of these criticisms are influenced by the ideas emanating from the world of science, particularly science related to the microscopic world of quantum mechanics. I look at some of these topics more closely before investigating enactivism and evolutionary educational psychology to see how these new learning theories have interpreted the ideas gained from what Wheatley (1992) refers to as the New Science.

As a result of these investigations the case for collective learning environments is made stronger even though the new theories support the concept for

very different reasons. However my research suggests that much of the enthusiasm for collective learning is for environments that develop the individual within a collective rather than for the development of the collective.

This finding prompts me to conclude chapter 3, by drawing a distinction between two types of collective learning environments that educators might wish to pursue; a co-operative learning environment – were the learning is primarily for the benefit of the individual learner or a collaborative learning environment – were the learning is primarily for the benefit of the group.

In chapter 4 my research takes a closer look at how this distinction is understood in the literature and 'played out' in practice. Once again most of my findings where supportive of the concept of collective learning in theory but several writers, including Hackman, expressed serious reservations regarding its practical implementation – "Creating the conditions that promote effective teamwork almost always involves change … and therefore is certain to threaten the turf, prerogatives, or preferences of currently advantaged organisational actors" (Hackman 2002:243).

But in spite of the evidence provided by my research from my investigations on learning theory there still seemed to be one issue for which my research hadn't given a satisfactory explanation.

Learning theory whilst being highly supportive of collective learning environments for the development of individual learning was relatively inattentive to the concept of collective environments for the development of the collective learning – collaboration. Yet it appears to be the concept of collaboration, which seems to be of utmost importance to both educational policy makers and big business alike.

In chapter 5 I researched the literature for possible reasons for the support of education and business for this aspect of the concept of collective learning, which seems in opposition to the understanding of most learning theorists. This critical and I dare say somewhat controversial issue I discuss in some detail and as a result I believe my research suggests the dominance of an economic imperative together with a possible alliance between business and education under the auspices of cognitive science.

Is education now being used, as Stromquist and Monkman suggest, in the development of human resources rather than human beings? And is this happening with the approval of science in their avid support of collective learning?

However, whether or not there is an alliance between education and the New Capitalism does little to detract from the support that the concept of collective learning has throughout the literature. But what is equally evident in the literature, is that the support there is, is for a concept, an ideal. This aspect is well expressed by Senge, when he suggests that at some time in our lives we have all probably experienced what it is like to be part of a great team. But he, together with almost every other supporter, is quick to point out the difficulties involved in successfully implementing the concept. My research suggests that it is left largely to the work of Argyris and Argyris and Schön to explain why this is the case. This work I investigate in detail in chapter 6.

A real-life learning experience

I think that there are moments in one's life when you hear a suggestion or receive a piece of information and for you it's similar to someone switching on a light in a dark room. I am pleased to admit that my experience in investigating the work of Argyris and Argyris and Schön was for me one such moment.

> People focus on identifying and correcting errors in their external environment. Solving problems is important but if learning is to persist, then people must also look inward. They need to reflect critically on their own behaviour, identifying the ways they often inadvertently contribute to … problems, and then change how they act. In particular they must learn that the very way they go about defining and solving problems can be a source of problems in its own right (Argyris and Schön 1978:84).

For years I have wondered why the responses I get to my behaviour are often not what I expected or intended. This aspect has been of particular interest to me in my personal relationships. How often have I been asked by my spouse "Do you still love me?" and I have responded with an "of course I do, why do you need to ask, don't I show it?" Unfortunately, the response to this is often, "no you don't" and this I have to admit usually causes me some

distress. Prior to starting my research I sincerely believed that I showed my affection everyday through my behaviour. But according to the interpretation of my spouse I was not doing so and this was certainly not my intention. My intention was to show her how much I care and yet I seem to fail to do this most of the time.

Similarly, whenever I have questioned my partner about her feelings towards me, her response has been similar to mine and she has also been somewhat surprised that I have needed to ask. This aspect of our personal relationships is, I believe, of immense significance. Having now studied the work of Argyris and Schön, it has certainly helped both myself and my partner understand how, in interpreting each other's behaviour, **both of us** draw inferences, which tend to lead to outcomes neither of us intended. Now we are learning that when this begins to happen, we need to be more conscious of how we both continue to behave:

> The criterion for success should not be a change in behaviour or attitudes. The criterion should be changes in defensive reasoning and the theories-in-use that produce skilled unawareness and skilled incompetence and the resulting organisational defensive routines (Argyris 1999:65).

What I believe is critical to this situation is that I have come to accept that I am behaving in ways contrary to that in which I claim to believe. I also accept that the reason why I behave in such a way is largely due to my Model I theories-in-use. And finally, I also accept that if I really want to behave differently I need to learn new behaviour. However it is this issue, which I believe my research shows is the 'Achilles heel' of collaborative learning.

Not 'top of the pops'

During the course of my research I began to wonder why the work of Argyris and Argyris and Schön has not been more widely recognised. When I tried to find an answer to this I discovered that others had asked the same question. Below is an excerpt, which offers one explanation and comes from an interview with one of Aryris' close former colleagues, Robert Putnam, voicing some of his thoughts regarding my question:

> The problem is that the tools are so conceptually straightforward and so easy to stick into a training program that in minutes somebody will say, "Oh, I understand that." They think they've got it but the tools are profoundly difficult to put into practice in the heat of the moment. I've been in organizations where they've trained hundreds or thousands of people in these tools and ironically it's almost as if they've inoculated the organization against the deep learning the tools can provide. People think, "We've already done that."
>
> Over the years we've discovered that giving everyone brief training, even when it starts with top management, is not a good approach. People do the workshops, find the tools easy to understand, and assume that good intentions are all it takes to use them. But they look around and see that their boss, who had the same program, still gets frustrated and in the heat of the moment makes the same imperious, unilateral moves they have learned to hate. Then they say, "See, the stuff doesn't work," … and it falls into disuse.
>
> The strategy that does make a profound difference is to have a small number of people who make a much larger commitment to learning to use the tools in practice. Then you get the genuine behavior change even under a significant degree of stress. That's when you begin to see sustainable change (Putnam in Creelman 2003:3).

The last point from this Putnam extract is I believe pertinent to the work that is being promoted by those supporters of an enactivist view of education. For a few educators to work towards becoming truly professional in educational practice by achieving genuine behaviour change. These professionals, working in what Breen (2000) refers to as "the teaching" paradigm would then be able to help others improve their practice from a position of "those that know teaching to those that want to know". While, at the same time, those that know collaborate to create opportunities for this to happen by developing a language appropriate to a 'body of practice'. In other words continuing to develop the practice needed for more effective co-operative learning environments.

This aspect is emphasised by Varela who writes, "we have failed to pay attention to the extent to which our actions … are ruled by our habits, which in turn are part of our structures". According to Breen (2001), Varela makes a plea for us to focus some of our energy on what he terms "the hinges that provide windows of opportunities for us to consider alternative actions" (Varela in Breen 2001:5).

One further issue that could be influencing not only dedicated educators but educators generally as well as policy makers and management theorists, is the view of behaviour espoused by visionary psychologist William James – The greatest discovery of my generation is that human beings, by changing the inner attitudes of their minds, can change the outer aspects of their lives. I wish it were so.

How critical the biological?

The second most significant learning experience that I have gained from my research on collaboration, has been the view from science of the import of a biological influence on our behaviour and possibly even more importantly, our motivation, or lack of it, in acquiring new knowledge.

Most of my life I have been encouraged to support the concept advocated by educators such as Senge, who claim that "not only … is it our nature to learn but we ***love*** (emphasis mine) to learn" (Senge 1994:4). But, as with my experience in working in groups, this has not always been how I felt or continue to feel about learning. For countless years I have failed to understand what went wrong with my education as a young person. In junior school I was an above average student a condition that persisted well into high school until I was introduced to several "new" subjects such as calculus, Latin, French, co-ordinate geometry and trigonometry and applied physics. It wasn't very long after this introduction before I started to believe that not only wasn't I particularly bright but that I might even be impaired, if one was to consider the rate at which the scores on my report card started to tumble. Part of the problem, according to some of my teachers, was that I asked too many "stupid questions". But now after having completed my research I realise that perhaps the problem was a much more complex one.

Of course it is quite irrational even to attempt an explanation for my 'fall from grace' after so many years. However, the work of Geary and Genovese has made me realise that up until my introduction to 'new subjects' in high school, the learning I

did came easily and was perhaps much more relevant to my life's development at the time. Whereas the new subjects required of me a very different approach such as that proposed by the evolutionary educational psychologists. An approach, with which I was perhaps at the time, ill equipped.

Should this sort of example indeed be the case, then I would submit that it has far-reaching implications for education and higher education in particular. For us as educators to realise that for the majority of learners, many subjects are exceptionally difficult to learn, and without the necessary motivation, which possibly needs to be social in nature, the exercise could prove somewhat less than successful. This seems to be fairly evident amongst high school students today, who often fail to see the purpose of studying certain subjects as Davis points out:

> Despite technologies that mean we will never have to perform long division outside the classroom, the suggestion that the months spent on this skill could be given over to other topics, is rarely entertained, let alone the dozens of other concepts jammed between the covers of contemporary textbooks (Davis 2004:81).

Do policy makers consider learners 'too stupid' to see this anomaly because of their 'natural love of learning'? Is it this attitude on behalf of policy makers that prompted Holt to comment – "We don't have to make human beings smart. They are born smart. All we have to do is to stop doing things that make them stupid" (Holt in Meyers 1986:9).

Associated with this issue of 'what comes naturally', is the somewhat equally contentious issue of co-operation or as it's often referred to by biologists "reciprocal altuism" (Evans 1999:65). If, as the evolutionary biologists and their supporters contend, working co-operatively is on a "what's in it for me tit-for-tat" basis, then the knowledge required to co-operate already exists in some basic form for almost anyone who has reached puberty. Therefore, for a co-operative learning approach to be implemented all that should be required is that this 'natural' basic knowledge or reciprocal altruism be given the opportunity to develop.

However, if what is required is collaboration – which requires that we set aside individual aspirations for the benefit of the collective – then I contend that this requires the acquisition of new skills, which must be learned. It is this position, which

I investigated in chapter 7. A position that I suggested was the 'Achilles heel' of collaborative learning and which, my research suggests, will be for most people, as popular as it is for them to learn calculus!

Concluding opinion

In summary, my research has helped me understand why education and business are both so enthusiastic in their support of collective learning environments. It has shown me that the best chance a country has to improve the lives of its citizens economically, is to be competitive in our new global world markets. It has also has shown me that one of the best ways of achieving this is to have a competitive edge in the production of knowledge.

I have also learned that science claims the best way of producing innovation – creating new knowledge – is by people working co-operatively in groups. Unfortunately it appears that this concept is only being considered from an economic imperative through the development of a country's human resources. This would suggest that the sole purpose of development is to equip citizens with the kind of skills required by a global labour market which are those 'leadership type' skills that business believes are necessary for people to work collectively in groups.

All of these findings convince me that developing human resources to satisfy a nation's economic imperative now seems to be of greater importance than the development of human beings to improve a nation's moral condition.

The other major issue for which my research has provided me with an answer is why I find working in student groups so problematic. I have learned that in order for groups to be effective certain criteria need to be in place. But more importantly I have learned that even when these criteria are met from a structural point of view, most of us do not have the appropriate behaviour in order to work collaboratively; especially in situations that need to address or correct 'second-order errors'.

My research has also shown me that the only way to improve this situation is for those people wanting to initiate collective learning environments to ensure that they have the necessary skills to firstly: be able to structure organised collective environments and secondly: to facilitate such organised groups. Without these skills my research suggests that little if any learning will take place and that the exercise, if

implemented, will more than likely only provide an opportunity for all those participating to practice their 'Model I theories-in-use'.

When I put all these factors together I conclude that collaborative learning through student project teams whilst in theory being a wonderful concept, which on occasion can work; the effort required for its implementation is so substantial that many will find it insurmountable.

However, having made this claim, I also believe that if one is willing to make the effort and can find equally motivated participants, there is no doubt, as I myself have experienced, collaborative learning can work and when it does, the rewards are significant. But the question remains – who is prepared to make the effort because as Richard Hackman points out:

> I would rather not use teams at all than risk inviting the kinds of problems that so often develop when one forces the formation of teams in circumstances where they cannot be designed or supported well. Even when the conditions are reasonably favourable, creating, supporting and leading teams well requires no small measure of knowledge, skill, and political savvy. At least at this point in the evolution of work cultures, creating and sustaining the conditions that foster team effectiveness can be something of an uphill battle even for well-intentioned and well-motivated leaders (Hackman 2002:255).

Strong words but possibly not strong enough. To add to this argument I would like to cite a comment made by leadership researcher Abraham Zaleznik, in an interview with Thomas Kiely published in the October 15, 1993, issue of CIO. Although from the world of commerce I believe it is equally applicable throughout all sections of our community:

> The trend toward teams and collaboration is eroding both leadership and accountability in contemporary organisations; and Sinclair (1992) suggests that team ideology can tyrannise individual members "by camouflaging coercion and conflict with the appearance of consultation and cohesion" (Hackman 2002:278).

Perhaps the way one considers the future prospects of collaborative learning will be largely determined by the view one adopts of our human species. The thoughts expressed above by Hackman are probably in keeping with what Pinker refers to in his recent publication "The blank slate" as a "Tragic" vision of humanity:

> In the Tragic Vision humans are inherently limited in knowledge, wisdom and virtue and all social arrangements must acknowledge these limits. In the Utopian Vision, psychological limitations are artefacts that come from our social arrangements and we should not allow them to restrict our gaze from what is possible in a better world (Pinker 2002:287).

Ending on such a tragic note seems so pessimistic and it also seems inappropriate not to save the last word for the people who have had such a significant influence on my research – Chris Argyris; a possible 'Utopian' who hopes that human nature might radically change in some imagined society of the future and his long-time colleague Donald Schön:

> Worlds that encourage the production of empirically testable knowledge, the enhancement of informed choice, and the strengthening of personal responsibility are worth designing and trying to implement. These basic values are not new. What is likely to be new is that we can help create worlds were they are not rare but part of the practice of everyday life (Argyris and Schön 1978:4).

I must admit that when I read words like these it does still inspire me to work harder at changing my behaviour in order to become a better educator for the future.

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