

Chaos and order in education

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The relation between chaos and order in social systems has been a recurring theme in educational literature over the last decade. Discussions commonly propose links with developments in mathematics and physics. The authors take a critically constructive look at some of the fundamental questions that underlie the discussion. They look at the nature of the relevant developments in mathematics and physics in their possible relation to educational theory and practice. They proceed to explore the role of order, predictability and control and the place of religion in the education systems, and in academic discourse, of today's pluralist societies.

Introduction

The relation between chaos and order in social systems, often linked with discussions of complexity and systems theory, has been a recurring theme in educational literature over the last decade. It continues to have an influential place. These discussions have been located in a variety of contexts.

For instance, Badenhorst (1993; 1995), Spector (1993), Claassen (1994), Badenhorst and Claassen (1995), Stuart (1995) and Van Niekerk (1996) locate them in the framework of postmodernism and education, Letseka (1995) and Treml (1995) in the context of systems theory, and Stoker (1996) in the context of physics. More recently, Brown and Moffett (1999) use the themes of the "new science, chaos theory and systems thinking" in developing the framework for a practice-focused treatment of school transformation.

The discussions raise important issues for educational theory and practice, especially in situations of change. They challenge us to new ways of thinking about education, and social reality in general, by offering new frameworks for that thinking.

At times the discussion is loaded with esoteric terminology, as is frankly acknowledged by Treml (1995) in his treatment of systems theory pedagogics; a discussion that ranges widely over such issues as functionality, complexity, contingency, selectivity, intentionality and interdisciplinarity with the tendency for complexities to rearrange themselves in times of crisis or adversity. Claassen's discussion (1994) is less dense, raising questions of relativism, subjectivism, unpredictability, randomness, emergence, self-organisation and the elusiveness of truth; yet, in this case also, we are invited to explore these often familiar concepts within a new way of understanding the educational environment that requires a significant shift in thinking about education.

Even though the discussion is, at times, characterised by a daunting technical complexity, it raises challenges that no serious educator can afford to ignore. Neither can we afford to limit ourselves to the more readily accessible presentations that avoid the technical complexities in order to concentrate on practical implications. In this case, there is too much danger of misinterpretation and distortion through an inadequate appreciation of the new frame of reference within which familiar words are to be understood.

If educational discourse in this area is to advance educational practice, it is important that the context of the relevant developments in science is understood adequately and the assumptions of links between that science, on the one hand, and educational theory and practice, on the other, are examined critically.

The scope and purpose of this article

We propose to take a critically constructive look at fundamental

questions that underlie the discussion, focusing particularly on the question of chaos and order. Our purpose is to test and strengthen the foundations for an effective analysis of issues of chaos and order in social systems, with special reference to education.

In proposing a critical approach we do not presuppose "better knowledge" (Treml, 1995:271). It seems to us that a presupposition of better knowledge is more likely to generate a dogmatic rather than a genuinely critical approach. By a critical approach we mean one that tests the foundations of knowledge claims in order to judge whether these claims are sustainable in the form in which they are presented. In speaking of a testing of foundations we are not espousing foundationalism. We do not believe that there is any set of universal, self-evident beliefs that can form a universally recognised basis for knowledge claims. What we are concerned to do is to bring into clear view the foundations, or the basis, for the making of particular knowledge claims so that we, and others, can make an informed judgment on the soundness of these foundations and, hence, the validity of the claims.

Links with mathematics and the physical sciences

A common assumption underlying the various discussions is that theories in physics and mathematics provide an appropriate framework for the analysis of social systems. The new models of physical reality generated by theories in physics, together with "chaos theory" in mathematics, are taken as the appropriate basis for the analysis of social reality.

In view of this, it is important to explore carefully two questions in order to engage effectively in the discussion. Firstly, what precisely do current theories in mathematics and the physical sciences tell us about chaos and order in physical reality? Secondly, what is the relevance of this for the development of social theories?

Chaos and order in mathematics and the physical sciences

In the educational discussion we encounter such claims as "what is chaotic is a source of order" (Letseka, 1995:301); "Disorder can be a source of order" (Brown & Moffett, 1999:21); "complex systems ... contain both order and chaos" (Badenhorst, 1995:13). These statements are commonly presented as supported by the assured findings of the physical sciences and mathematics, and commonly linked, in particular, to "chaos theory".

Whilst such descriptions are not altogether inaccurate, they can be seriously misleading when applied to the context of social reality, unless the specific technical meaning that "chaos" has in this context is made very clear. As Badenhorst (1995:13) observes, citing Hayles, researchers in the area generally prefer such terms as "non-linear dynamics" or "dynamical systems theory" as more accurately identifying their area of investigation than "chaos theory".

Contrary to the common use of the word, the "chaos" of chaos theory is not a state of disorder. The use of the term chaotic systems already indicates that a form of order is being investigated, since any system is, by definition, orderly. These systems are described as chaotic systems not because they are disorderly but because of their unpredictability. We are accustomed to think of an orderly world as one that enables us to predict outcomes; "if an object with specified properties moving at a specified velocity strikes a sheet of glass having specified properties then the glass will shatter".

In education, the assumption of such ordered predictability gives confidence that, if we create the right conditions, we can be sure of achieving our educational goals. The unsettling thing about recent developments in mathematics and the physical sciences is that they cast doubt on the validity of this assumption. They do not, however, cast doubt on the fundamental orderliness of the world.

As Polkinghorne, a mathematical physicist (1991:36), observes, the relevant chaotic systems exhibit, in the unpredictability of their most "chaotic" elements, a decided orderliness. This leads him to speak of "an orderly disorder ... That is why chaos theory was not a well-chosen name." Later (1991:39) he speaks of the "structured chaos" of such systems. Note that he is not speaking of an order existing alongside or interacting with the chaotic but of an order within the chaotic itself. He does speak (1991:37) of "the emergence of order out of chaos" but this is not the "chaos" of everyday discourse characterised by an absence of all order; it is "chaos" in the limited, technical sense of an absence of ordered predictability.

Chaos theory comes together with developments in physics to compel us to review our conception of order. The physicist Paul Davies argues that our present state of knowledge about the physical world requires us to think of it as characterised by contingent order with "various laws and regularities". It is a world in which we encounter (1992:182) complex open systems that, whilst unpredictable and "indeterministic", unmistakably "display ordered and lawlike behaviour". In such systems (1992:193), we may say "that there is order in disorder", not that there is an absence of order.

What we are faced with, then, is not an interaction of two fundamentally different principles, "order" and "chaos", but a kind of order fundamentally different from the traditional conception of order in western thought. In that traditional conception order is necessarily characterised by necessity and predictability. The order we encounter in today's world of physics and non-linear dynamics is characterised by contingency rather than necessity, unpredictability rather than predictability, and a dynamic, non-linear causality rather than linear causality.

In discussions of education and social order, therefore, it is important, when appealing to these findings in physics and mathematics, to make very clear the nature of the "chaos" that is involved. A failure to do so is liable to result in an invalid use of these findings in support of theories of order and chaos in the social order. It also tends to obscure the more important issue raised by these developments: the existence of more than one kind of order in our world.

Education, social order and physical theory

Once we have a clear view of the relevant mathematics and physical theory, the question still remains: How does this relate to education and the social order? Much of the discussion appears to assume that a theoretical model of the physical world provides an assured scientific basis for social analysis.

This is, at best, an assumption that needs to be argued rather than taken for granted, as it so often is in educational discussions of order and chaos. It is possible, of course, to mount an intellectually respectable — though not necessarily persuasive — argument in support of this position, but it is also possible to mount an equally respectable — and, we believe, more persuasive — argument for a negative answer.

Gadamer, for example, (1993:552) while expressing a high regard

for science,¹ argues persuasively that the illegitimate intrusion of science into social theory and practice stands in the way of a proper understanding of social issues. "In a time when science penetrates further and further into social practice, science can fulfil its social function only when it acknowledges its own limits and the conditions placed on its freedom to maneuver. Philosophy must make this clear to an age credulous about science to the point of superstition."

Gadamer's warning finds echoes in Toulmin's discussion (1982) on the distinction between scientific theories and scientific myths. Scientific theories are the assured findings of science. They are authoritative only within the limited scope of the relevant field of scientific investigation within which they are developed. A scientific myth, on the other hand, is the result of the use of scientific concepts "not to explain anything, but for other purposes — for instance, as the raw material of myths." (Toulmin, 1982:32). Toulmin's use of the word "myth" is in no way pejorative. He uses it as a term for the comprehensive frame of reference that we all need to give coherence to our experiences.

His concern is with the practice of basing a myth on scientific concepts in ways that give the myth an appearance of scientific authority that it does not have. He does not argue that science should have no part in the development of a myth. Indeed, his work concludes with a strong plea for a collaborative endeavour in the construction of a new myth that takes full account of developments in science (1982: 270-274). His concern is with the blurring of the distinction between scientific theory and myth so as to give a false scientific authority to the myth.

Toulmin's distinction is relevant to the discussion of order and chaos in education. "Chaos theory" and related theories in physics have been developed as answers to problems in the physical world. They have clear scientific authority in relation to these problems. They have no assured scientific authority in relation to problems of order in educational and social relations. If we choose to use them as a framework for social and educational analysis we need to recognise, and make it clear, that they are now functioning as myth, not as science, and have no scientific authority.

Implications for educational practice

Whilst we have these reservations about the way in which chaos theory and related developments in physics are sometimes used in discussions of social and educational issues, we do not doubt that the changing conceptions of order in the physical world do have implications for education. Whilst the physical theories do not provide us with assured scientific answers to the relevant social and educational theories, they raise issues that responsible educators cannot ignore.

Issues of order, predictability and control

Since thinking about social order has long been dominated by the same monolithic conception of order that dominated the physical sciences, the discrediting of that conception by findings in the physical world clearly calls for a rethinking of the conception of social order, including the ordered relations of education.

Educational practice has commonly proceeded, and often still does proceed, on the assumption that predictable educational outcomes can be achieved by the consistent application of scientifically based forms of control. Teaching strategies and techniques carrying a "scientific design" label are promoted, and adopted, as the teacher's tools for manipulating the educational situation to achieve assured educational goals. An appropriate learning environment is seen as one that is controlled by the teacher to achieve an ordered environment that ensures effective learning.

Whatever justification may be offered for this practice, it is clear

¹ Whilst there is a case for regarding all academic disciplines as science, for the sake of convenience in the present discussion, the word "science", in line with common usage, is to be taken as referring to the "natural sciences" unless otherwise specified.

that it cannot be justified by appeal to scientific conceptions of order. Any such appeal can only be to an outdated science. On the other hand, when we turn to educational research, we find ample evidence that this conception of educational order fails to offer the optimum learning environment. On the contrary, it inhibits learning by repressing creative learning potential that is intrinsically unpredictable in its operation.

The work on learning styles, represented by, among others, Sternberg (1997), McCarthy (1987), and Gregorc (1985), directs our attention to the diversity of ways in which people learn. In doing so it casts serious doubt on any idea that the best learning environment is one in which order is secured by tight control that channels learning into a single, logically sequenced process. It calls for an open environment that encourages creative diversity.

The work on multiple intelligences, spearheaded by Gardner (1993), invites us to recognise more ways of intelligently — hence rationally — ordering our experiences than by the logic of mathematical and verbal systems. These remain important, of course, but room needs to be made for others if we are to have the benefit of the full range of human intelligence. Again, the indications are that an effective learning environment is one of creative diversity rather than controlled order.

We might add to this the evidence that much creative thought does not conform to the neatly sequenced pattern of ordered thought that has commonly been taught in schools as the norm for disciplined thinking. Roger Penrose, the distinguished Oxford mathematician, points out (1989:418-425) that his own creative thinking in mathematics does not follow any such logically ordered pattern. Rather the creative elements in his mathematical thinking typically arise as sudden, inspirational flashes of insight that have no apparent causal connection in the thought processes that follow a linear logic. He supports this with references to the testimony of other leading figures in mathematics and the physical sciences to the same effect.

It seems clear, then, that there is a need for a fundamental rethinking of the issue of order in formal educational relationships. This does not mean that we need to jettison all the old strategies and teaching practices as worthless. Many of these are still likely to have a valued place in the new order.

What we need is a new conception of educational order that is more flexible and open to allow for the diversity of learning styles and thinking processes that we now know to characterise human learning. We need to move away from an order that is achieved by a teacher-prescribed order in the learning process. We need to move towards the ordering of learning around a problem-oriented focus, allowing room for a diversity of student-initiated learning processes within the discipline of this focus. We need to welcome the unexpected and unpredictable, not as disruptions to the orderly progress of learning, but as welcome opportunities for learning about a world that is always able to surprise us.

And we need to decisively abandon all idea of the teacher's role as a controller producing a controlled order in the learning situation. Rather, we need to see that role more as that of a flexible, open guide enabling students to make sense of an ordered, yet often unpredictable, world. The teacher must reject the role of oracle providing authoritative answers to become a guide showing students how to find answers; including finding the meaning of those human actions that bring disruption and disorder into the experienced world.

This shift in the conception of educational order is demanded of us if educational practice is to fit all we now know of the nature of our world, both from scientific explorations of the physical world and from systematic investigations of human intelligence and learning.

The issue of religious pluralism

The second area in which the changed conception of order in the physical world calls for a rethinking of educational practice is the issue of religious pluralism. The existence in a society of a plurality of religious convictions, is a fundamental feature of modern societies. This

creates potential for social fragmentation and conflict, especially where the religious plurality is associated with cultural plurality.

A strategy commonly used to defuse this divisive potential has been the exclusion of religion from the public education system. In some cases, this has meant a total ban on the discussion of religion — institutional exclusion — while in other cases it has meant the isolation of religious discussion from the mainstream of the curriculum — curricular isolation.

Whilst this strategy has had some success in achieving its aim, it is, in principle, both oppressive and a hindrance to rational discourse. As Nord and Haynes point out (1998:3; 4), secular ways of interpreting human experience are functionally indistinguishable from more traditional religious interpretations. A strategy of exclusion or isolation, therefore, effectively establishes one kind of religious interpretation as the only valid one to the exclusion of all others in the mainstream of learning (Nord & Haynes, 1998:6-9).

To similar effect, in an analysis of the human phenomenon of religiousness, Wentz concludes (1987:13-21) that secular ways of giving meaning to the world of human experience are as decisively expressions of religiousness as are traditional religious interpretations. The absence of the religious forms of traditional religions may disguise, but does not diminish, the religious character of secular interpretations. Toulmin's argument (1982:81-85) that scientific myths fulfil the same function in the modern secular society as religious myths did in earlier societies points in the same direction.

The secularisation of education in modern societies, therefore, has not removed the religious issues from education. It has simply established one (secular) form of religious interpretation as the one authorised interpretation in the curricular mainstream. The effect is oppressive in that, in the mainstream of learning, a privileged position is given to one way of interpreting human experience to the exclusion of the alternatives that exist within the society.

It hinders rational discourse because it disguises, without in any way diminishing, the role of religious-type understandings in human perception of the experienced world. The privileging of one form of understanding places a dogmatic constraint on rational discourse that hinders rational consideration of the alternatives.

This would be, in itself, sufficient ground for reviewing the way in which religious plurality has commonly been dealt with in the public education systems of modern secular societies. However, the changed scientific conception of order that has come from developments in twentieth century physics and mathematics provides a powerful additional argument for such a review.

Throughout much of the nineteenth century and the first half of the twentieth century, the scientific vision was of a world of predictable order and certainty in which, in principle, the rational procedures of science could control events to ensure an increasingly happier and more fruitful future. It was, for most, a satisfying vision giving the security and hope that has traditionally been provided by religion, carrying with it all the authority that science had gained through its many impressive achievements.

As the new scientific perceptions of order slowly, yet surely, filtered through to society at large, this scientific basis of security and hope about life has been eroded. Science can no longer reassure us that we live in a world of predictable order in which we have the means to control events with any absolute certainty in order to secure an assured future for ourselves and our children.

Some, such as the distinguished Cambridge physicist, Stephen Hawking (1988:156; 167), continue to find hope in science. It is, however, a hope that is expressed in terms of probabilities rather than certainty and relies, in the end, not on any assured finding of science, but on a religious faith in science as the means by which we can gain access to "the ultimate laws of nature". Such a hope may be adequate for him, and others like him, but for many it is not enough.

If the educational experience is to be meaningful to students in today's world, therefore, and not be merely training for competent participation in a sterile, meaningless world, we cannot afford to exclude

religious issues from the curriculum. Kessler's study (2000) underlines the practical importance of finding ways to include such issues if educational institutions are to serve the needs of today's youth.

With regard to public education systems, the challenge is to do this in a way that neither violates the religious convictions of any nor introduces divisive religious conflict into the learning environment. Kessler's own approach (2000:x-xiv) is to encourage students to share their personal experiences of the spiritual dimension, or inner life, in a context that is detached from all particularities of religious dogma or world view.

This approach has merit, and is worth including in any strategy that may be adopted, but it is not, we suggest, adequate in itself. Firstly, we question whether it is possible to deal with issues of spirituality stripped of all particularities of religious faith and world view. It is possible to do so without explicit reference to such matters but any discussion of issues of spirituality will inevitably involve implicit beliefs of a religious nature.

Embedded in Kessler's description of her own strategy is the implicit world view belief that answers to spiritual questions are validated by the experience of the individual. An answer is valid if it satisfies the individual's spiritual longings. This is an individualistic and relativistic view of spirituality that, while acceptable to many, is also challenged by others.

The danger is that, because the strategy is declared by the teacher to be free of particular religious assumptions, this most fundamental assumption is likely to pass unnoticed by the students who will, nevertheless, be influenced by it through their participation in the learning process.

Secondly, Kessler's approach does not go far enough in uncovering for students the pervasive reality of religious faith. As Nord and Haynes (1998:4) point out, religious faith cannot be compartmentalised but has implications that extend to all of life. There is simply no way to deal satisfactorily with issues of religious faith other than by considering that faith in the fullness of its expression.

In the public education system of a plural society, this will need to be done in a way that neither promotes nor endorses any one faith but deals with all on equal terms. This requires, first of all, that we define "religious" in a way that embraces all the diverse ways in which human religiousness is expressed. Wentz' approach (1987:13) that identifies religiousness with the human impulse to seek ultimate meaning for life, whether it be in secular or traditional religious terms, commends itself as a useful way to do this.

A second requirement is mutual openness in sharing the diverse ways in which we express this common religiousness. On the one hand, there must be openness for all to speak freely of the ways in which they find meaning in the world, whether this is expressed in traditional religious language or in secular language. On the other hand, each must be open to listen to the other with a view to gaining understanding of the other's experiences.

A third requirement is mutual acceptance of one another, with all the diversity in our religious convictions. This need not mean either an agreement with or an acknowledgement of the validity of the other's convictions. To expect this would be asking many to deny their own convictions.

It does mean respect for the integrity of the other's convictions as sincerely held beliefs about the answers to life's deepest issues. It does mean renouncing all use of power, including pedagogical power, to coerce another into accepting what we believe to be the right answers. And it does mean looking together for ways in which, without blurring the integrity of our diverse religious convictions, we can work harmoniously together on the common problems that arise in our life together in one society.

Bringing religious issues in this way into public education will not only enrich the educational experience for all students in the most fundamental way but will also do much to promote understanding and harmony in the wider society. It is, we suggest, the most effective way to defuse the explosive potential of religious, and cultural, plurality in

the modern society.

The same openness and acceptance should characterise the way issues of religious plurality are dealt with in educational institutions operated by religious communities in a plural society. These institutions will desire, quite properly, to ensure that their educational practices are informed by their own religious faith. However, if they wish to prepare their students for a constructive role in society, they must equip them with an adequate understanding of the religious diversity of a plural society together with an adequate basis for operating in partnership with people of diverse religious faiths in addressing common problems.

This cannot be done if other faiths are dealt with only in terms of the polemics of the school's own faith. It can be achieved only through the openness to and acceptance of religious plurality that is required of the public education system. This does not require any compromise or relativising of the school's own faith. It requires only openness to and acceptance of the reality of the diversity of religious conviction that is characteristic of the society of which the school is a part. Indeed, it is only through this openness and acceptance that such a school can prepare its students to participate in this society in the integrity of their own faith.

A personal note

The requirements of openness to and acceptance of religious plurality in the pedagogical situation apply with equal force to the world of academic discourse in a religiously plural society. At this point, therefore, we want to articulate the nature of the religious faith that informs our academic endeavours and the reasons for our confidence that, without compromising the integrity of this faith, we can engage in fruitful dialogue on common ground with colleagues who do not share that faith.

The world as creation: a perspective on order

The development of our views on order takes place within the perspective of the belief that the whole world of human experience, in all its diversity, is the creation of God, in all of which we experience God's presence. We do not find the natural/supernatural distinction helpful since it implies that God's activity is confined to a supernatural realm detached from the realm of nature. We recognise God as wholly distinct from, yet intimately involved with, the whole of our experienced world, the ordinary and everyday as much as the extraordinary and unexpected.

In conceptualising this relationship, we find it useful to speak (*cf.* Fowler, 1991:27ff) of God as relating to all creation through an interface that runs through the whole of human experience. Through this interface God is in constant and intimate contact with creation, governing it by his ordering Word, yet never merged with it. Also, by means of this interface we humans, as God's image in creation, have contact with God at every point of our daily existence.

In consequence of this dynamic ordering of God, we expect the world of human experience to exhibit an ordered constancy. At the same time, as those who are always on the creaturely side of the interface, we can claim no privileged access to any sort of divine blueprint for the ordering of our world. Like everyone else, we can know the patterns of order in creation only through our experiences of creation. Our knowledge is always necessarily provisional, subject to correction and modification as a result of extended experience of created reality. On this basis, we gladly join with others who do not share our faith in tracing the patterns of order in human experience, patterns that we recognise as the result of the Creator's dynamic ordering activity. We welcome the changes in the understanding of the nature of that order that have come through twentieth century scientific investigations, as an enrichment of our understanding of creational order and a correction to earlier, more limited, views of that order.

We welcome, likewise, the challenge to review our conceptions of educational order to ensure an educational practice that more adequately equips students for the reality of life in this world. In the pro-

cess of all this, we find that our understanding of God is enriched and deepened.

The world as creation: a perspective on chaos

As Letseka (1995), Spector (1993), Badenhorst (1995) and others have convincingly argued, there is typically a measure of chaos, or what is perceived as chaos, in society, and therefore also in education, during times of transformation or revolution. We find it unsatisfactory, however, to regard this social chaos as a necessary prerequisite for, or source of, social order.

There are, we suggest, three very different sources for the experience of disorder in situations of major social change.

The first is the uncertainty, disorientation and insecurity that many people experience when moving from a familiar form of social order into an unfamiliar one. In this case, the sense of chaos, while very real and significant, is due to a subjective condition within those involved and not any disorder in the social context.

A second source is an inevitable fluidity in the social order as a new order is being constructed to replace the old. While this may, at times, have a certain chaotic appearance, it is no more a genuine chaos than is a building site during a process of demolition and reconstruction. It is an orderly process of social reconstruction. This is, perhaps, the closest thing in terms of social order to the "orderly disorder" of physics and chaos theory. Again the perception of disorder is a subjective response to an orderly, but unfamiliar, reconstruction process.

A third source is the violation of normative conditions in the human ordering activity, resulting in a disturbing disruption in human relationships. This may be due to the actions of the revolutionary forces of change, but it may also be due to features of the old order that have left enduring distortions in human relationships that remain in spite of fundamental changes in the formal social organisation.

In this case only there is genuine chaos, in the sense of a breakdown in social order. It is not, however, and cannot be a source from which a new order is generated. On the contrary, it is the result of the violation of norms of social relationships that is a hindrance to the establishment of that order. Order can only be established through steadfast resistance of such anti-normative forces.

This brings us again to the problem of plurality in modern societies. It can hardly be disputed that social life is subject to norms. We regularly make judgments about human societies that presume such norms, judging one form of social order to be better than another, and certain kinds of social arrangement to be unacceptable. The difficulty is that we do not always agree about what these norms are.

This lack of agreement about social norms is a significant source of conflict, and even violence, in today's developed societies. On the surface, the conflicts are commonly over practical issues such as the environment, world trade, or social and economic policy. Yet, if we look closely, it is clear that the fight is fuelled by different visions of the good society, with the differences in social norms that these different visions entail. What one side in the dispute sees as being for the good of society, the other side sees as a social evil.

The disputes can be resolved only if we resolve the differences about the relevant social norms. This is no easy matter, since the differing visions of the good society are grounded in differences of religious faith. Any vision of the good society is necessarily grounded in beliefs about the ultimate meaning of human life. On the broad definition of "religious" proposed earlier, such beliefs are clearly religious in nature, even when expressed in secular language.

If we are to deal in an effective way with the disruptive tendencies of these differences over social norms, we must abandon the notion that there is some set of universal social norms that are recognised by all right-minded people. We must be open about the normative differences that inevitably exist in the modern plural society. In our own case, we believe that there are universal norms for social life that are grounded in the revelation of God in Christ. We see this as an integral revelation experienced in three ways: in the experience

of the ordered contours of creation, in the person of Jesus Christ and in the Christian scriptures. We believe that, in the final count, a society is a good society only so far as it conforms to these universal norms. At the same time, we recognise that, in a society characterised by religious pluralism, we cannot expect universal recognition of these norms. We accept that, on some points at least, others will have different perceptions about social norms. And, even if it was possible, we regard it as unacceptable to use the instruments of social power to impose our norms on society, since it would inevitably be oppressive of other communities in the society.

We propose, as the only effective way forward for achieving social harmony in today's plural society, a process of open dialogue in order to establish a consensus on the practical norms that are to govern public life in the society. By consensus we do not mean a majority decision but rather an agreement by all the diverse communal interests in the society on norms that serve as a basis on which they can live together in harmony and goodwill in the one society.

Such a process will require open dialogue in which each party is free to present the case for what it sees as the right norms as vigorously as they choose. Yet, the end result cannot be what any one party would choose if its interests were the only ones involved. It can only be a common ground that all can accept as sufficient for living together, without oppression, in one society. The only alternative to such consensus-building dialogue, it seems to us, is social oppression, through the imposition on all of the norms of one section of society, or social disintegration as a result of a normative vacuum.

Educational institutions can make a fundamental contribution to this process in three ways. Firstly, they can promote understanding and acceptance of the normative diversity of society. Secondly, they can encourage students to articulate and explore the foundations of their own beliefs about social norms. And thirdly, they can initiate students into a constructive process of consensus-building through open dialogue.

In Conclusion

We have little, if any, control over chaos and order in the physical world. We can only work with the world as it is in order to achieve the optimum results for our purposes. On the other hand, the social world, including the world of education, is a world of our making. Changing patterns in our knowledge of the physical world, and rapidly changing social patterns, demand creative change in the way we order education if our educational practice is to remain effective in preparing students for tomorrow's world.

Key words

Social change, educational change, physical sciences, cultural pluralism, religious differences, learning strategies

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