DOCUMENT RESUME

ED 446 275		CE 080 893
AUTHOR	Shaw, K. E.	
TITLE	Teaching Technical Students To Be Critical.	
PUB DATE	2000-04-08	
NOTE	15p.; In: TEND 2000: Proceedings of the Technological Education and National Development Conference, "Crossroads of the New Millennium" (2nd, April 8-10, 2000, Abu Dhabi, United Arab Emirates); see CE 080 883.	
PUB TYPE	Opinion Papers (120) -- Speeches/Meeting Papers (150)	
EDRS PRICE	MF01/PC01 Plus Postage.	
DESCRIPTORS	*Adult Learning; Classroom Techniques; Cognitive Development; Cognitive Processes; Constructivism (Learning); *Critical Thinking; Educational Needs; Educational Practices; Educational Research; Educational Theories; Elementary Secondary Education; Foreign Countries; Instruction; *Integrated Curriculum; Learning Processes; Learning Theories; Metacognition; Needs Assessment; Position Papers; Postsecondary Education; Teaching Methods; *Technical Education; *Technical Institutes; Theory Practice Relationship; *Thinking Skills	
IDENTIFIERS	Reflective Thinking; Situated Learning; *United Kingdom; United States	

ABSTRACT

Changing conditions in the global market have necessitated that students be taught to adopt new knowledge by understanding it in depth and having it spontaneously available for use in the real world. All students, especially those in science and technology, must learn to construct new meanings and understandings independently by restructuring experience through reflection. A pedagogy promoting development of these abilities must be initiated in early childhood and continued throughout higher education. This pedagogy must be based on utilization of the following items: learners' knowledge about their own ways of thinking; learners' self-control and self-regulation; and learners' beliefs and intuitions. Students must be given opportunities to engage in reflective abstraction and construct new meanings for themselves by using the following metacognition skills: judgment (the ability to see particular cases or situations as parts of a greater whole and select relevant approaches to given problems); understanding of the relevance of their existing knowledge, skills, and experience; and analysis and synthesis (the ability to put experience into appropriate and meaningful mental categories). Learners must engage in "situated cognition" that draws on the culture of people actually working in the field (thus putting them in a position similar to that of apprentices). (Contains 18 references.) (MN)

TEND 2000

Crossroads of the New Millennium

Teaching Technical Students To Be Critical

Prepared and Presented

By

Dr. K.E. Shaw

Research Fellow

School of Education

University of Exeter

email : K.E.Shaw@exeter.ac.uk

Saturday 8 April, 2000

Workshop 1

Abstract

Changing conditions of competition in the global market in respect of employment and human resource accumulation, have stressed the need for revised pedagogies. Real adoption of new knowledge, particularly in science and technology, means that it must be understood in depth and be spontaneously available for use in the real world and not merely in the examination hall. Students need to have mastery of higher cognitive processes, the so-called metaskills. Central to these is a more developed awareness of their own understanding, learning strategies and mental processes. They need to be able to construct new meanings and thus understandings, independently, by restructuring experience through reflection. A pedagogy that promotes these, needs to begin early and be carried through to the end of higher education.

Teaching Technical Students To Be Critical

Not everyone is at present willing to accept that as more and more young people enter higher education, all of them are capable of developing high level skills and understanding. Yet as the economies of advanced countries have moved first from agriculture to industry, then on to advanced technological modes of production, those who go on to higher education have risen from a very small part of the age-group to over a third. The anthropologist Musgrove (1982, pp.51-55.) argued that in Africa, for example, those who moved from the countryside to the more stimulating atmosphere of the town performed better in education than those who remained villagers. There seems to be something about being brought up and living in a quickly changing society that demands modern ways of living that help younger people pick up the new behaviours quickly. They find easy and natural some things that the older generation finds difficult and harder to learn. It may well be that as we move to an information/knowledge based society with widespread electronic communication, the younger generation will continue to be stimulated, to learn and adapt readily to new conditions. There are grounds for optimism, but higher education needs continually to review its methods of teaching.

We need to be able to build on the new capacities young people are able to develop because of their exposure to new technologies and experiences. It is not just a matter of up-dating the curriculum to new knowledge. The teaching methods and approaches need to be kept up to date as well. At the same time, we need to hold on to the great traditions, such as Islam, which hold societies together in the face of change. We need to understand the older outlooks and values as we accept some new ones. In rapidly developing societies, such as the Gulf States, some people are bound to meet discontinuities in the ways they experience life as these changes take effect. Even well educated people may have problems in making sense of what is happening in their lives as values and outlooks change. Introducing what is new is never easy or free from conflict in societies. There are no "quick fixes". New elements in the local culture are forced upon societies because they have no choice but to participate in the global economy. Large groups in the population, especially the better educated, need to be able and willing to accept a measure of uncertainty and ambiguity, yet still be able to make decisions and live with the outcomes these produce. They need to develop further the ability to manage change in a critical but positive spirit. This is especially true in the world of technology.

HIGHER THINKING ABILITIES IN YOUNG CHILDREN

Any method of teaching which aims to promote the higher thinking skills needs to begin early. It cannot be left until students reach higher education. Gardner (1991) has suggested one reason. He points out that the natural endowments that enable infants to learn language so successfully also lead often to children picking up in their early years misunderstandings such as preconceptions, stereotypes and other misleading basic ideas about how the world is. This work has been done by studies of performance in mathematics and physics, but also in the social sciences. Many of the children's basic assumptions, though primitive, are adequate at first. Later, however, they have to be challenged by more sophisticated ideas and concepts which are more difficult and may appear at first to go against common sense. This is even more likely to happen if the later ideas are taught away from direct experience of reality, just verbally in the classroom and lecture hall. A common result is that these more adequate theories may be learned by the students well enough to get the desired certificates and diplomas. Yet there is plenty of evidence that, if these students meet problems which do not fit clearly within the standard classroom solutions they have learned, they often go back to the earlier misapprehensions. That is to say, unless the more advanced ideas and concepts which they ought to be applying have been learned with genuine understanding, so that they really replace the older and more basic ways of thinking. Otherwise, these inadequate approaches will persist in the students' minds. Even in mature people and higher education students they can cause misunderstandings, mistakes and wrong approaches to problem solving. Just how to teach the more advanced ideas, so as to bring about genuine understanding and not just surface learning, has been a matter for much argument, as we shall see.

For this reason, it is now considered important in the West to start teaching critical thinking, the ability to be very aware of one's own ways of thinking, early in school life. This has been described as setting out on the path that leads to metacognition. Fortunately some procedures for bringing about this sort of teaching are already known and can be employed in the first grades of the elementary school. An early pioneer was Lipman (1976). He realised that young children can be led to participate in work that might be expected to improve later achievement of higher mental processes, understanding and use of more advanced ideas. Borrowing techniques from philosophy, he tried to get teachers to be talented questioners of their pupils, not just transmitters of standard knowledge. He devised questions and material that would strengthen children's reasoning and judgement. He saw a role for enquiry in classrooms, taught in ways that would lead children to become aware of and correct poor solutions for themselves. He wanted quite young children to be taught to be aware of the context of problems, the circumstances in which they arose, to understand and think about criteria. They were to be asked to make judgements in groups through discussion in project work. Lipman's Philosophy for Children programme tried to get younger pupils to reflect on their own ways of thinking, to be more alert and talk about solutions to problems. He wanted them to pay attention consciously to what they learned about their own ways of thinking as these were revealed in group discussions. This kind of teaching was intended to be of lasting value, to encourage the students to question dogmatism, challenge assumptions and examine arguments rather than uncritically reproduce them for examinations and tests (Fisher, 1990/93).

In the UK and the USA, there are currently many anxieties about how well children have mastered basic language and number skills. Governments want ways of assessing children's achievement that can be used in comparisons to show how well schools and teachers are performing. These have dominated national testing. But a great deal of work has been done in the UK, for example by Pollard (1995) and by Adey and Shayer (1994), which is intended deliberately to get students even in the more junior grades to be more thoughtful about how they learn the subject matter of their schoolwork. Similar work is being carried out in the USA, particularly in Project Zero at the Harvard School of Education (Gardner 1991), and work at Vanderbilt University (The Cognition and Technology Group, 1990). All this is quite at the opposite extreme from 'blind' rote learning. It is hoped that children will become more self-aware, and thus more self-critical, learners. This is considered to be among the most important elements in learning-for-understanding, rather than mastering ritual, conventional, procedural learning and performances. These may enable students to make correct responses to expected cues and questions, for example in tests and examinations. But they do not often provide genuine and deep understanding that can be used for problem solving in the real world without further practice.

HIGHER THINKING ABILITIES IN THE MIDDLE YEARS

As we turn to older students and begin to leave behind the basics of elementary education, we enter into controversies about skills and competencies versus general education (Bowden, 1993, 1997). In the West, the problems go back as far as Whitehead (1929) and Dewey (1933) who drew attention to the knowledge people have but cannot make use of. They can recall such knowledge if asked directly but, if they are trying to solve non-routine problems to which the knowledge would be relevant, they have difficulty in using it. Thus, it is not simply that, as they grow, students need to replace basic simple ideas with more adequate theories; real adoption of new knowledge means that it has to be understood in depth and be spontaneously available for use. To be able to do this, students need to be much more aware of, actually notice consciously, how the new information affects their knowledge stock, how the new theories extend their own understanding and thinking. They have to be encouraged to be aware of, alert to, how their own minds work when it comes to learning new ideas and solving non-routine problems. It must be emphasised that this metacognition is not a substitute for thorough, fluent and sound knowledge. The two need to develop together. These competencies need to be fostered deliberately by teaching styles and activities, which in the US are called interventions, alongside the sort of teaching that is designed to bring about retention of knowledge. The Harvard and Vanderbilt studies have tried to invent such interventions and to examine the theories that claim to justify them.

A recent study by Goodchild (1997), based on much study of classrooms, once again stresses the well-known finding that mathematics students often cannot use their knowledge of the subject imaginatively and inventively. They may even have difficulty in reproducing aspects of mathematics that have been explained and practised, unless they are prompted. This is especially so in applications of mathematics to real life situations. In his study, Goodchild, following Schonfeld (1987), draws attention to three sorts of ways in which the mind works:

- the knowledge learners have about their own ways of thinking
- learners' self-control and self regulation -- how well they can track what they are doing, and
- learners' beliefs and intuitions -- the ideas about mathematics they bring to their work.

He claims that students can be led to reflect on their experience of learning and so construct new meanings for the material they are studying. Consequently, they gain new understandings. The operations and activities they undertake in their learning produce new experiences and new insights. If these can be handled properly, significant changes can be brought about in the understandings -- the schemata --that students already have in their minds, as a result of being stimulated to reflect in an abstract way about what they are doing. Because this is needed, the ability learners have to observe and think consciously and critically about the thinking they are engaged in needs to be deliberately developed. Often when this is not done, teachers have plenty of opportunities to observe "blind" learning taking place amongst the students. They are simply following procedural steps without conscious realisation of where they are headed. In ordinary teaching in the classroom, this sort of activity amongst the students may even produce the right answer in the test. However, the students are leaving classes with little genuine insight or understanding and what they have remembered may not be available to them for solving practical problems outside academic situations. Yet they may be able to recite the procedures, the formulae and so on confidently and fluently provided they receive the cues and questions they have come to expect.

When this sort of less productive learning is taking place, then, students are regularly engaged in accomplishing tasks which satisfy the teacher and appear productive whilst, in act, they are doing little more than blindly practising set procedures. Such students are not "doing mathematics", or "doing physics": they are "doing college". Such knowledge as they gain is restricted very largely to the predictable classroom situations, but it is not fully available to be taken across the school or college doorstep to be used confidently in the world outside. There is a long tradition in the philosophy of mind in the West that claims that the world cannot be known directly. Only organised experience can be known. If we accept this, learning is a process of continuously adapting our ideas and understandings by restructuring and reformulating the experiences we have in the lecture hall and elsewhere. We have to do something actively with what is transmitted to us by teachers. As Underhill (1991b) puts it, reflection by the learners "is the main factor which stimulates cognitive restructuring."

Students who engage in these forms of reflective abstraction whilst they are learning are being self-aware, keeping conscious track of what they are doing. They are trying to make themselves aware of the ideas about mathematics (or whatever other subject) they have brought to their work. They are constructing new meanings for themselves by metacognition. Metaskills include:

- Judgement, in particular, the ability to see a particular case or situation as part of a greater whole and to decide which amongst several possible approaches to the problem may be relevant.
- Awareness developed and cultivated understanding of the relevance of the knowledge, skills and experience a student already has, that may apply to the problem, and of the limits of their competencies. In particular, self-awareness, that is, an alert readiness to get involved in learning and problem solving activities and, at the same time, to monitor one's own performances, reactions and responses, so as to make more appropriate moves.
- Analysis and synthesis, that is, the ability to put experience into appropriate mental categories that are meaningful; also to see or impose a pattern on experience and apply these new insights in different situations and problems so as to gain some degree of control and understanding.

All these rely heavily on confidence that students get by experience and practice of the approaches we have been examining. It has, of course, to be recognised that heavy curricular demands rarely allow students much time to achieve such practice. The cost of that is a lot of "blind" learning that is often not fully understood until much later, if at all.

TYPE TWO LEARNING AND SITUATED COGNITION

At the Technological Education and National Development Conference held in Abu Dhabi in 1997, Bowden argued for higher technical education to aim for outcomes based on competencies students had achieved and could demonstrate, rather than the kind of general development of mind and self-insight that we have advocated here. Bowden's approach helps to remind us that over the past 20 years or so, views in the West about cognitive psychology have developed in at least two different directions. The first I have been discussing in this paper. It is concerned with learning as a path towards understanding, higher processes of thinking, metaskills concerned with gaining insight and mental awareness, in contrast to "blind" memorising and the practice of routine skills and procedures.

The second is "situated cognition" nearer to what Bowden wants. This is the view that good learning is very much a matter of social groups. It draws on the culture of people actually working in the field, so that learners are put in a position rather like apprentices. Bowden, and to an extent the Harvard University Teaching for Understanding project see understanding as demonstrated by something to be performed, as the ability to demonstrate a competence, or, as Perkins and Blythe (1994) put it, "giving an understanding performance".

This is a thoughtful performance in which the learner attends consciously to the attempt rather than merely executing skilled motor activity in a routine way. On this view, learning must mean that the student is engaged in activities (Gardner, 1991; Lave and Wenger, 1991) where they are required to generalise, find new examples and carry out applications of the material studied. The stress is put on the way the students develop an awareness of criteria, and on feedback to them which is evaluative and formative, that is, offered as the work progresses to aid in its achievement. It is intended that there will be opportunities for reflection as learners confront carefully chosen topics which are central to the discipline being studied. They are selected to be within the learners' experiences, as well as connected to real life and to each other. Learners have goals of "understanding that....", "appreciating that....". The course needs to include a variety of such understanding performances increasing in subtlety as the work progresses, with supportive formative feedback rather than tests.

Both these pictures of the learning process contrast with "thinking as usual" (Quick, 1994). Characteristic of the more sophisticated learning approach described above are thinking strategies of which learners are consciously aware and are drawn from a varied stock present in their minds. They are not just filling pages dutifully. When students can show that their understandings are explicit and critical, it is valued.

There is an unsettled disagreement between supporters of these two approaches in mathematics. It has been claimed that what some professionals working in the field of mathematics do, is abstract, "in the mind". Any insights and awareness are, therefore, private to the practitioner, not necessarily "situated" nor in a social context. In addition, if the object of the teaching is to bring the students to higher order capacities of the mind, and not specific vocationally related ones, Bowden's position has less to offer. All the same, it cannot be overlooked that any such attempt to modify current teaching and learning approaches has serious implications for the curriculum content as regards breadth rather than depth.

In the world of the next century, higher technical education may be willing to extend its vision beyond the production of "disciplinary experts" in specific areas such as engineering, mathematics and physics. For employment in the global market, there is likely to be a need for students to have some recognition that they must become "symbolic analysts". The sort of extended knowledge and skills they will require will include those which can be observed in think-tanks, consultancies, novel organisational settings, often with international personnel. They will have a concern for creativity by people able to work well in groups and alert to a dynamic market for knowledge-based products. Describing this sort of knowledge, Gibbons (1994) stressed that it is created when the need arises, not bought "off the shelf" but invented in response to the huge new demands of the "knowledge society" of the future. High quality human capital, that is, appropriately educated and job-socialised people, are the key resource for finding, producing and applying this knowledge in the world market.

The stream of writing that we have been considering, which insists on learning for understanding and on high quality thinking, runs into the difficulty that much learning in the classroom and lecture hall is distant from everyday reality and away from of any familiar context for the learners. Such academic knowledge runs the risk of producing a cognitive elite who function with difficulty in the world of work. Knowledge valued in this real world, which Gibbons calls "type two" knowledge, as opposed to type one which is conventional subject disciplines, is usually very strongly related to the immediate context and is judged by how it is used. It is developed on the job in the face of the problem. It is carried by experts who can see beyond their original degree discipline and are willing to borrow, hybridise and consider different perspectives side by side. As students in Higher Colleges of Technology move beyond first degree studies, they will, in many cases, soon encounter issues of policy and of management. These are related to society as much as to their degree subject and for which the stage of more advanced studies needs to prepare them.

The whole task cannot be achieved entirely by schools and higher education. Tishman et al. (1993) adds to this point the suggestion that skills and higher mental abilities are not the whole story. Learners also need a set of dispositions, an inclination, a settled system of beliefs and values, to be able to operate happily in these settings and with this style. Such traits may well be implanted and fostered in the home. They may well relate to the manner of parenting and thus they are to some extent a cultural issue. There are ways of being brought up to see the world which favour adventure, planning, breadth, curiosity, self-awareness, interest in how and why questions and in decision-making, A disposition is a sort of commitment to principles and conduct. It is not normally fostered by heavily transmissive teaching methods, which may inculcate the rule but not the spontaneous disposition to apply it thoughtfully. Hence, as well as teaching, higher education institutions need to take pains to draw students into a culture in the institution, a climate and relationships, which encourage all members to question, to seek explanations, probe assumptions, give reasons and examples and interactions. It is not simply a matter of receiving direct instruction. This is rather a tall order. As the Higher Colleges of Technology are able to move from a teaching to a teaching-and-research function, promoting such a climate within them should become easier.

Over the last 20 or 30 years, then, the work I have been discussing, which relates largely but not entirely to mathematics, science and technology, has strengthened the view that when structures and curricula are securely in place and working in the Higher Colleges of Technology, they should turn more attention to how they teach. Colleges might try to develop and implement more sophisticated styles of pedagogy. This is especially needed because of the demands of the coming global market for symbolic analysts rather than disciplinary specialists. In addition to problem solving and finding new applications, the needs of the market demand that the same technologies and skills must be constantly developed and repatterned to meet the ever new call for wider product ranges. The world economy will increase the opportunities for problem identifiers. Such people can act as brokers amongst those interested in the new technologies, and are specialists in communications with the ability to interpret new ideas. All such personnel will be able to go beyond conventional research and development into the world of policy and politics. They will be able to work on problems of how knowledge works as an economic resource. The

Higher Technical Colleges are well positioned to introduce students to "type two" knowledge, close to the market, if they are willing to work towards a modified institutional culture and revised pedagogy. This might involve flexible project teams, transient research clusters, arrangements for acting as brokers to exchange knowledge amongst different interested parties and rapid response to technological change. Such an outlook and practice would understand that a developing research culture was something more than just an elite activity for postgraduates still built on the conventional subject areas.

To sum up: higher technical, or indeed any kind of higher education, cannot be content for much longer with teaching aims and cultural styles which see their chief purpose as turning out young people qualified with their degree certificates. Changes in the global and local job market are bound to continue. Nobody can now say in advance what the graduates and post-graduates of the future will need in the way of information and skills. But it is possible to foresee the need for modified attitudes to knowledge. In particular, these will involve students in real world problems involving symbolic and conceptual analysis at a high level and in a wide range of contexts. As we in the West have become more familiar with higher education as it was carried out in the former socialist countries, we have seen how institutions can lose flexibility. They retain for too long styles of teaching and curricula, which are heavy with conventional and traditional approaches and material. These can certainly give students well-furnished minds and advanced skills. However, it is questionable whether such people are nimble enough in many cases for the faster moving conditions to which East European societies are now exposed, economically, culturally and technologically. This lack of the ability to up-date themselves to modern conditions fast enough is a long recognised difficulty for centrally controlled institutions, especially where they exist in autocratic cultures. The normal responses have been to call for improvements in the structures and the curricula of such institutions, as the TEND 97 Conference well showed.

The intention of this paper has been to argue that, whilst these two are necessary, they are not enough. There is a third element of equal importance. It is to move to a more up-to-date approach to teaching and a modernised, opened-up culture within the institutions. Approaches and methods of teaching and learning, in classrooms, lecture halls, laboratories, workshops and computer workstations tend to be matters for private individual decision. They are less likely to be debated in public than matters of structure and curriculum.

Revisions in the way people teach and learn tend to depend on insights and experiences which are shared within the teaching staff. They are often derived from research sources much less well known to the public and to administrators than structures and curricula. They can be developed and spread within the individual institution if its is run in an open way. It certainly helps if there are other necessary changes taking place at the same time, so that there is a general atmosphere of change and renewal going on. On a worldwide scale, the rapid appearance of mass rather than elite higher education has loosened up institutions in many countries. This is rather like the last big change in higher education when the university, which had seen itself as the House of Intellect, steadily came to take on the role of the School for (professional and technical) Skills. We are still digesting this major change. In a rapidly moving world, each major change in any institution is not final; it is just a rehearsal for the next. And each of these major changes has to be managed in such a way that the great traditions of the individual states which the institutions serve are fully taken into account and also change a little as a result.

REFERENCES

- Adey, P. and Shayer, M., (1994). *Really Raising Standards,* London: Routledge
- Bowden J.A. and Masters, G.N., (1993). *Implications for Higher Education of a Competency based Approach to Education and Training.* AGPS:Canberra, Aus.
- Bowden J.A., (1997). "Competency Based Education: Neither a Panacea nor a Pariah", *Proceedings of Technological Education and National Development 97 Conference,* Abu Dhabi.
- Dewey, J, (1933). *How We Think,* 2nd Edn. Boston Mass.:D.C.Heath.
- Gardner, H., (1991). *The Unschooled Mind,* London:Fontana
- Goodchild, S., (1997). "An exploratory study of year ten students goals in the mathematics classroom", *Unpublished PhD,* University of Exeter.
- Fisher, R., (1990/93). *Teaching Children To Think,* Hemel Hempstead: Simon and Schuster Educational.
- Gibbons, M., (1994). *The New Production of Knowledge,* London: Sage.

- Lave, I and Wenger, E., (1991). *Situated Learning*, Cambs: CUP
- Musgrove, F., (1982). *Education and Anthropology*. Chichester: John Wiley and Sons.
- Perkins, D and Blythe, T., (1994). "Putting understanding up front", *Educational Leadership*, Feb., pp.4-7.
- Pollard, A. and Filer, A., (1995). *The Social World of Children's Learning*, London: Cassell.
- Quick, J, (1994). *Pupil culture Curriculum Studies* 2, 1. pp.99-117.
- "1996 Learning and context." *British Journal of the Sociology of Education*. 17, 1 pp.103/113
- Schonfeld, A.H. (ed.), (1987). *Cognitive Science and Mathematics Education*
- Tishman, S. et al., (1993). "Teaching thinking dispositions", *Theory into Practice* 32. pp.147-153.
- Underhill, R.G., (1991). "Learning to teach: the programme director's response", *Journal of Education for Teaching* 17, 1. Pp.73-79.
- Whitehead A.N., (1962). *The Aims of Education*, 3rd edition, originally 1929, London:Benn

CE080880

U.S. Department of Education

Office of Educational Research and Improvement (OERI)
National Library of Education (NLE)
Educational Resources Information Center (ERIC)

ERIC®

REPRODUCTION RELEASE

(Specific Document)

I. DOCUMENT IDENTIFICATION:

Title: TEND 2000 CONFERENCE PROCEEDINGS	
Author(s):	
Corporate Source: HIGHER COLLEGES OF TECHNOLOGY	Publication Date: APRIL, 2000

II. REPRODUCTION RELEASE:

In order to disseminate as widely as possible timely and significant materials of interest to the educational community, documents announced in the monthly abstract journal of the ERIC system, *Resources in Education* (RIE), are usually made available to users in microfiche, reproduced paper copy, and electronic media, and sold through the ERIC Document Reproduction Service (EDRS). Credit is given to the source of each document, and, if reproduction release is granted, one of the following notices is affixed to the document.

If permission is granted to reproduce and disseminate the identified document, please CHECK ONE of the following three options and sign at the bottom of the page.

The sample sticker shown below will be affixed to all Level 1 documents	The sample sticker shown below will be affixed to all Level 2A documents	The sample sticker shown below will be affixed to all Level 2B documents
PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY Sample TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) 1	PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL IN MICROFICHE, AND IN ELECTRONIC MEDIA FOR ERIC COLLECTION SUBSCRIBERS ONLY, HAS BEEN GRANTED BY Sample TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) 2A	PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL IN MICROFICHE ONLY HAS BEEN GRANTED BY Sample TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) 2B
Level 1	Level 2A	Level 2B
☑	☐	☐
Check here for Level 1 release, permitting reproduction and dissemination in microfiche or other ERIC archival media (e.g., electronic) *and* paper copy.	Check here for Level 2A release, permitting reproduction and dissemination in microfiche and in electronic media for ERIC archival collection subscribers only	Check here for Level 2B release, permitting reproduction and dissemination in microfiche only

Documents will be processed as indicated provided reproduction quality permits.
If permission to reproduce is granted, but no box is checked, documents will be processed at Level 1.

I hereby grant to the Educational Resources Information Center (ERIC) nonexclusive permission to reproduce and disseminate this document as indicated above. Reproduction from the ERIC microfiche or electronic media by persons other than ERIC employees and its system contractors requires permission from the copyright holder. Exception is made for non-profit reproduction by libraries and other service agencies to satisfy information needs of educators in response to discrete inquiries.

Sign here, → please

Signature:	Printed Name/Position/Title: ANTHONY BILLINGSLEY SUPERVISOR PUBLIC RELATIONS	
Organization/Address: PO BOX 25026 ABU DHABI, UAE.	Telephone: (971-2) 6814600	FAX: (971-2) 681 0830
	E-Mail Address: anthony.billingsley@hct.ac.ae	Date: 22.10.00.

(over)