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# Preface

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ELSA LEO-RHYNIE

*Chair, Board for Undergraduate Studies, UWI*

Intense debate about changing educational needs in technology-driven knowledge economies and a globalized world has been taking place worldwide for practically two decades. The Caribbean is no exception, and the concept of quality assurance has been a concern at all levels of the education system. On 8 and 9 June 2005, the Office of the Board for Undergraduate Studies staged a conference with the objective of spreading the quality message to a wide audience and to encourage a concentration on quality at all levels of the educational system. The theme “Quality Enhancement: Innovation and Change” was chosen to shift attention from quality assurance to consider how quality can be enhanced: this implies a commitment to a continuous improvement in quality, which can best be achieved through innovation designed to bring about the types of change which result in system, institution and individual development and advancement. The conference was an avenue for the examination and discussion of issues that are vital to the improvement of the quality of education in the Caribbean, with the sharing of research, perspectives and opinions which have the potential to inform policy, as well as stimulate interventions at various levels of the education system.

This volume of the *UWI Quality Education Forum* presents twelve major papers from this conference and is an important means of ensuring wide dissemination to the Caribbean education community of the information shared in that two-day event.

In the first article, Elsa Leo-Rhynie points to the concern for quality education in the Caribbean in the face of many changes in the educational

provisions over the past decade. This concern includes the intellectual competencies that are going to be required in the future (educational output), and how societies can, through their educational systems and curricula, prepare their citizens, from birth to adulthood, to develop these competencies (educational input and process). The issue of accountability and the challenge of ensuring both quality and accountability are examined, with particular reference to Jamaica. Responses to these concerns have to be guided by a wide range of factors, not least of which is the knowledge of many Caribbean countries' serious shortage of resources, and a recognition that those resources that are available must be used to the best advantage.

A major resource must be technology, which is an important component of the language and tools of education in the twenty-first century, opening new avenues of communication, and the possibilities of increased access and improved quality in the educational product. The papers from Robert Lancashire, Christian Posthoff and Stewart Marshall all emphasize this with focus on different areas. Robert Lancashire highlights the immense potential that exists for increasing the impact which computers can have in teaching and learning, while Christian Posthoff provides us with examples that emphasize the way in which computers can and should develop and enhance cross-disciplinary and interdisciplinary teaching and learning. Stewart Marshall's "emancipatory" model, which recognizes and values the contributions of learners to the learning process, discusses the role that information and communication technologies can play in enabling students from a variety of cultures and experiences to exchange ideas and engage in debate and discussion, as well as work collaboratively. Special considerations relating to teacher education, particularly in the area of science education, in this dynamic environment will be a priority. The paper by Ann Childs and Jane McNicholl presents us with an analysis of the requirements of teacher education in the twenty-first century and the challenges of meeting this need.

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**Intense debate about changing educational needs in technology-driven knowledge economies and a globalized world has been taking place worldwide for practically two decades. The Caribbean is no exception, and the concept of quality assurance has been a concern at all levels of the education system.**

Angela Glasner critically examines the task of re-engineering education for quality enhancement. She emphasizes that the practice of education, if it is to be relevant and quality driven, must be research informed and learner led. This is the challenge for educators in a world where education is becoming big business, and is in a constant state of dynamic change. The extent to which students' post-secondary learning experiences contribute to their intellectual and psychological development is explored in Christopher Knapper's paper, which emphasizes the implications of this information for curriculum development, teaching strategies and learning outcomes. The concern with relevance, quality and learning outcomes is vital in the context of a global world where services, including educational services, are liberalized. Sandra Gift, in her paper, explores the implications of transnational education for the Caribbean and highlights the national and regional concern for quality assurance and accreditation. The importance of implementing regulatory strategies to assess and monitor the quality of the diverse services being offered in the region as well as the varied methods of delivery of these services is stressed.

Including and maximizing the learning of the gifted and talented, of students with physical disabilities, and those with learning problems are vital in the discussion of quality enhancement. Mary Dixon, Celene Gyles and Carey Phillipps share with readers the challenges that "including the excluded" presents. Mary Dixon looks at special education in the context of the Education for All mandate, and urges a shift in focus from provision of remedial and compensatory services to a more preventative stance. Celene Gyles shares research findings which look at the post-school adjustment of blind and visually impaired students and highlight the important contribution of self-determination on student success. The importance of providing affective learning experiences to assist in the development of this and other adjustment behaviours is emphasized. Carey Phillipps focuses attention on "twice-exceptional" children – those who are gifted and talented students and who are also suffering from disabilities and other disorders. The importance of adequate testing and the use of appropriate teaching approaches and techniques have implications for teacher education as well as for the provision of services designed to address the needs of these groups.

In the context of the global Education for All thrust, Claudia Harvey iden-

tifies initiatives taken by UNESCO, with various partners, in achieving internationally agreed education development goals. Her evaluation of the progress being made in sub-Saharan Africa, and the comparison with the Caribbean and other developing countries illustrate the “challenges of context and the opportunities and limitations of curriculum in addressing these challenges”. Quality education is reaffirmed as a powerful force in the struggle for quality livelihoods and quality lives in these contexts.

The conference and this publication have been supported by the Commonwealth Secretariat, UNESCO, the University of the West Indies Office of Finance, the Offices of the Principals of the Cave Hill and St Augustine campuses, and Jamaica Money Market Brokers. Publication of the papers will ensure that the issues are widely disseminated and will contribute to curriculum development and teaching, new research, as well as policy development and implementation. A deepening and entrenchment of the quality initiative in the culture of educational institutions is eagerly anticipated.

December 2005

# A Concern for Quality, a Need for Accountability

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ELSA LEO-RHYNIE

The quality of the education being provided by the educational systems of the anglophone Caribbean is being challenged by educators, parents, students and other stakeholders, who point to the wastage and less than optimal performance of the education systems. Using the June 2004 results of the Caribbean Examinations Council (CXC) Caribbean Secondary Education Certificate (CSEC) examinations as a crude measure of performance and quality of output following five years of secondary schooling, the indicators are not encouraging.

- Of 81,141 students sitting, 49.6 per cent are able to gain acceptable grades 1, 2 or 3 in English language. A much smaller number of students, 17,170, sat English literature, with 64.8 per cent gaining grades of 1, 2 or 3.
- Of the 76,873 students who sat mathematics, 35.1 per cent attained grades 1, 2 or 3.
- In the sciences, the pass rate for biology is 62.5 per cent of 12,422 sitting; for chemistry 53 per cent of 8,732 candidates sitting; and for physics 61.4 per cent of 8,042 sitting.
- Performance is somewhat better in the business subjects: 25,792 sat principles of accounts and 32,946 sat principles of business, with 77.9 per cent and 81.2 per cent, respectively, gaining grades of 1, 2 or 3.

A major concern has also been the gender composition of students sitting these examinations. Despite the fact that equal numbers of boys and girls make up the age cohort, many more girls than boys enter for and sit these examinations. Of 402,979 subject entries, 257,279 were from girls and 145,700 from boys.

These issues raise questions and concerns about the quality of the Caribbean education systems, which, at the end of twelve years of schooling, cannot yield results that are consistently above 50 per cent in mathematics and English, and which are failing to retain boys to continue the pursuit of education. The trends identified in the CXC/CSEC results and used as an indicative measure of performance of the systems persist at the tertiary level.

What is quality education? This quality has been variously defined: it has been viewed in terms of excellence, of consistency, of meeting certain standards, as transformation of students, as value for money and as meeting market demand. It is often defined and assessed by examining certain indicators, such as examination results, access, enrolment, attendance, retention and drop-out ratios, literacy levels, and expenditure on education as a percentage of national budgets. These indicators are vitally important signs of quality but they are also inadequate in terms of providing a comprehensive definition or indication of quality.

Rapid change, the growth of technology, and the development and success of knowledge economies have generated the demand that academic institutions be more relevant, more accountable, demonstrate greater flexibility and increased responsiveness to the requirements of local communities, as well as national, regional and international needs. Students, their parents and employers have become more demanding in terms of the types of courses, programmes and learning opportunities they require, and this is at all levels of the educational system. In tertiary and higher education, in particular, new policy directions in the Caribbean in terms of human resource development, the changing demographic profile of persons wishing to access such education,

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the heightened demand for tertiary education from several sectors of the society, and the increasing competition to supply this education force the University of the West Indies and other national and regional tertiary-level institutions to be responsive to these demands in creative and innovative ways. The demand is for quality, in governance, in management as well as in the academic and administrative services offered by these educational institutions.

The demand cannot be focused at the tertiary level exclusively, however. A clear focus must be quality education from birth. Early childhood development was recognized at the Education for All Forum in India in 1993 as the important foundation for lifelong learning. Integrated, well-planned strategies for maximizing the curiosity and learning potential of children are vital, and the resources for accomplishing this and providing quality experiences for young minds and growing bodies are crucial.

The quality issue in education is one which is of international concern, and addresses several levels. Institutional quality, programme quality, and input, process and output quality are all considerations of educational systems. Bogue and Hall (2003) point out that the quality concern ought to be shared by leaders of educational institutions, who must develop a strong curiosity of purpose: What are we trying to achieve? How good a job are we doing and how do we know? Stakeholders are also asking similar questions of quality and performance; questions that are vital to the process of re-engineering learning, of crafting relevant and innovative education for new generations and a globalized world. The crucial question of relevance is, What sort of intellectual and lifestyle competencies are going to be required in the future (output), and how can societies, through their educational systems, prepare their citizens, from birth to adulthood, to develop these competencies (input, process)? Responses to these concerns have to be guided by a wide range of factors, not least of which is the knowledge of many of our Caribbean countries' serious shortage of resources, and a recognition that those resources that are available must be used to the best advantage.

Stakeholders are also indicating their expectations of a quality system: employers want a quality graduate of the education system to have excellent communication and practical problem-solving skills (Brown, Stewart and

Bell-Hutchinson 2005). Recently, there have been increasing calls for a concentration on the entrepreneurial graduate – one who can be innovative, self-confident and risk taking, and who will have an interest in creating rather than seeking employment (“Hill Bats for Entrepreneurism”, *Daily Observer*, 20 May 2005).

The students who graduate from quality education systems in the early decades of the twenty-first century will have to be very knowledgeable and technically competent, multi-skilled, marketable, and committed to continuous learning throughout life. They must be prepared, from early childhood and primary through secondary and tertiary levels of education, to be able to think strategically, to recognize, appreciate and respect diversity in all its forms, and promote equity of gender, social class, ethnicity, sexual orientation, age, race, creed and other cultural factors. They must be able to communicate well, both orally and in writing, with diverse cultural groups. They will have to be self-assured, confident in their abilities to make a contribution locally at the community level, nationally and/or internationally, and to effect change. They must be quality driven, prepared to demonstrate an excellent work ethic and to be catalysts in their communities; committed to empowering others to deal with the new world order intelligently. Most importantly, they must be committed to high standards of ethical behaviour (OBUS 2003).

If these are the desired or expected outcomes of educational systems in the first decade of the twenty-first century, we are forced to consider, in terms of quality of education, the sort of educational environment and educational process that must be created to foster the development of the citizens described. The relevance focus of the quality imperative demands the development and implementation of educational systems that will have as their goal the effective preparation of such students.

The questions of quality that need to be posed when discussing outcomes and relevance highlight issues of inputs and process. These questions include the following:

- Are students obtaining the sort of educational experiences which will produce the desired outcomes?
- How can we design and implement curricula which will address the provision of appropriate experiences?

- How can we develop assessment instruments which test the range of competencies deemed to be important?
- To what extent can the new technology and changed delivery modes incorporate methodologies which will stimulate the development of creativity and initiative, and build motivation?
- How can we attract those who seem to have given up on schooling as a means of preparation for life and who are seeking their education on the streets?

The multidisciplinary nature of the responses to such questions and the need to be aware of this in order to adequately address the issues require that we have a reliable knowledge of the environments in which our young children grow and develop, the youth culture in our societies, the nature and extent of peer and other influences, and the influence of the media. Our judgement of the emerging culture must be based on sound evidence and reliable data, and those who set policy and devise curricula must be prepared to accept, without condemnation, new norms of behaviour. We also need to consider how we can change these new norms if change is needed. How can we design curricula to effect such change? How can we engage our educational institutions as resources for national and regional problem-solving in this area through the conduct of rigorous research, using the most appropriate methodologies, so that a sound informational base will be able to promote reasoned decisions? How can we include and maximize the learning of our gifted and talented, our students with physical disabilities, our students with learning problems?

The need for change in approaches to research has been pointed out by Gibbons (2002), who notes that the traditional Mode 1 research of universities (disciplinary, and governed by academic interests and practices) will have to adjust to recognize and embrace what he refers to as Mode 2 research, which is conducted outside of, as well as within universities, and which will allow greater interdisciplinarity and relevance in terms of addressing problems relating to public and social policy and scientific and technological development. Caribbean tertiary and higher education institutions must continue to serve as resources for national and regional problem-solving, especially in edu-

cation, and this requires ongoing research capacity building and collaboration with agencies, governments, business entities and communities in order to ensure a strong developmental focus in the research conducted.

Quality thus needs to be defined broadly. Beckles, Perry and Whiteley (2002) define quality at the University of the West Indies as relevance and fitness for purpose, and they speak to the holistic nature of the educational experience with which students must be provided in a quality educational institution. Such broad perspectives of quality education have led to the development of educational institutions that are being termed “learning communities”, because every exchange, every interaction, is seen as a teaching and learning moment (Barr and Tagg 1995).

The quality initiative in educational institutions which are learning communities cannot be limited to the realm of academics, although this is vital. The importance of the scholarship of teaching (Boyer 1990) and the quality delivery of teaching using the most appropriate methodologies, based on rigorous research and employing up-to-date technology cannot be disregarded. In the learning community, however, transdomain learning is vital; learning in the cognitive and affective domains is equally important and is the responsibility of all educators in the community. In learning communities, educators include administrative, technical and supervisory staff who must be involved in customer care and customer-service training in order to extend the quality initiative to the services provided by the entire community. Recognition of the importance of the non-academic aspect of student learning is an important part of the quality thrust, and is addressed through career education, guidance counselling, family life education, sporting activities and coaching provisions, sponsorship of development programmes, and co-curricular activities. Promotion of affective as well as cognitive learning is vital to students’ educational experience, their readiness for the world of work and their all-round development.

The quality imperative has specific relevance to teacher education, which must respond to the challenge of change. New teaching competencies must be geared towards providing student-centred activities and on identifying and meeting the needs of different ability levels in their classrooms. The focus must be a shift in perspective at all levels from considering and framing goals

of educational systems and institutions in words that capture inputs: in the classroom, the focus is often on the activities of the teachers rather than the outcomes expected of the learners. Educators (Barr and Tagg 1995; Barr 1998) advocate a shift in focus to the learner, which demands the creation of quality learning environments in our educational institutions. Such environments are characterized by a culture of student learning and development in which there is integrated learning, with links being established between subject areas and a strong focus being placed on research, cooperative and experiential learning.

The focus on outcomes also demonstrates the irrelevance of many of the elements of the educational process, including some of the teaching tools which have been used traditionally. Many of these tend to promote rote memorization and are not geared to developing the questioning, searching minds and higher-order thinking skills required of the graduates of a quality educational system. Crucial to the change are creative educators who are technologically competent and who can produce teaching materials to be delivered through the medium of computer software, the Internet, video and audio tapes as well as print. All delivery modes should incorporate methodologies that will stimulate the development of creativity and initiative, build motivation, and facilitate achievement. Trained teachers, as one output sector of the education system, and an important input resource, must be prepared to demonstrate the skills and competencies demanded of graduates of a quality system so that they will have the confidence to transmit the appropriate messages to their students and ensure a quality product.

Teacher education cannot be confined to preparation for the teaching of subject/content areas in a variety of modes and using high-tech media. The objectives of quality education must extend far beyond subject matter competence, and the role of education in character building, positive attitude and value formation must be acknowledged and emphasized. This focus implies

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reaching beyond the cognitive domain to embrace those aspects of student development that include the development of a culture of ethical behaviour in educational institutions and in the wider society.

The focus on quality in education is usually trained on the classroom activities of schools, colleges and universities. Equally important are the efficiency, transparency and accountability that must characterize the management of these institutions. Students, parents, employers, the governments and the taxpayers all invest significantly in education, and these stakeholders must be assured that institutions are demonstrating fiscal responsibility and constantly striving to achieve a good balance between maintaining reasonable costs and high quality.

The concern for quality has led to calls for accountability: When students fail, who or what is to blame? Recent rankings in the print media in Jamaica of the performance of schools in the CXC CSEC imply that schools must be accountable for their students' performance, while the recommendation of the 2005 Jamaican Task Force on Education that performance pay for teachers be introduced suggests that teachers are being held accountable for their students' performance. The responses to such analyses urge an understanding of the multifaceted nature of the educational process and the dangers of pinpointing single variables to try and explain the complex interaction of factors associated with student success and failure.

The quality and accountability issue takes on a new dimension when private educational providers enter the marketplace, and the liberalization of educational services and transnational education become important elements in the education scenario within national and regional borders. How can users and stakeholders be assured of the quality of the offerings of private and overseas providers who deliver their programmes using a range of modes and employing First World marketing strategies to attract participants? Can the institutional label on a distance-delivered course be considered a trustworthy indicator of quality? Accountability has become a crucial need in the current education landscape.

Recognition of this need has led to calls for accreditation and the importance of regulating the quality of educational programmes offered. Accreditation originated in the American higher education system and has

gained popularity because of the two important functions it performs in that country. The first is to provide a nationally accepted and recognized assurance of a minimum quality standard to protect students and their families from falling victim to fraud and abuse by unscrupulous providers. The second function is to provide a standardized measure of what constitutes an academic credit, so that transfers across institutions can be facilitated and also that employers can have reasonable expectations from a graduate with credits in specific subject areas.

Caribbean countries have already or are in the process of establishing accrediting agencies to regulate the provision of educational services within their national boundaries. Such accreditation constitutes an attempt to hold programme providers accountable for the standard of the education delivered and the utility of the qualifications offered. This development is in keeping with UNESCO's view that the quality of the education that countries offer within their borders be determined by national developmental priorities and interests, a view supported by the 1998 UNESCO Declaration on Higher Education, which emphasizes the importance of providing assistance to developing countries to strengthen national educational systems rather than imposing "foreign models". The declaration states that national educational systems "have the right and the duty to regulate the provision of education, including the licensing of schools and universities, the accreditation of courses, and ensuring that course contents are culturally appropriate".

The increase in local, regional and international education providers in the Caribbean, particularly at the tertiary level, the use of new delivery modes, and the possibilities for increased student choice and mobility all complicate the already difficult issues of credit transfers, advanced placement, articulation, recognition of qualifications and accreditation, and there have been calls for regional and even international accreditation.

The Council for Higher Education Accreditation (CHEA) in the United States notes the ongoing debate about whether international standards for higher education ought to be established, or whether such standards should be national or regional. The president of CHEA observes that

some supra-national organizations are giving increasing attention to quality assurance. These include the United Nations Educational, Scientific and

Cultural Organization (UNESCO), the World Bank, and the Organization for Economic Cooperation and Development (OECD). In general, these organizations favor the development of regional or international quality standards as they focus on the role of higher education in the economic development of individual countries. (CHEA, 2002)

The 1998 UNESCO Declaration on Higher Education anticipated the need for the development of international regulations for educational practice, and this is a priority focus of the UNESCO Global Forum on International Quality Assurance, Accreditation and the Recognition of Qualifications. The main objective of this global forum is to address new challenges to access, quality and equity that have emerged as a result of the increase in private and commercial provision of higher education worldwide.

A major consideration will have to be the development and maintenance of national and regional institutions to ensure the levels of relevance, responsiveness, innovation, quality and accountability necessary to meet the needs of students, employers and the developing societies. In that regard, accountability also embraces considerations of the cultural penetration and lack of relevance of external educational services to local and regional cultures. Higher education in the Caribbean has traditionally played a pivotal developmental role in the region by providing the human resource to assume leadership in productive endeavours and by functioning as the knowledge base relied upon to drive Caribbean economies. Persistence of this “public good” is important, but transnational education and the advent of overseas providers could erode this vital function of Caribbean education.

Accountability may be defined as a formally expressed expectation that

1. requires evaluation of both administrative and educational services;
2. asks for public evidence of programme and service performance
3. encourages independent/external review of such performance evidence; and
4. requests information on the relationship between dollars spent and results achieved. (Bogue and Hall 2003, 229)

This definition captures the internal and external concerns about quality in academic as well as non-academic areas and the need for evidence gathering to satisfy the accountability criterion which stakeholders demand.

The quality concern and the accountability demand often create a tension in educational institutions. Bogue and Hall (2003, 229) typify the quality and accountability cultures as being in opposition because of the motives and the methods of civic and collegiate accountability. They describe this tension as

- Improvement vs. stewardship
- Peer review vs. regulation
- Process vs. results
- Enhancement vs. compliance
- Consultation vs. evaluation
- Trust vs. evidence
- Interpretation/holistic vs. measurement/specifics

These cultures cannot remain in opposition; they must be reconciled in order to fully service both educational quality and accountability requirements.

The theme of this conference highlights quality enhancement and emphasizes moving beyond assurance and/or compliance towards innovation and change. To do so requires a blend of the cultures, working towards the quality criterion we must demand of ourselves as educators, as schools, as colleges and universities, and as educational systems, and also meeting the accountability demand of providing the performance evidence that will assure stakeholders – educators, policymakers and the public – that we, our schools, our colleges and universities, and our educational systems, are producing desired results.

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# Science, Technology and Curriculum

## Integration for Quality

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ROBERT J. LANCASHIRE

### Introduction

This paper was prepared several days after the Quality Enhancement conference and attempts to describe my PowerPoint presentation during the session Science, Technology and Curriculum.

The first two slides shown were added as potential discussion points and came from a World Bank report and an Australian education initiative called “The Qualifications Framework”. The idea was to set the context of what was guiding the policy process for science education and what were the expectations of students who were graduating with a bachelor of science from Australian institutions. I made the point that many of these concerns had been expressed by the University of the West Indies (UWI) as well.

### Mapping Science Education Policy in Developing Countries

Professor Keith Lewin, director of the Centre for International Education, University of Sussex, England, and chair in the Institute of Education explains that

Orthodox views of science education tend to stress the importance of discovery, invention and understanding of the natural world over application, improvement of already existing technologies, and the development of scientific knowledge related to the needs of the poor and marginalised.

The central point is that the kinds of science education and training that might prepare young people to generate new technologies, invent new products, and discover fundamental scientific truths may well not be the same as that best suited to adapt the application of existing science and technology to new contexts. (World Bank, Human Development Network Secondary Education Series, 2000)

## Bachelor's Degree Guidelines

The Australian Qualifications Framework (<http://www.aqf.edu.au/bmdguide.htm>) gives the characteristics of learning outcomes at this level as

1. the acquisition of a systematic and coherent body of knowledge, the underlying principles and concepts, and the associated communication and problem-solving skills;
2. the development of the academic skills and attributes necessary to undertake research, comprehend and evaluate new information, concepts and evidence from a range of sources;
3. the development of the ability to review, consolidate, extend and apply the knowledge and techniques learnt, including in a professional context;
4. a foundation for self-directed and lifelong learning; and
5. interpersonal and teamwork skills appropriate to employment and/or further study.

## Overview

The following slide gave an overview of the remainder of the presentation:

- Characteristics of UWI science students
- IT infrastructure changes at UWI

- The Internet as a resource
- Web-based teaching and learning

## Student Statistics 2002/2003

It is generally noted that the UWI student population has a roughly 3:1 female-to-male ratio. While this holds true in the non-science faculties, the figures for science suggest that it is much closer to 50:50.

Table 1

Agriculture			Engineering			Medicine			Science			U'grad Nos.	
	F/T	P/T		F/T	P/T		F/T	P/T		F/T	P/T		
Male	90	6	Male	739	57	Male	614	1	Male	1,195	283	Male	8,762
Female	113	19	Female	261	11	Female	949	2	Female	1,407	201	Female	18,034
Total	203	25	Total	1,000	68	Total	1,563	3	Total	2,602	484	Total	26,796

## Age Characteristics 2004/2005 of New Students

Another significant difference between science and non-science students is their age at the time of admission to UWI. The figures show that 95 per cent of science students are under twenty-five years old and so they predominantly enter UWI straight from high school. In science, 81 per cent were less than twenty years old at entry, compared to social sciences, for example, where 42 per cent were less than twenty years old. This should have an impact on maturity and perhaps intensity of purpose, and may well affect their ability to cope with technical areas such as software applications. Little has been done to assess the impact of this difference.

Table 2

Age	Humanities/Education				Law				Medicine				Pure & Applied Sciences				Social Sciences				Total			
	M	F	Total	%	M	F	Total	%	M	F	Total	%	M	F	Total	%	M	F	Total	%	M	F	Total	%
<20	104	321	425	36	2	18	20	45	21	128	149	34	218	302	520	81	140	595	735	42	485	1,364	1,849	46
20-24	58	190	248	21	3	12	15	34	28	137	165	37	54	39	93	14	93	240	333	19	236	618	854	21
25-29	31	155	186	16	2	2	4	9	3	51	54	12	9	6	15	2	58	189	247	14	103	403	506	12
30-34	18	86	104	9	1	1	2	5	3	32	35	8	3	1	4	1	33	31	164	9	58	251	309	8
35-39	19	56	75	6	2	0	2	5	4	24	28	6	7	0	7	1	26	93	119	7	58	173	231	6
40-49	16	98	114	10	0	0	0	0	0	11	11	2	1	3	4	1	38	84	122	7	55	196	251	6
>50	5	30	35	3	0	1	1	2	1	0	1	0	2	0	2	0	4	14	18	1	12	45	57	1
Totals	251	936	1,187		10	34	44		60	383	443		294	351	645		392	1,346	1,738		1,007	3,050	4,057	
Percent	21	79			23	77			14	86			46	54			23	77			25	75		

## Infrastructure at Mona

- The Mona campus now has over thirty-five hundred PCs connected to the IT Gb backbone.
- There are student laboratories ranging from less than ten to more than fifty PCs.
- Most staff have direct access from their offices.
- Email for fifteen thousand users is now filtered for spam and viruses (more than fifty thousand per day).

From the humble beginnings of a daily dial-up to the University of Puerto Rico to get email to the point where the Mona campus receives over sixty thousand mail messages a day in just over eleven years is remarkable.

To be in a position to offer distance education by electronic methods, such as via the Web, requires that the sites are accessible 24/7 and 365 days of the year. Fortunately, hardware has become much more reliable and this is less of a burden than it once was. In addition, turnaround times on responses to student queries and input needs to be within hours not days. This mandates a distinct change in culture from face-to-face teaching and is a heavy commitment, especially when dealing with diverse time zones that would come with students being anywhere in the world.

## Google Searches

The next slide showed the extent that Web content had grown over the years and reveals a huge leap in the number of pages being found by the search engines. What is not known, though, is the accuracy of information available from these pages and one of the prime responsibilities of teachers in the Internet age is to prepare students for information overload and how to distinguish the relevant information from garbage.

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**To be in a position to offer distance education by electronic methods, such as via the Web, requires that the sites are accessible 24/7 and 365 days of the year.**

Key Word(s)	AV Indexed Pages	G Indexed Pages	G Indexed Pages	G Indexed Pages
	October 1999	January 2002	January 2003	June 2005
Biochemistry	880,465	1,250,000	1,700,000	28,000,000
Biology	3,026,279	6,540,000	8,800,000	138,000,000
Botany	458,666	711,000	1,010,000	10,400,000
Chemistry	3,786,033	5,710,000	8,230,000	118,000,000
Computer Science	17,423,978*	2,020,000	2,760,000	78,400,000
Geography	1,814,699	3,450,000	4,840,000	49,800,000
Geology	879,187	1,910,000	2,610,000	28,700,000
Mathematics	3,444,998	6,210,000	8,410,000	114,000,000
Physics	4,662,627	7,330,000	11,600,000	152,000,000
Zoology	250,730	593,000	795,000	8,200,000
Sex	10,756,899	75,400,000	202,000,000	163,000,000

## Our VLE: E-learning Environment

The Mona campus is moving from the WebCT-based environment to a Moodle course management system called OurVLE (virtual learning environment). Currently, there are hundreds of courses being developed for use via the Web and access is by student ID and password. It is already possible to complete a programme entirely by distance.

**THE UNIVERSITY OF THE WEST INDIES @ MONA**

English (en) Login

**Main Menu**

- Site news
- Downloads
- Student FAQs
- Need Help?
- Course Container Request Form
- Test Chat Instructions
- Test Chat (For trial only)

**Courses**

- eLearning Tutorials
- Foundation Courses
- Faculty of Humanities & Education
- Faculty of Medical Sciences
- Faculty of Pure and Applied Sciences
- Faculty of Social Sciences
- Search courses...
- All courses...

**Course Categories**

Course Category	Count
eLearning Tutorials	3
Foundation Courses	8
Faculty of Humanities & Education	0
Caribbean Institute of Media and Communications	59
Department of Educational Studies	216
Department of History and Archaeology	63
Department of Language, Linguistics and Philosophy	53
Department of Literatures in English	36
Department of Library and Information Studies	39
Department of Modern Languages & Literatures	50
Faculty of Medical Sciences	0
Department of Advanced Nursing Education	56
Department of Community Health & Psychiatry	51
Bachelor of Medicine, Bachelor of Surgery	0
B. Med. Sciences	0
Year 1	0
Semester 1	6
Semester 2	3
Year 2	1
Semester 1	3
Semester 2	0
Year 3	1
Semester 1	1
Semester 2	3
Faculty of Pure and Applied Sciences	1
Department of Chemistry	37
Department of Geography and Geology	43
Department of Mathematics and Computer Science	76
Department of Life Sciences	50
Department of Physics	71
Faculty of Social Sciences	0
Centre for Hotel and Tourism Management	32
Department of Government	69
Department of Economics	57
Department of Management Studies	109

**Login**

Username:

Password:

Login

**eLearning @ UWI**

**Latest News**

- 04 May, 10:00 - OurVLE Administrator BED Secondary (Distance) Project more...
- 23 Feb, 17:01 - OurVLE Administrator Urgent Notice more...
- 14 Feb, 16:00 - OurVLE Administrator OURVLE REFRESHER TRAINING FOR B.ED DISTANCE STUDENTS more...

Oldest discussions ...

**Calendar**

<< May 2005 >>

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

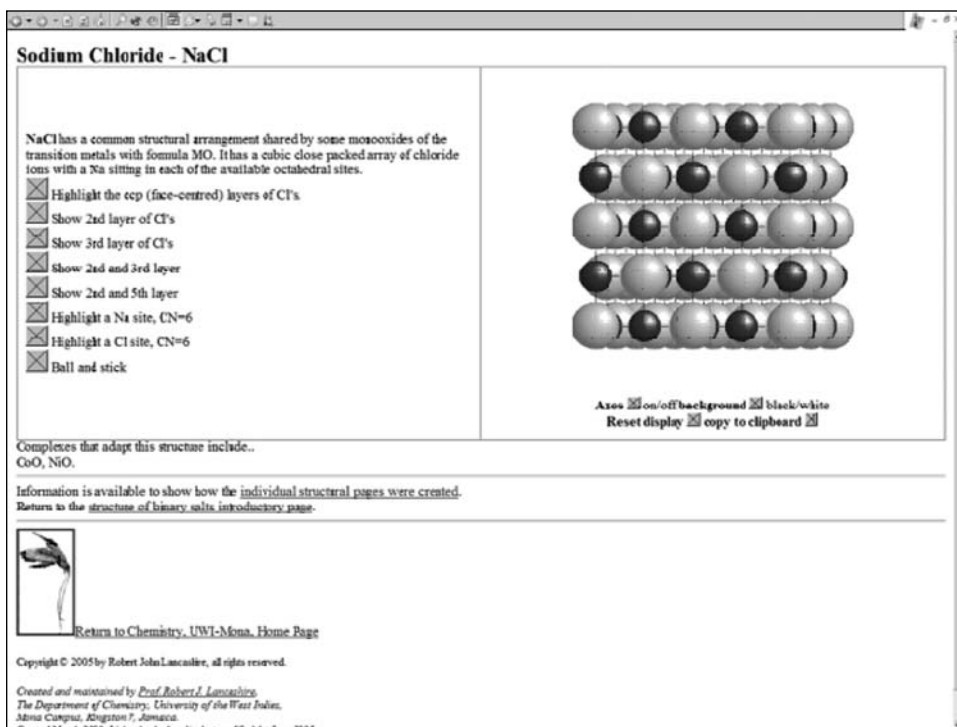
<http://wwwchem.uwimona.edu.jm>

I suspect that my invitation to this conference was partly due to my involvement in delivery of chemistry information through the Web site I established in 1994 and continue to maintain:

- the first web site in the Caribbean
- over six thousand files online
- staff profiles, research facilities
- lecture, tutorial and laboratory information
- over one thousand visitors a day



The second slide is from a series used in first- and second-year chemistry courses and was designed to aid in visually putting three-dimensional (3D) structures into context. Many students appear to have difficulty with visualizing in 3D and the move from simple textbook diagrams to interactive 3D graphics on a Web page was made possible through collaboration with a software company in California, who produced the browser plug-in MDL Chime.




**Sodium Chloride - NaCl**

NaCl has a common structural arrangement shared by some monooxides of the transition metals with formula MO. It has a cubic close packed array of chloride ions with a Na sitting in each of the available octahedral sites.

- Highlight the ccp (face-centred) layers of Cl's
- Show 2nd layer of Cl's
- Show 3rd layer of Cl's
- Show 2nd and 3rd layer
- Show 2nd and 5th layer
- Highlight a Na site, CN=6
- Highlight a Cl site, CN=6
- Ball and stick

Complexes that adopt this structure include..  
CoO, NiO.

Information is available to show how the individual structural pages were created.  
[Return to the structure of binary salts introductory page.](#)

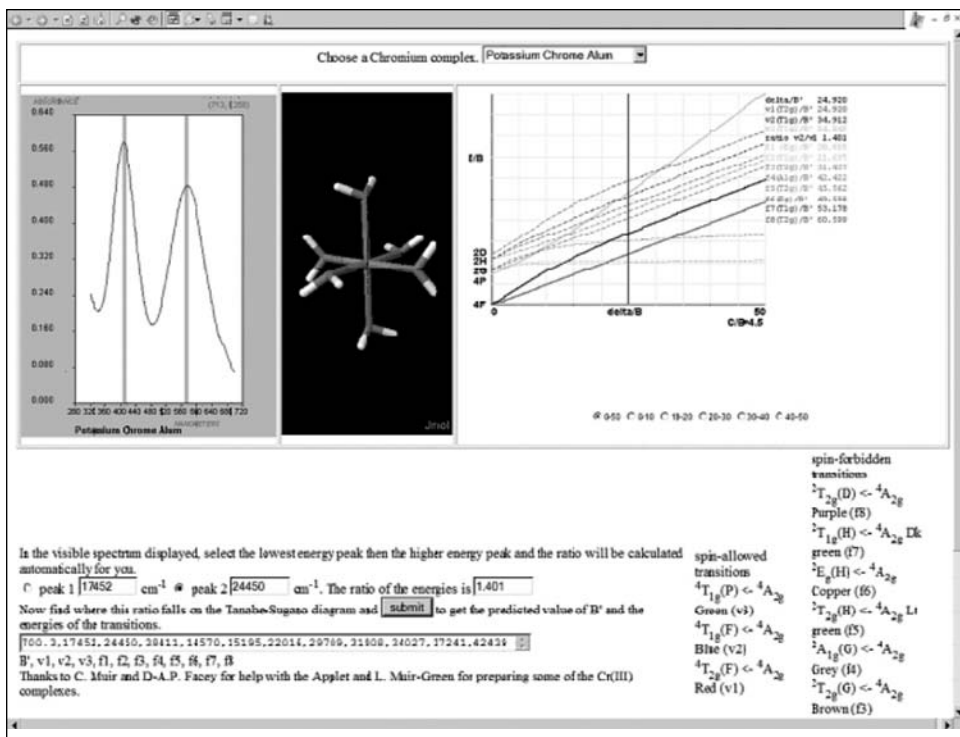
 [Return to Chemistry, UWI-Mona, Home Page](#)

Copyright © 2005 by Robert John Lancashire, all rights reserved.  
Created and maintained by Prof Robert J. Lancashire,  
The Department of Chemistry, University of the West Indies,  
Mona Campus, Kingston 7, Jamaica.

Also  on/off background  black/white  
Reset display  copy to clipboard

In the third slide, I highlighted a page used as part of a laboratory experiment in our third-year chemistry programme. It makes use of two Java applications written to aid spectral interpretation. For the past eight years, we have worked with MDL Information System Limited to write code for the display of spectra and the code has been part of Chime since 1997. This means that both the molecular graphic and the spectra can be shown in real-time as interactive displays with links established between them. In this case, clicking on a peak will highlight the region selected and return the energy of that peak posi-

tion. The values can be submitted to the Java application to determine a range of other factors needed in interpreting the origin of the peaks.



Another significant difference between science and non-science students is their age at the time of admission to UWI. The figures show that 95 per cent of science students are under twenty-five years old and so they predominantly enter UWI straight from high school.

# The Interdisciplinary Importance of Computer Science

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CHRISTIAN POSTHOFF

## Introduction

Historically, computer science has been strongly associated with mathematics. During the 1960s and 1970s, computer science was nurtured at universities in departments of mathematics. By the late 1970s and early 1980s, however, computer science had matured sufficiently and many universities spun out computer science as a discipline distinct from mathematics. Its position in the structure of the organization was not uniform, and several models emerged: a department of computer science within the science or engineering faculty or even within social sciences (Department of Information Systems). By the 1990s, the model that emerged as the preferred placement was a school of computer sciences (names vary) with links to science, engineering, social studies and even medical sciences (bioinformatics and medical computing).

These developments are especially crucial, because the level of one discipline is strongly dependent on another discipline, and only the efficient cooperation and combination of computer science and other disciplines results in a modern education and the application of this knowledge.

## The Interdisciplinary Importance

The guiding principle will be that the level of university education is only as good as the level of computer science application and knowledge. What follows are some examples that underline this principle and show the responsibility of academic staff to cope with this guiding principle. The production of transparencies, course material and so on is only a first and tiny step. It must also be understood that the following are only a few examples, as an exhaustive survey would require much more time and space.

### Mathematics

At present, powerful systems for mathematics are available, such as MAPLE, MATHEMATICA, MATLAB and MATHCAD, among others. The discussion for using these systems in teaching mathematics is ongoing, but in addition, there is no doubt that courses that present and use these systems must be available for other science disciplines (such as physics, biology and chemistry). Based on these systems, mathematics is more applicable than ever before. For example, it is important to express a problem in physics in a mathematical format, hence mathematical modelling is crucial; and thereafter, it is necessary to understand the solutions and to use them properly. Thus a science faculty has an urgent need of compulsory courses in modelling and simulation or scientific computing for all science students. This approach can be extended to all the engineering disciplines, which are also related to mathematics. The special systems dealing with statistics and financial mathematics must also be used, albeit in a narrower environment.

### Other Science Disciplines

In addition to the influence of mathematics on the respective science disciplines, or by using mathematics as a bridge, in areas such as computational physics, computational chemistry, bioinformatics, DNA-computing and quantum computing we see the development of special disciplines that repre-

sent the combination of the sciences and/or mathematics with computer science. At present, the teaching of these sub-disciplines or even an introduction does not exist.

## Medicine

The role of computer science in medicine is rapidly growing, as many areas of medicine become more computerized. These developments are often based on the union of medicine, electronics and computer-based methods. Internationally, developments such as telemedicine or medical informatics can be found. Interesting and useful developments in the near future include the cooperation between artificial intelligence or soft computing methods and medicine. Other rapidly growing fields emerge through learning from examples in medicine and creating powerful diagnostic systems, and enhancing methods for image processing. Students of medicine must be educated in these areas.

## Education

There is an urgent need to educate computer science teachers as well as to train all teachers in the use of computers for educational purposes. The development of computer science didactics and the didactics of computer-based instruction and teaching need more attention. These areas often do not exist or are restricted to the use of some commercial systems. Distance education can extend the reach of university education in remote places and improve the quality of education and of life in isolated areas.

## Social Sciences

In the social sciences, the overlap with computer science (information systems, e-commerce, database systems applications, Internet technologies, financial systems, security issues) is only rudimentarily discussed and defined.

Internationally, however, we can see enormous developments in many of these areas. E-government is another hot topic that requires efforts to improve the quality of the public service and many branches of business. The use of computer science in the legal and judicial system is another aspect of these issues, and its application here can improve the efficiency of the system.

## Scientific Writing

In this changing world of education based on computerization, publishers often require manuscripts that are more or less ready for publication. Science-related publications rely heavily on mathematics; however, typesetting of mathematics requires special knowledge. Our graduate students should acquire this knowledge compulsorily, based on advanced typesetting systems, in order to make them competitive in this area.

## Conclusions

These are only some examples that show the enormous responsibility of each staff member to acquire the necessary knowledge and to work, more than ever, in an interdisciplinary way for the improvement of the quality of our university education.

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**In this changing world of education based on computerization, publishers often require manuscripts that are more or less ready for publication. Science-related publications rely heavily on mathematics; however, typesetting of mathematics requires special knowledge. Our graduate students should acquire this knowledge compulsorily, based on advanced typesetting systems, in order to make them competitive in this area**

# Emancipatory Learning

## Integrating Information and Communication Technology for Quality Education

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STEWART MARSHALL

### Introduction

“Quality” has been defined in many ways (see Harvey and Green 1993), including zero defects, excellence, transformation/empowerment, value for money and fitness for purpose. Also, “notions of quality are evolving or merging” as the higher education environment changes, in particular as “new forms of provision in higher education such as online or e-learning and cross-border or transnational education” prompt the need for change (Campbell and Rozsnyai 2002, 24). The definition of quality adopted by the Board for Undergraduate Studies for its work at the University of the West Indies is one of “fitness for purpose” (OBUS 2000). This paper seeks to address some of the quality issues arising from the university’s role (and hence purpose) in providing access to higher education throughout the English-speaking Caribbean in order to prepare citizens for life in the knowledge society of the twenty-first century. The paper describes how information and communication technology (ICT) can be utilized to address the specific needs and demands of the students and so enhance the quality of their learning.

## ICT in Higher Education

Reform in education and training has been called for to explore and implement ways of educating and training the twenty-first-century workforce and ways to provide life skills for citizens in an information society (for example, Microsoft 2003). The demand for learning by adults has been demonstrated by data from the National Centre for Education Statistics, which indicated that between 1999 and 2001, 73 per cent of all undergraduates were in some way “non-traditional” (NCES 2002).

In seeking to respond to increased need and demand for education and training opportunities for people, industry, commerce and organizations, education providers have in the past decade extensively explored alternatives to face-to-face instruction for formal and non-formal education and training. These alternatives need to be more cost-effective and able to reach audiences not readily able to access education/training opportunities (Daniel 1996, 1999). The latter aspect particularly applies to persons living in locations remote to education/training institutions or who are unable to attend an institution due to work or family commitments. In the context of the above, the use of ICT has had an important role in enhancing the nature and quality of student learning experiences through open learning and distance education. It has also enabled providers to introduce support, delivery and administrative systems to improve efficiency and effectiveness of all these aspects (Marshall and Gregor 2002).

The alternative learning/teaching approaches using ICT include the Internet (facilitating synchronous and asynchronous interactions between learners); videoconferencing (facilitating tutorials comprising distributed groups of students and remote access to live lectures); digital libraries (as knowledge repositories); computer simulation (substitutes for laboratories);

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**In seeking to respond to increased need and demand for education and training opportunities for people, industry, commerce and organizations, education providers have in the past decade extensively explored alternatives to face-to-face instruction for formal and non-formal education and training.**

and many others (Evans and Nation 1993; Evans and Newell 1993; Asensio et al. 2000; Jegede 2000; McAlpine 2000; Devi 2001; Williams et al. 2001; Discenza, Howard and Schenk 2002; Ruth 2002). Overall, these new technologies create a learning environment in which learners, tutors and learning resources can all be networked. But these methodologies require both staff and students to cross new sociocultural borders (Jegede 2000), change existing work practices, and acquire new literacies and learning skills (Wallace and Yell 1997). However, up to this time the culture of ICT remains young, middle-class, male and Western based (for example, Holderness 1998). The challenge of educators, policymakers, governments, industry and society in general is to develop models for access to education and training that will reach all in both developed and developing countries. The following section presents a case study of how this is being addressed by Central Queensland University (CQU)<sup>1</sup> through online education.

## Using ICT to Provide Networked Education

With nearly 23,000 students in 2002, CQU is Australia's fastest-growing university in terms of international students. CQU has the largest percentage of international students (41 per cent, or 9,389 students out of the total) of any university in Australia. By comparison, in 1996, international fee-paying students comprised only 7.3 per cent of the total number of students (DETYA 1997).

In Central Queensland, CQU's traditional catchment area, Rockhampton is the location of the main campus, Mackay campus is 350 kilometres to the north, Gladstone campus is 120 kilometres to the south, Emerald campus is 280 kilometres to the west and Bundaberg campus is 330 kilometres to the south. On these campuses, classes are taught using combinations of synchronous video delivery of live lectures, videoconferencing to connect distributed groups of learners, Web-delivery, email discussion lists, chat rooms, bulletin boards and face-to-face classes. Distance education students are serviced with a combination of printed, CD-ROM and Web-delivered material, as well as electronic asynchronous communication for class discussion and mailing lists.

Thus, for both on-campus and distance education modes, CQU has moved to a networked education model that uses ICT to link learners, teaching/learning resources, lecturers and tutors.

CQU formed an alliance with a commercial partner to establish campuses at Sydney in 1994, Melbourne in 1996, Brisbane in 1999 and the Gold Coast in 2001, specifically to provide educational services for international students. In addition, alliances have been formed with partners to create educational delivery centres in Singapore, Malaysia, China and Hong Kong, and a full campus in Fiji (Gregor, Wassenaar and Marshall 2002). At all these locations, the flexible learning resource materials produced by the CQU academic staff in Central Queensland provide the global content for the teaching, which is conducted by locally appointed academic staff. The model is a “glocal” networked education system – an education system that uses a global approach to the delivery of higher education in which global learning resources and networks are used, but local academic and administrative support is provided for student learning. Hence the portmanteau expression “glocal” – it is global and local at the same time.

By using this globally created and validated, but locally mediated and supported, system of open and distance learning, CQU is able to cater for the needs of its diverse student body. But the use of ICT with this diverse student body also provides opportunities for new modes of global learning.

### Using ICT to Facilitate Collaborative Learning

Taylor, Dekkers and Marshall (2003) describe an “emancipatory” approach to online learning that uses ICT to facilitate synchronous and asynchronous interactions between learners so as to enable them to work collaboratively in virtual groups. This online collaborative learning approach (Roberts 2003)<sup>2</sup> is based on a sociocultural constructivist<sup>3</sup> model of learning and is used at CQU at both the postgraduate and undergraduate levels. It employs “one-to-many”, “one-to-one” and “many-to-many” forms of interaction with students. A virtual group may comprise students who are studying on campus or at study centres at various CQU locations and also students who are studying in distance education mode anywhere in the world.

Typically, the instructional materials for a course using this approach include a video that contains detailed explanations on how the course functions, a course profile (available online on the course Web site and also available on a CD-ROM or as a hard copy) that provides necessary information about the course (for example, the study schedule, assignment and exam requirements, and contact persons); a textbook; and a class email list. Students are expected to subscribe electronically to the class email list. They are then encouraged by the lecturer to introduce themselves to the class online by informing the group about themselves, their interests, their current work or study areas and their backgrounds. This helps to contextualize the backgrounds of the class members and hence provides a framework for discussion, interpretation and linking across the group.

The students are allocated to groups in the second week of the semester. Students then establish contact with their virtual group members and start working on their assessment tasks. This time is also used to seek out incompatibilities in the groups, to try to resolve any conflicts and to help people to learn to work together. Any traditional cultural or ethnic differences are treated with immediate sensitivity. In week three of the semester, the first group makes its presentation to the class online. The presentation consists of a critique that links an article with the reading in the book for the week. Feedback from students contributes to the grade for the presentation. The above process is repeated for ten weeks, with each week dedicated to an in-depth discussion on a different topic that is related to the reading for that week.

Taylor, Dejjers and Marshall (2003) describe six major advantages of the approach:

1. *It involves the three modes of teacher-student interaction.* Students have interaction with the teacher in the traditional one-to-many mode when they interact with the course material and the lecturer in normal post and electronic interactions. Students have the immediate possibility of one-to-one interaction with the lecturer by mail, telephone or email for points of clarification or detailed discussion. However, the bulk of the interaction is through the many-to-many mode where students interact through their groups in the development of their presentations to the

class and in commenting on other group presentations. This mode recognizes the emergence of the “non-traditional student”, many of whom have current work-based skills in the subject matter for which they are seeking accreditation. The many-to-many mode captures this contextualized information in the learning process.

2. *It provides flexibility for lecturer and learner.* Supplementary readings are chosen by the students to allow contextualization of the material and to increase discourse around different world views. Temporal effort is negotiated within groups and this allows the pressures of modern life to be accommodated. This process embeds the concept of plurality, which recognizes different world views. The approach also provides flexibility for the lecturer, in that the weekly assessments can be conducted online from any physical location with Internet access.
3. *It allows for increasing understanding across cultural groupings.* Because the students are geographically isolated within groups, meaning is negotiated every week within the context of the subject matter. This ensures that different ethnic backgrounds can be more easily accommodated in the learning process. The process of discussing the meaning of applications allows the terminology to be contextualized and shared meaning to be developed within the learning subgroup and subsequently within the whole class group.
4. *It accommodates regular and timely asynchronous interaction.* Because asynchronicity is a component of this online approach to learning, it meets the requirements now placed on courses by students, namely, the need to accommodate different time zones, employment status, family commitments and so on.
5. *It mitigates issues of power and social presence.* Social presence fundamentally affects how participants sense emotion, intimacy and immediacy, and it depends not only on the words people speak but also on the verbal and nonverbal cues, body language and context (Rice 1993). Social presence has been found to be an inhibitor to communication, understanding and learning. In researching online groups, Wellman et al. (1993) found that limiting social presence is a factor in removing inhibition, increasing creativeness and strengthening weak social ties in

narrowly focused groups such as learning groups. Hence the non-visual online medium is likely to increase learning outcomes across class, culture, gender and age.

6. *It strengthens both hard and soft skills.* The model outlined by Taylor et al. (2003) provides training in processes that facilitate increased learning through collaboration, discourse and different world views. Students learn important online skills, how to be citizens of an online community and how to contribute to a virtual team, including dividing the work between the team members, resolving conflicts, developing ideas and projects, and providing positive feedback to others about their work.

## Conclusion

The use of an ICT-based education programme as described in this article offers increased flexibility for both the learner and provider. The approach of using the model of a “glocal” networked education system has the advantages of being able to provide a high-quality education course for persons across the globe while at the same time “customizing” the education programme to meet the local needs and demands of students. Importantly, the model can accommodate the specific education and training nuances of a country as well as cultural and religious needs and demands. It recognizes the emergence of the “non-traditional student”, many of whom have current work-based skills and knowledge that can be utilized in the learning process.

Several researchers (for example, Bhattacharya 1999; Branon and Essex 2001; Smith and Ferguson 2002) have identified advantages to be gained from online delivery and the use of asynchronous communication: communicating with temporally diverse students; the minimization of the power differential between student and teacher; the encouragement of deeper levels of discussion; and the ability to consider responses owing to the asynchronous nature of the medium. Downing and Chim (2004), in their research on the learning styles and teaching modes, found no significant relationships for the activists, theorists and pragmatists, but “the *reflectors* showed a highly significant preference (as measured by satisfaction levels) for the online (blended)

learning mode of delivery” (p. 249). They found that the asynchronous online communication allowed the reflectors “to behave in a more extraverted and active way”, in contrast to “being unable to contribute fully . . . in the traditional mode of delivery” (p. 251).

Online distance education courses can take many approaches and include new forms of interaction that involve learners in open discourse providing increased contextual and emancipatory dimensions. In the provision of distance education, new approaches can involve an open discourse approach as a part of the delivery mechanism. Such an approach can also address issues of differences in understanding brought about by cultural diversity. The “emancipatory” approach outlined in this article provides a mechanism for a wider engagement in, and interpretation of, the learning process through use of ICT which reduces the negative-impact social presence, increases the use of weak ties (Granovetter 1973) in the learning process and provides a degree of anonymity to increase contribution.

The “emancipatory” approach recognizes the reality of power relationships, politics and conflict in the learning process and brings them into the process rather than ignoring their existence. Thus, the approach also develops skills which are becoming increasingly important in the application of knowledge and learning in a community setting. With more open access to knowledge bases and resources, greater opportunity for engagement and debate, and having alternative means for expression available through a number of communication pathways, the “emancipatory” approach encourages a pluralistic interpretation, which allows learning to be discussed and locally contextualized across wide variations in culture and experience.

## Notes

1. The author was dean of the Faculty of Informatics and Communication at Central Queensland University for five years prior to taking up employment at the University of the West Indies in 2004.
2. For useful resources about online collaborative learning see Tim Roberts’s Web site at <http://clp.cqu.edu.au/>

3. For a useful discussion of sociocultural constructivism see Jaworski 1996. See also Doolittle 2001.

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# Teacher Education for the Twenty-first Century

## The Role of a University in Teacher Education

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ANN CHILDS and JANE McNICHOLL

### 1. Introduction

This article briefly examines a number of questions about the role of a university and its teacher educators<sup>1</sup> in teacher education, with a particular focus on science education. We begin by briefly examining the age-old tension of the relationship between theory and practice in teacher education and the challenges faced by both initial teacher education (ITE) and continuing professional development (CPD) or continuing professional education (CPE)<sup>2</sup> in this area. We then examine some models of ITE and CPD, including the Oxford Internship Scheme, in relation to the challenges and questions identified, which will include a consideration of the nature of the expertise held in a university and a school and the issue of who should make decisions about the curriculum for ITE or the focus of CPE and CPD. Finally, building on these models, we develop a small case study in science education to show a possible means to integrate ITE and CPD by considering a more community- or department-based process that addresses key issues within science education, for example, the role of scientific literacy and constraining factors at work in the English context.

This article is written in a spirit of exploration of ideas and questions rather than offering answers – the models and ideas discussed are from many different contexts and therefore provide examples to promote discussion and debate about our own contexts. It is hoped that the following questions will be addressed both explicitly and implicitly:

- What expertise does a university bring to teacher education?
- What expertise do schools and teachers bring to teacher education? Are these “expertises” distinct, complementary or in tension?
- What implications does this have in designing and implementing teacher education programmes and in the nature of the relationships between schools and the university?
- Is the expertise residing in the university and in the schools adequate for teaching in an education system that aspires to meet the demands of the twenty-first century?
- If not, how should university tutors and teachers develop their practice in their role as lifelong learners?

## 2. Challenges for Initial Teacher Education and Continuing Professional Education

In this section we outline some of the issues and challenges faced by ITE and CPD, focusing particularly on the issue of the theory/practice divide and the discontinuities between university-based teacher education and the realities of the context of schools.

### 2.1 The Theory-Practice Divide and the Expertise of the University Teacher Educator

Korthagen and Kressels (1999, 5) nicely point out the tensions between theory and practice in ITE by saying, “Teachers need quick and concrete answers to situations in which they have little time to think. This type of action-guiding knowledge is rather different from the more abstract, system-

atized and general expert-knowledge that teacher educators often present to student teachers.”

Eraut (1994, 34) also goes on to argue that the working out of this more theoretical academic knowledge in the practical situation of teaching is problematic and that there is a danger for teacher educators in the university setting that “academic freedom and breadth of study take precedence over knowledge use, and students get relatively little support for working with ideas and making them part of their thinking”. Here it is interesting to note already, and perhaps unsurprisingly, that theory is perceived to be the preserve of the university and that its transfer to student teachers in context is not a simple and unproblematic process.

But what kind of knowledge do universities have? Eraut (1994, 34) argues that in the university, students are given a “broader vision, to view issues from several perspectives, see many alternative courses of action, expect to handle multiple interpretations etc. Where rival theories or explanations exist, academic staff are expected to give the student a choice and to avoid being prescriptive.”

Therefore, from these examples we see two issues emerging: first, the nature of the knowledge a university and university teacher has, perhaps conceived as broader, more general and decontextualized and having multiple interpretations, and, second, the challenges of its “transfer” to an action-oriented context, the school.

The theory-practice tension is not just an issue for ITE but also for CPD because, again, as Eraut (1994, 34) says, “theoretical ideas” presented by higher education “cannot be applied ‘off-the-shelf’, their implications have to be worked out and thought through”. In addition, Butler et al. (2004, 436), in criticizing “traditional” top-down approaches in professional development for achieving only surface and more technical learning in teachers, say,

In recent discussions of in-service professional development, researchers are criticizing traditional approaches for resulting in surface level or shallow implementation of instructional principles as opposed to deep rooted changes in practice. Another criticism is that because expert driven, top down workshops are typically designed to convey procedural skills . . . they run the risk of casting teachers as technicians whose job it is to implement “algorithms” for teaching.

In the traditional approaches described here, university teacher educators or researchers are cast as the experts in a process of delivering theory in an unproblematic way to teachers with an assumption that the “construction of new knowledge is the purview of researchers, while teachers’ roles are to implement research findings” (Butler et al. 2004, 437).

In sum, we are arguing that the knowledge residing in a university department and its teacher educators is more generalized, theoretical and decontextualized and, if introduced in a kind of uncritical theory to practice model as Butler et al. (2004) describe, does not promote deep and lasting professional change. The challenges for teacher educators, then, are how to make this knowledge accessible and relevant in the context that teachers and student teachers spend their time, that is, in the school. But further questions arise: first, Who should decide what is relevant theory or research for ITE and CPD, and, second, When is the right time for theory/research to be introduced? An additional question for CPD would be, Who is best placed to decide the relevant focus for any CPD? We will return to these questions in sections 3 and 4.

## 2.2 The Knowledge Base of Expert Science Teachers

So far, we have considered the knowledge base that the university and its teacher educators bring to ITE and CPD as well as the tensions inherent in making that knowledge base accessible to practising teachers in context. We now want to briefly consider the knowledge base that experienced teachers bring to ITE and CPD, and for this we turn to science education.

This section provides just a glimpse of a complex area of professional knowledge in order to begin to understand the expertise that experienced and expert teachers bring to both ITE and CPD and the importance of valuing this knowledge.

Teaching is one occupation that claims to be a profession. For teaching, Eraut (1994) would argue that the following characteristics mean that it is indeed a profession: it requires academic qualifications obtained from higher education and a period of pupilage or internship during which students spend time learning their “craft” from an expert. Given that, being a member of the

teaching profession requires a teacher to possess professional knowledge. But what is professional knowledge for a science teacher? Answering such questions is problematic, since there does not appear to be an unambiguous and uncontested body of knowledge available to draw upon. Indeed, Eraut (1994, 102) has complained of the “primitive state of our methodology for describing and prescribing a profession’s knowledge base”. However, others have developed Aristotle’s distinction between “technical knowledge” and “practical knowledge” (Eraut et al. 2000; Eraut 1994, 2000; Oakeshott 1962), although Eraut et al.’s (2000) definition of the knowledge base for teachers is particularly useful here. They divide teachers’ professional knowledge into two main areas: the first is codified knowledge, defined as “propositional knowledge”, codified and stored in public domains and subject to public scrutiny; the second is “personal knowledge”, defined as knowledge that teachers bring to their practice that enables them to think and act. Such knowledge is acquired through the use of public knowledge but is also constructed from personal experience and reflection (Williams, Prestage, and Bedward 2001, 2). In addition, Polyani’s (1967) term “tacit knowledge” is often used to describe professional knowledge as being what we know but what we cannot tell. Brown and McIntyre (1995) use the term craft knowledge to describe the personal and tacit knowledge that teachers possess.

Subject content knowledge refers to the amount and organization of knowledge per se that a teacher possesses and would be defined as propositional knowledge, and Anderson (1991) argues for the central importance of science content in teaching. There are a number of ways to represent subject content knowledge, however; Schwab’s (1964) distinction between substantive and syntactic structures of a subject (that is, the variety of ways in which the basic concepts and principles of the disciplines are organized, and the ways in which truth or falsehood, validity or invalidity are established) is a useful definition here. As Shulman (1986, 9) states, “the teacher need not only understand that something is so; the teacher must further understand why it is so, on what grounds its warrant can be asserted, and under what circumstances our belief in its justification can be weakened or even denied”. Grossman, Wilson and Shulman (1989), however, suggest that research acknowledges a fundamental difference between subject content knowledge

that scientists have and subject content knowledge for those teaching science, or, as Shulman (1986) once asked, “How does the successful college student transform his or her expertise in the subject matter into a form that high school students can comprehend?” He argued that student teachers need to be able to blend pedagogical expertise together with subject content knowledge expertise so that they are able to generate explanations, use analogies, metaphors, examples and demonstrations. In other words, they need to develop pedagogical content knowledge.

Clearly, pedagogical content knowledge could be defined as personal knowledge, but arguably, much of a science teacher’s pedagogical content knowledge is also in the public domain (Shulman 1987; Summers, Kruger and Mant 1998). Perhaps what makes it a personal form of knowledge is that it is contextually based. For example, how a teacher gives a science teaching explanation will be determined by a number of factors: the pupils being taught and the resources at hand. Indeed, Shulman and Shulman (2004) characterize pedagogical content knowledge as “individual”, but it could also be characterized as personal and tacit (Eraut 2000) or as craft knowledge (Brown and McIntyre 1995). Indeed, the research of Sanders, Borko and Lockard (1993, 371) resonates with this view of pedagogical content knowledge as tacit or personal when a specialist chemistry teacher’s use of analogy is described: “She said she could explain the content ‘a lot of different ways’ and ideas, examples, analogies came ‘off the top of my head’.”

Therefore, one could say that an experienced teacher’s professional knowledge is highly contextualized and “practical”. So for these teachers, when acting as mentors<sup>3</sup> in ITE, their role is to offer highly contextualized knowledge about how to teach a particular concept to a particular class/individual on a particular day at a particular time, and so on. But this knowledge is also implicit, and often, as Polyani (1967) says, teachers do not know what it is that they know. This presents a challenge for ITE and CPD. For ITE it poses two significant challenges: first, How can student teachers genuinely access this “craft” or implicit knowledge for their own learning, since, for experienced teachers, this knowledge is deeply buried and difficult to articulate; second, How useful is such context-specific knowledge to a student teacher who will work in many contexts in their professional lives? We will come back

to these two points in particular when we look at the internship model for ITE. For CPD it poses a challenge for university-based teacher educators in how they can better understand and access the expertise of experienced teachers and not regard them as empty vessels waiting to be filled up with “theory”.

### 3. Ways Forward for ITE

#### 3.1. Practical Theorizing: The Oxford Internship Scheme<sup>4</sup>

How is coherence and integration of theory and practice achieved in the internship scheme? Hayward (1997, 19) argues that it

can be achieved by a dialectical process where:

1. Suggestions for practice derived from say product-process research or national/international examples of “good practice”, usually provided by the university tutor, can be tested against practice in the school using criteria like the ideas’ feasibility, social responsibility and effectiveness.
2. Contextualized ideas for practice from school can be tested against more academic criteria of, for example, theoretical coherence, general ideas of good practice, the educational and social values implicit in different practices, their generalizability in terms of effectiveness, and their impact on the long term learning of children, in the university.

Therefore, internship uses the notion of “practical theorizing” whereby student teachers draw on the expertise of both university teacher educators and teachers, where both forms of expertise are considered to be equally valid, to develop their professional practice. Interns, therefore, are presented with differing perspectives and points of view. As the department’s Web site says,

The course is not seen as an apprenticeship scheme in which interns learn to teach like their mentor, nor is it a theory-into-practice scheme in which ideas taught in the university are put into practice in school. Instead, the emphasis is on interns as critical learners, thinking about different perspectives and testing out ideas for themselves in their practice. This process of reflection and experience underlies the whole course. In relation to classroom work, interns are helped to develop their own range of teaching strategies and their own philosophy. (<http://www.edstud.ox.ac.uk/pgce/internship.html>)

Therefore, we are hoping to develop, through this process of practical theorizing, a means by which beginning teachers, in any context and at any time in their professional lives can learn from a range of evidence presented to them: they are equipped to be lifelong learners.

This is the process of practical theorizing that lies at the heart of the internship model, but how does this work in practice? First, the school input and university input for the internship scheme are jointly planned by the university teacher educators and the school-based teacher educators (the mentors or schoolteachers) in each curriculum area. The student teachers are placed mainly in one school from September to April.<sup>5</sup> For the first fourteen weeks of the course, the student teachers spend part of their week in the university and part of the week in school – these are called the joint weeks (or J-weeks). From January, they then go into school full-time, with two weeks back, one in February and one in April, to sustain the university input – these weeks are called the school-based weeks (or S-weeks). The contribution from the university teacher educators is also sustained by their visits to schools, up to four times during the September to April period.

During the fourteen J-weeks a typical pattern would be on Monday for the student teachers to be presented with suggestions for practice derived from research, good practice and so on, related to the theme for that week by their university teacher educators. The student teachers then spend two days (Tuesday and Wednesday) in their internship school carrying out a school-based activity to look at the theme of the week in the context of the school. In the school-based activity, jointly designed by university tutors and mentors, the student teaching may be observing experienced teachers, talking to experienced teachers, teaching themselves and talking to pupils on the theme for the week. The school-based activity is designed to allow student teachers to ask detailed questions of their mentors and other experienced teachers in order to begin the process of learning from their “craft” knowledge, which, as we have previously argued, is difficult for experienced teachers to articulate. On the Friday, the student teachers bring all the evidence gathered from Monday to Thursday to the university where the student teachers meet with their tutors and this is where the ongoing process of practical theorizing begins when the evidence for that week, gathered by the student teacher, is

brought together with support from the university teacher educator to begin to make the student teacher think about what this evidence means for his or her own practice. In addition, these Friday feedback sessions in some senses are also designed to address the issue raised by Eraut (1994, 34) to give support to student teachers in “working with ideas and making them part of their thinking”. Further support for this process is provided once a week by mentors who meet with the student teachers and by university teacher educators’ regular visits to schools through the J-weeks and S-weeks.

The themes for the week are decided by school and university partners and are influenced by a set of guiding questions. From this model the roles of the university tutor and mentor are more sharply delineated. The mentor’s primary role is to suggest ideas for practice in the context of the school. The role of the university teacher educator is not to give tips for teaching and they are most definitely not “super teachers”. Rather, as Hayward (1997, 20) says, “they act as guides to theoretical ideas which provide suggestions for practice which student teachers need to evaluate”.

The key principles that emerge about the internship programme are

- the recognition of the distinctive knowledge bases that can best be offered by a university tutor and a school-based mentor;
- the need to develop an agreed integrated programme that focuses on suggestions for practice which are valued by both university tutors and school-based mentors;
- the need to expose student teachers to a wide range of sources of learning and the need for them to test all ideas, whatever their source, against a wide range of criteria, from the academic to the practical; and
- the need for student teachers to develop a habit of theorizing about teaching, which they carry on into new contexts and which allows them to be lifelong learners.

However, among many tensions and challenges in the internship scheme, we would like to mention two here. First, Furlong and Maynard (1995, 50), while acknowledging the strength of internship, do problematize the issue of treating all forms of professional knowledge as equally valid and question how student teachers can actually make sense of this when they say that

one might still ask . . . by what criteria one can judge the results of reflection. Are some forms of professional practice, however they are justified, “better” than others? The difficulty with McIntyre’s work is that in the end it does not help to resolve this difficult issue. With a kind of postmodernist relativism, the Oxford scheme leaves it to the student to make up his or her own mind about what are the appropriate forms of practice.

This is a valid point to make.

Second, as can be seen in this model, both the university teacher educators and the school-based mentors decide in partnership what “theory”/suggestions for practice, and so on, should be introduced in the scheme and where they are best introduced. Many of these “suggestions for practice”, such as lesson planning, classroom management and assessment, are finally uncontentious. However, there are areas in science education, such as scientific literacy, the nature of science, the role of practical work and constructivist theories of learning, which are more problematic. We will look at how these tensions play themselves out in practice.

### 3.2. The Realistic Approach

The nature of the realistic approach and its description (Korthagen and Kressels 1999) is complex and beyond the scope of this article. However, there are four key issues that provide a focus here:

1. the linking of theory and practice in ITE;
2. the discussion of the nature of theory and what might be relevant theory for student teachers to work with;
3. the role of a student teachers’ preconceptions and “theories” on entering ITE; and
4. the role of the university-based tutor in the realistic approach

This realistic approach offers a “practice to theory back to practice” model and is best captured through an example that Korthagen and Kressels (1999, 10) present:

Before entering teacher education, a student teacher reacted automatically to a child who wrote down “ $12 + 9 = 22$ ” by pointing out his mistake. During teacher

education she went through a process of change by experiencing a variety of situations the fact that knowledge transmission is not actually very effective. She became aware of the importance of creating learning experiences for children, and promoting their reflection as a prerequisite for their learning. In supervision and during group discussions, she developed a schema about teaching and learning, of which she was consciously aware. In this schema, notions like “experience” and “reflection” play a central role. Having taught for some time on the basis of this schema, she again reacts “automatically” to a pupil who writes “ $12 + 9 = 22$ ”, but this time her reaction is to ask him how he can check his work. In the concrete action situation, her schema now functions as if it were a Gestalt: She uses it almost unconsciously.

The example is interesting because here the role of the teacher educator is to work with the student teacher on specific significant instances of his or her practice as a springboard to develop that practice. Therefore, it is the initial moment of practice by the student teacher that determines the focus for beginning the process of theorizing about teaching through support from, for example, group experiences and supervision by the university teacher educator. Korthagen and Kressels offer a new role for the teacher educator to include: creating suitable experiences for the student teacher to develop suitable “gestalts” to promote further awareness and reflection and theory building. They also suggest a further role for the university teacher educator in being able to “offer theoretical notions from empirical research at a specific moment” to help take the student teacher’s thinking and “theory” development further.

The realistic approach also has interesting implications for the kind of “curriculum” needed for this model of ITE, as Korthagen and Kressels (1999, 13) acknowledge: “The realistic approach . . . focuses on a more concrete level, that is, the specific concerns, questions, and problems student teachers take with them to the institute today on the basis of yesterday’s experiences in school. This implies a much greater flexibility and more limited possibilities to prestructure the program.”

The realistic approach is similar to the internship scheme, in that it deals with issues in schools as these happen and again addresses Eraut’s (1994) concerns about supporting student teachers in making sense of ideas as they arise.

However, two important differences are apparent: first, the realistic approach is focused on the university teacher educators' responding to individual concerns as they arise and so, as acknowledged above, this makes prestructuring a programme difficult. Internship does deal with individual concerns through the student teachers meeting with their mentors and university teacher educators on a regular basis but it also does have a prestructured programme jointly agreed with mentors. Second, in Korthagen and Kressel's model, the role of school-based teacher educators (teachers or mentors) is not explicitly discussed. It seems to be the case that the student teachers' practice initially drives the agenda for development and the role of the university teacher educators is to create suitable opportunities for development and to ensure that more theoretical input is introduced when appropriate for the student teachers.

## 4. Ways Forward for CPD

Again, in this section, as with ITE, we will look at issues of the theory-practice tension in CPD, the role of the university teacher educators and also consider the question of who decides the focus for the CPD, given that there are a number of interested parties here. We will do this by considering two models of CPD in sections 4.1 and 4.2.

### 4.1. Best Practice Research Scholarships (BPRS)

The BPRS programme was part of a raft of initiatives by the Department for Education and Skills (DfES) in England. Its lifetime was short, from its inception in September 2000 to the third and final cohort who submitted their reports in December 2003. The BPRS was designed to support teachers' continuing professional development, and each year approximately one thousand scholarships worth up to £3,000 were made available to classroom teachers to engage in school-focused research. Classroom teachers or scholars could apply for a BPRS either as individuals or as part of a team. Each teacher also had to appoint a mentor from a local education authority, a school or education

action zone or from a higher education institution. The research focus was chosen by the teacher but had to fit in broadly with the national priority areas at the time, such as gender issues and achievement, teaching gifted and talented children, managing transitions from primary to secondary school, overcoming social barriers to attainment, and many more. At the end of the year's scholarship, the teachers had to produce a relatively brief report of one thousand to two thousand words describing their research, how it had impacted on the school and how they had disseminated its finding. Some teachers published their work in professional journals.

The BPRS scheme was essentially the use of an action research model as a means to improve practice that was officially funded by the UK government. What was an important principle of the BPRS scheme was that the individual teachers and groups of teachers set the agenda for their research, admittedly within the confines of national priority areas, but these were very wide indeed, with the view that

when the people acted upon are themselves made true partners in the actions, and co-discoverers of the corrections of error, then through and through and in spite of blunders or even by virtue of them, vital energies are increased, confidence increased, power increased, experience builds towards wisdom and the most potent of all principles and ideas, deep democracy slowly wins the field. (Collier 1945, 265)

This view clearly foregrounds the importance of teachers having a say in the agenda for their education and development. How, then, did Collier's high ideals play themselves out in practice? Furlong and Salisbury (2005, 59) did an extensive evaluation of the BPRS scheme and did find that "there was a strong consensus that, as Collier (1945) described over 60 years ago, taking part in action research through the BPRS scheme was a very valuable form of continuing professional development". In their evaluation, they found that teachers' confidence increased, teachers engaged with literature more and became more knowledgeable, and teachers collected and used evidence more

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**What was an important principle of the BPRS scheme was that the individual teachers and groups of teachers set the agenda for their research, admittedly within the confines of national priority areas**

systematically to inform practice, which lead to more “informed reflection”. They found that many of the BPRS projects had a major impact on teachers’ practice and a “considerable personal impact on the teachers themselves”. In addition, many of the teachers talked at length about how the BPRS scheme had impacted upon pupils and their learning in very positive ways

There are three particular areas we want to pursue: first, the role of the mentor in the BPRS scheme. In the BPRS, teachers’ projects indicated that 80 per cent of the mentors came from higher education institutions and were university-based teacher educators. These mentors offered support in shaping teachers’ ideas, in providing advice for the design of the research projects, in giving research training, in allowing teachers access to expert knowledge such as academic literature, and support with dissemination and pastoral care. In terms of the issue of “theory” here, and the way in which teachers used the expert knowledge from research literature, Furlong and Salisbury (2005, 61) say,

The BPRS scholars were engaged in this form of “reflective action”, using research-based evidence and reading in relation to the development of their own practice. What most of them were engaged in was therefore research-informed development and the BPRS scheme had provided a structure to scaffold their “reflective action”.

In our experience on this scheme, this scaffolding role often meant searching and providing research evidence that was relevant for the teachers’ research and then spending time working with the teachers as they contextualized this knowledge for their own research project. In some senses, this role was similar to that described by Korthagen and Kressels, which often started with an instance of practice and worked together, with research-based input, to more “research-informed” practice. Furlong and Salisbury (2005, 81) also see the BPRS as a powerful tool for integrating theory with practice when they talk about the nature of the process of BPRS and contend that “what it does do, as Stenhouse (1978) so eloquently argued for, is to create a culture where insights from research and from theory can be taken seriously, where they can be engaged with where they need to be engaged with, and that is in the ‘context of practice’ itself”.

The second issue we want to pursue is the effectiveness of teachers on the scheme working as individuals or in groups. Furlong and Salisbury looked at this issue and overall they found that 70 per cent of the BPRS projects were undertaken by individuals and the remainder was part of some kind of group project. However, as a result of their evaluation they felt that “overall, our judgment was that there was considerable benefit to scholars and their schools when projects were undertaken on a group basis. . . . In these circumstances, there seemed to be increased opportunities to change practice and embed a research culture within the school more generally” (Furlong and Salisbury, 2005, 79).

Therefore, in terms of “true impact”, Furlong and Salisbury identify the significance of the BPRS scheme being much more located in developing collaborative practice and enriching research and learning cultures than its actual “product”, that is, the research findings. We will return to the issue of CPD taking place in departments and communities and develop this approach in relation to a case study in science education

Finally, of course, there were criticisms of the BPRS scheme which revolved around whether this kind of teacher action research is research at all (Hammersley 2004). Furlong and Salisbury raise many important questions and tensions about the BPRS scheme, including issues of the generalizability of the research and its validity. However, as discussed above, in the end, what is at the heart of the BPRS process is perhaps not the product, the research findings and their dissemination but the development of teachers and groups of teachers who can now undertake systematic investigation into their own practice, who value the contribution of theory/research and can then, in any future context, continue to be lifelong learners.

#### 4.2. Collaboration and Self-Regulation in Teachers’ Professional Development

Butler et al. (2004) look at a collaborative research project where teachers from one school district in Canada were invited to participate in a learning community within and across schools with “the common goal of trying an instructional innovation”. Butler et al., in designing their model of profes-

sional development, reject more traditional top-down approaches of CPD for more collaborative models which “emphasise the importance of nurturing learning communities within which teachers try out new ideas, reflect on outcomes, and co-construct knowledge about teaching and learning in the context of authentic activity” (2004, 436). They offer an alternative view, and one not far from the practical theorizing offered in internship, of “both teachers and researchers bring combinations of formalized and practical knowledge to classrooms as they seek to make instructional change. Further, when teachers and researchers collaborate to examine and reflect on practice, both are co-constructing formal and practical knowledge” (p. 437)

What particularly attracts us about this conception is a recognition, as in the internship model, of the different expertise brought to teacher education by teacher educators (in this case, researchers) and teachers, and that both parties are cast as learners as the distinct knowledge bases they bring to the CPD are co-constructed and developed. This accords with our experience of BPRS, but we certainly, until reading Butler et al. (2004), did not consciously articulate this process as such.

A key difference in this model from BPRS was that the project the teachers worked on was designed by the researchers and not by the teachers themselves. BPRS allowed the teachers to decide their own focus for professional development, whereas this intervention did not. This brings us back, of course, to the question of who decides the focus for CPD and the issue of empowerment and partnership advocated earlier by Collier (1945). However, the researchers were aware of these tensions, and in this study the teachers were involved in designing the research procedures and how to conduct the case studies so that the research was not done on the teachers.

In addition, there was also an important consideration of the tension that, in offering such a framework for the development of teaching, it would not recognize the expertise of teachers and could also constrain them. However, the findings from the research confirm that the teachers were not constrained and did “adapt the SCL [strategic content learning] principles rather than learning from a scripted approach to instruction” (Butler et al. 2004, 452). The research showed, in particular, how teachers did benefit from participating in collaborative learning communities by sharing ideas with colleagues, for

example, and that they “valued the distributed expertise provided by various community members (i.e., colleagues and researchers)” (ibid.). The main challenge identified by the researchers for this type of professional development was sustainability: first, by avoiding dependency on the researchers for sustaining the innovation and, second, for the ability of the communities to sustain the innovation much past the two years of the project. This indeed could be a criticism levelled at the BPRS scheme, and Furlong and Salisbury’s evaluation does not indicate what happened to the teachers and groups of teachers who were involved in these projects after the money dried up and the mentors left. Were the learning cultures described by Furlong and Sainsbury sustained?

Although BPRS and the model offered by Butler et al. are different, both advocate teachers learning in communities, as do many other authors. Interestingly, Shulman and Shulman (2004, 267) also advocate the same shift in focus when they say, “the analysis of teacher learning in our efforts has moved from a concern with individual teachers and their learning to a conception of teachers learning and developing within a broader context of community, institution, polity and profession”. It is to this idea of community that we now turn in considering a model for both ITE and CPD.

## 5. ITE and CPD

In this section, we want to try and bring together some of the issues and challenges presented for ITE and CPD, and to resolve these in a germ of an idea for a model in science education that brings together ITE and CPD. This model is offered again in the spirit that there are no “right” answers for the future of ITE and CPD but, rather, a set of finely balanced decisions that have to be weighed in context. This model is therefore offered for discussion and critique. However, before we embark on describing this model, we want to put the example in context and consider a key issue in science education and two key constraints currently operating in the English environment. We are doing this for two reasons: first, to help the reader understand why the example was chosen and, second, in considering any kind of teacher education, it

is crucial to understand and work with the realities of the constraints for the success of any teacher education programme.

### 5.1. Some Key Issues for Science Education in England

There are many areas for consideration and development in science education internationally that we could draw on here, but the one we have chosen, because it is of key concern nationally and internationally, is that of a movement to develop scientific literacy in all our citizens.

In the United Kingdom, the report *Beyond 2000: Science Education for the Future* (Millar and Osborne 1998, 9) offers a vision for a new type of science curriculum:

Our view is that the primary purpose and explicit aim of the 5–16 science curriculum should be to provide a course which can enhance “science literacy” . . . school science education should aim to provide a populace who are comfortable, competent and confident with scientific and technical matters and artefacts. The science curriculum should provide sufficient scientific knowledge and understanding to enable students to read simple newspaper articles about science, and to follow TV programmes on new advances in science with interest. Such an education should enable them to express an opinion on important social and ethical issues with which they will be increasingly confronted. It will also form a viable basis, should the need arise, for retraining work related or technology in their later careers.

Hodson (2003, 645), in response to a particular concern in North America of “the link between science education, economic globalization, increasing production and unlimited expansion”, advocates a more politicized, issues-based science curriculum “culminating in preparation for sociopolitical action”. Whatever view one takes of scientific literacy, and the term is complex and contested (Donnelly 2005), for teachers to be able to “deliver” the curriculum advocated will require the development of many science teachers’ knowledge base. Hodson (2003, 665) acknowledges that this agenda for change is challenging: “Much that I have suggested is likely to be disturbing to science teachers, severely testing both their competence and confidence. . . . Indeed to teach this kind of issues-based curriculum science teachers will

need to develop the skills, attitudes more commonly associated with the humanities and language arts.”

There have been some notable dissenters from this vision. In particular, Donnelly (2005, 298) argues that “the study of science should lead to an understanding of the intellectual coherence of that knowledge and its instrumental power to predict and control”. He argues that it is the powerful ideas in science that explain that natural world and that make science a major cultural achievement which should be at the heart of science education. In addition, he argues that in order to understand topical science issues and to really engage in debates (for example, global climate change) would also involve a deep understanding of many areas of science and, in addition, social and political science. This is a rather brief summary of a powerfully argued position.

Given the agenda for change advocated by those promoting scientific literacy, which may not, in any case, be shared by all, there are two further constraints on the English context that are relevant here. First, there is a current shortage of physical science teachers in secondary schools across the United Kingdom. This means that many biology graduates are teaching both physics and chemistry to higher levels in the curriculum. Therefore, if the promotion of scientific literacy means extending teachers’ knowledge base to include an understanding of political, moral and ethical issues, we also have to face a more basic challenge to educate our biologists to be confident in teaching areas of the curriculum for which they have limited subject content knowledge. Second, the English context is deeply affected (perhaps afflicted) by a high-stakes testing regime that distorts practice and leads to science viewed entirely as a body of knowledge, encouraging rote learning which is mostly teacher centred. This particular issue was highlighted recently in examining a PhD thesis (Black 2005) on understanding the teaching of biology at A level.

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**Therefore, if the promotion of scientific literacy means extending teachers’ knowledge base to include an understanding of political, moral and ethical issues, we also have to face a more basic challenge to educate our biologists to be confident in teaching areas of the curriculum for which they have limited subject content knowledge.**

Black poses the following difficult questions as challenges to the teaching of science in the United Kingdom:

How, for example, do individuals who consider science to be a fixed body of knowledge and truths about the world reconcile the different findings and conclusions of competing scientific theories concerning issues pertinent to them? Furthermore, if the pressure of examinations encourages the development of such a truncated conception of biology/science, this might have implications for the role that examinations play in the overall aim of developing scientifically literate citizens. (2005, 294)

However, Black does not judge this practice but rather views these practices as an entirely intelligent and thoughtful response of teachers, given the context in which they find themselves: “what this thesis has tried to show is that the teachers’ use of teacher-centred methods and repetition was not thoughtless but rather thoughtful. The teachers in this study are highly skilled practitioners” (2005, 298).

In this section, we have looked at three contextual issues that one might need to take account of in thinking about the future and development of teacher education in the UK context for the twenty-first century. There are very many more, but we want to now discuss a possible model for developing teacher education while seriously taking into account the constraints of the context and working with them, but also not allowing them to dictate what can be achieved.

## 5.2. The Model: The Teaching of Energy

We are now going to try to draw together the strands of the models we have offered to give an example of how CPD and ITE might be drawn together in practice to

- try and make sense of the tensions between theory and practice and when “theory” might be useful, how it should be introduced, and who is best placed to decide the focus for the development; and
- see how this model can draw upon and develop the distinctive contributions that the university teacher educators and the teachers bring to ITE and CPD.

The model would be of a science department, a university teacher educator and its student teachers, as a community of learners working together on an action research project, the focus chosen by the department, to develop the teaching and learning of the topic of energy to its eleven- to fourteen-year-old learners.

### 5.2.1. Why Energy?

In the current context, this department has noticed that its examination results in the topic of energy are lower than other areas of the curriculum. It is an important priority for this department to meet an external pressure of improving pupil performance for the government's school league tables. In addition, due to the shortage of physical science teachers, the department has a predominance of biology specialists over physical science specialists. Finally, the topic of energy, among others, has been a national priority area in developing science teaching.

### 5.2.2. The Role of the University Teacher Educator

Input from the university teacher educator would be advisory, much as in the BPRS scheme. In the initial stages of the department's action research project, it might involve providing forms of research knowledge, knowledge about teaching and learning, and good practice in science teaching as well as any research specifically in the area of teaching energy. Here, the department has chosen the focus of the development and draws on the expertise of the teacher educator to decide what "theory" might contribute to the development of the action research project. In addition, as with BPRS, the teacher educators would provide research training. The role here would be less a focus on the individual student teachers but more on them as part of the community of learners, the science department. The process of department action research, where the department will be systematically collecting evidence from a wide range of sources, is certainly akin to the internship process of practical theorizing, but it would involve the student teachers and the department they

work in and the university teacher educator all as co-learners or theorizers to develop practice.

However, as with BPRS scheme, it would be hoped that the teachers working within the department would grow in confidence and, in addition, the relationships between the teacher educator and the department would become stronger and more trusting. In this climate, the department, as a coherent learning community, may feel confident to take on more radical changes, such as those advocated by the scientific literacy movement. The university teacher educators “in situ” would be able to be more responsive to practice as it happens (for example, Korthagen and Kressel’s model) and to know better what kind of knowledge would be relevant to introduce so that it had a chance of being embedded in the department. But, even more radically, the teacher educator could then offer more adventurous suggestions, such as cross-disciplinary cooperation with the geography department on issues of sustainable development, dealt with in both geography and science on the topic of energy (a subject that lends itself very well to issues of sustainability). Therefore, the teacher educator, working within the context, will become more and more contextually attuned as they themselves are cast as co-learners in this process rather than as experts imposing solutions from “on high”. As Eraut (1994, 57) says: “The barriers to practice-centred knowledge creation and development . . . are more likely to be overcome if higher education is prepared to extend its role from that of creator and transmitter of generalizable knowledge to that of enhancing the knowledge creation capacities of individuals and professional communities.” This creates an enormous tension for university teacher educators, however, because the role we are describing here is time consuming and we are required by our university to conduct our own research. As discussed previously, the research generated by the action research projects is not necessarily generalizable and therefore able to be published in academic journals, as is required by our role. We have argued that the product (that is, the findings) of the action research project, while important, may be secondary to the development of the process of inquiry within the department and of developing a research-rich culture that is sustainable. In addition, as teachers within the department become more expert in reading and using research (and may even use the action research projects to gain higher degrees such as an MSc), will

the boundaries between the different notions of expertise of the university teacher educator and the teachers become blurred? We leave these as ongoing issues for discussion.

### 5.2.3. The Role of the Department

The department brings its wisdom of the context, its commitment to development and process and to working together to improve teaching and learning from a research-informed perspective. The ultimate aim is to create an exciting and sustainable research culture in a department which enriches the experience of the student teachers learning to teach within this context.

### 5.2.4. The Role of the Student Teachers

We find this part of the model most problematic. Certainly, learning to teach in a school department that is committed to professional development and has developed a research-rich culture would be beneficial. We would be concerned, however, that in the initial stages, the student teacher, a beginner, may get lost in the department as it begins to implement a major initiative such as an action research project. Although in this model it is envisaged that the teacher educators would work with the department as a whole, we believe that in the early stages they would still need to keep closely focused on the student teachers as well.

### 5.2.5. Who Decides?

One of the criticisms of this model might be that the decision for the focus of the action research project rests entirely with the department. However, as was clearly shown from the BPRS, teachers and groups of teachers chose projects that fitted with national priorities and with their own knowledge of context. They did not choose to investigate idiosyncratic, minor or side issues. But, even if they had, the purpose of this model is to empower teachers and departments, much as Collier (1945) described, and to develop a research culture so

that the department as a whole has the skills, motivation and knowledge to continue to develop any other areas they see as needing attention after the initial project has come to an end. In addition, were the teachers (and student teachers) to transfer context, they would be equipped with at least what was possible to develop practice and make them more likely to be lifelong learners.

## 6. Questions Still to Be Addressed

1. What would motivate teachers in a department to give themselves more work and to become involved in an action research project(s)?
2. What if the priorities of the department and university teacher educator do not coincide?
3. How much will this cost?
4. Will this have a real impact on student teachers' learning or will they become marginal participants because the department will be too busy engaging in the inevitable demands of an action research project to attend to their learning?
5. If all members of the department do not agree to be members of the community, can you then have a community within a community?
6. How does the university teacher educator balance working to support departments with the demands to research and publish in academic journals?
7. In such a model, will the knowledge bases of university teacher educators, teachers and departments become blurred? If the answer is yes, does this matter?

These are some preliminary questions; there will be many others.

## Notes

1. In the United Kingdom, some university teacher educators are required to do both teacher education and research.
2. Eraut (1990) makes the distinction between the term continuing professional education (CPE) as referring to formally organized conferences or educational events rather than work-based learning. Continuing professional development (CPD) refers to both.
3. A mentor is a teacher in a science department who has volunteered for the role to act as the school-based teacher educator and is responsible for the student teacher's programme and support in the school.
4. This scheme provides a one-year course for graduates to teach in secondary schools in science (biology, chemistry and physics), English, history, geography, modern foreign languages and mathematics and results in the award of the Post-Graduate Certificate in Education (PGCE), the qualification needed to teach in state schools in the United Kingdom.
5. The student teachers are placed in a short second school experience for six weeks from the beginning of May until the middle or end of June.

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# Education for the Twenty-first Century

## Re-engineering for Quality Enhancement

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ANGELA HALE GLASNER

I am delighted to have been invited to participate in this important conference looking at quality enhancement, innovation and change, and in particular at the challenges we face if higher education in the twenty-first century is to be relevant and a secure part of all our futures. I do believe that higher education is big business across all the world's major economies. It is key to the social and economic development of modern society and an integral part of the expectations of significant proportions of our young people. Yet it is part of a world economy that is dynamic and ever-changing. I want to explore what this means for our responsibilities as educators and researchers, and I want to end by suggesting that this means that we must actively re-engineer what we do to ensure that we meet the needs and expectations of an increasingly changing and challenging world.

I will do this by looking briefly at the role of higher education (I will touch upon other education sectors, but my prime focus is on higher education), then considering where we are at with respect to quality assurance, before moving on to look at who our learners are and at what skills, knowledges and competencies they need before suggesting how we work to get right education for the twenty-first century.

The role of higher education is set out nicely in the mission which the University of the West Indies (UWI) has set itself: “To unlock West Indian potential for economic and cultural growth by high-quality teaching and research aimed at meeting critical regional needs, by providing West Indian society with an active intellectual centre and by linking the West Indian community with distinguished centres of research and teaching in the Caribbean and overseas.”

For me, there are four elements to this mission:

1. unlocking potential for economic and cultural growth – higher education today has a responsibility to draw into its embrace a wider diversity of people who twenty years ago would not have looked to spending time at university, but whose skills we need to harness;
2. having high-quality teaching and research – a recognized subject expertise and an informed pedagogy;
3. meeting critical regional needs – including responding appropriately to its place in the educational hierarchy; and
4. being an active intellectual centre – constantly moving forward and enhancing what it does.

As UWI’s Pro Vice Chancellor Tewarie said in the January 2005 *UWI Newsletter*,

These are challenging times for universities all over the world. Universities today are required to be more business-like in their approach and even to develop an entrepreneurial flair. They must be responsive, flexible and agile enough to meet multiple demands. A University must meet and exceed the demands of its customers and stakeholders . . . and do even more: . . . [it] must delight and enlighten its customers and even challenge and uplift them.

UWI is an institution with a number of specific challenges. It has a federal structure with three campuses and students studying in a variety of other locations, from the non-campus countries, known, I believe, as the UWI-12. It possesses cultural diversity, reflected in the fact that it has a huge catchment area of some eighteen to twenty islands across the Caribbean, with the concomitant responsibility of acknowledging and responding to the diversity of

those cultures as well as their commonality. It is an international university, even while not recruiting beyond its geographical boundaries – not something that many other institutions of higher education can claim.

Issues around school matriculation also present a challenge. Many universities across the world are challenged by the knowledge and achievement status of their new recruits, and UWI is no exception. There is much concern, not least in Jamaica, about the quality of secondary and primary education. This is publicly acknowledged in newspaper articles, and it is a shared concern which we face in the United Kingdom too. This concern presents an education and quality challenge that most universities did not have to meet twenty years ago.

Tuition fees, as in the United Kingdom, change the nature of our relationship with our students, and this is complicated in the case of the UWI by the differential position of students from Barbados (where their fees are paid for), Trinidad (where students have, subject to means assessment, to meet 10 per cent of the cost of their programmes) and Jamaica (where the cost to the individual is 20 per cent). We have found in the United Kingdom, and no doubt UWI's experience is similar, that when students make individual contributions to the cost of their tuition, they change from being relatively passive students to being critical and demanding consumers/clients.

Competition is a big issue for us all and here, too, UWI shares the challenge of international league tables and international competition. There is the trend of several countries starting national universities (such as the University of Trinidad and Tobago) in the Caribbean in competition with UWI, and also an influx of overseas providers of variable quality.

Financial health needs are also a challenge: with nearly twenty thousand undergraduates, over five thousand postgraduates and some three thousand distance learners, and a staff of over two thousand, UWI is big business in a sector in which quality, not profit, is the key indicator. Financial security is not guaranteed by quality, but without a quality reputation, financial health is insecure.

Quality assurance, having systems to ensure and assure quality, and externality to verify that quality, is now a firm and unchallenged part of our vocabulary and our practice. Ensuring that the learning we provide is accessible,

relevant and meets the changing needs of society and students is an integral part of educational practice today. But how do we ensure that the quality of the learning opportunities we provide is continuously and appropriately enhanced? Much of what follows applies to other education sectors, to primary and secondary education as well as university education, but it is the latter on which I will principally focus.

Many of the challenges I have outlined are shared, but some are unique to the UWI. The key concern has to be not only the meeting of these challenges but how to set out UWI as a university of the highest quality and status, and therefore as an institution of first choice. If UWI is to meet these challenges and those of the twenty-first century, how is it to be done?

I suggest that there are six areas to focus upon in making a difference and re-engineering for quality enhancement so that UWI retains and enhances its stronghold position. These are as follows:

1. teaching
2. assessment
3. learning
4. skills
5. flexibility
6. graduate characteristics

Teaching is our core business and at the heart of all we do as university lecturers. As I have said elsewhere (“Can All Teachers Aspire to Excellence?” *Exchange*, no. 5 [Autumn 2003]), it is my belief that all teachers aspire to excellence in this domain, but they may not always be entirely clear about how to achieve this. In striving for excellence (and therefore as part of our strategy of quality enhancement) I suggest that there are four key areas of focus:

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**Quality assurance, having systems to ensure and assure quality, and externality to verify that quality, is now a firm and unchallenged part of our vocabulary and our practice. Ensuring that the learning we provide is accessible, relevant and meets the changing needs of society and students is an integral part of educational practice today.**

1. Courses should be appropriate to the level and mode of study. This means that there should be clarity of the objectives of all that is taught, and the appropriateness of the learning outcomes and method of delivery to the students (first year/third year, undergraduate/postgraduate) and how they are studying (classroom/online/other distance) should be assured.
2. Courses that have most impact on students are those that are exciting and relevant. Think back to your own experience as students: the inspirational teachers are as memorable as the courses and material that they taught.
3. The continuing health of a course is assured by quality processes that involve not only self-reflection by the member of staff concerned, but also by peers and, importantly, by students.
4. Finally, expectations change as does the environment of learning. Our students expect today to be able to harness technological opportunities; staff need to feel comfortable with the new technology and they need to adapt their teaching to recognize the challenges of such technologies, not the least to manage plagiarism (a concomitant of the information technology revolution in education). We have to guide our students to use the World Wide Web intelligently, to bring evaluative skills to bear upon their use of it and to understand the consequences of misrepresenting the work of others as their own.

Teaching is, of course, a complex activity and it does not stand alone: there are two related areas that need attention.

Assessment is the first, and it is a critical area of our responsibility, alongside teaching and learning. Assessment is how we know how well we are teaching and how well our students are acquiring knowledge, understanding and skills. Here, there are five key factors to bear in mind:

1. It should be fit for purpose – it should be a valid, reliable and fair means of assessment, remembering the diversity of students we have to work with.
2. Mindful of the learning outcomes we want them to demonstrate they have achieved, it should be clearly linked to transparent programme learning outcomes, the objectives which we have set for our courses.

3. Good assessment is formative (even when it is summative) and informing. It tells students what they have successfully achieved and what they have yet to demonstrate. It does this by giving students qualitative feedback in a timely way on all assessments, whether exams, coursework, dissertations, group work or laboratory assignments. At Portsmouth, I established a protocol for the return of work with feedback, normally within three weeks of the work being submitted; this enabled the feedback to inform subsequent work and students to learn from their mistakes and successes. Recognizing the need for and putting into action such protocols as this ensures that weak students are helped to achieve challenging educational goals and strong students are encouraged to achieve even more.
4. If assessment is about achieving competencies, then it is necessarily criterion-referenced rather than normative. Our concern should be with clear statements of what student have achieved and the level of their attainment (reflected in the grades they are given) rather than trying to fit students' achievements into the conventional bell-shaped curve that is defined by normative assessment. I recognize, of course, that in some cases what we do here is constrained by professional accreditation requirements where, for example, the professional body determines that there shall be norms about the proportion of candidates deemed to be successful at any assessment point (as a means of controlling entry into a restricted profession).
5. Finally, assessment should be designed in and not bolted on. It should be one of the considerations when designing or updating a course – a natural reflection of having articulated the learning outcomes, the objectives of the course: How will I assess them? What would be the appropriate assessment tool to use? How will that assessment requirement fit alongside the other assessment asked of student in earlier years (so that it does not reassess the same knowledge/expertise but rather stretch and add to the prior learning)? How will that assessment requirement sit alongside others simultaneously (on other courses/units)? How can I design the assessment to reduce the chance of student plagiarizing and ensure that I am assessing their own learning?

I now turn to what I think is a key shift that occurred in the late 1990s and look at the process of learning itself. We have moved away from the era when the student was regarded as the passive recipient of what we taught. Research literature shows quite clearly that there are different kinds of learners and different styles of learning. The learner focus puts the learner at the heart of the process of teaching and learning. This is all the more important today as we face a plurality of learners – a mass system of higher education with learners with increasingly diverse educational backgrounds and prior achievements. Continuing to teach the same material in the same way to an assumed commonality of learners will simply lead to failure and frustration for the teacher and for the learner. Recognizing the needs of the learner, and listening and responding to those needs, is the path to success and fulfilment.

More mature learners – those studying in different environments – will increasingly incorporate more independent learning in their portfolio, and this independence and autonomy of learning is also increasingly required in our graduates so that they are fit for the rapidly changing world. We cannot teach them all that they will need to know, but we can help them to develop a capacity to self-direct and learn more in the future.

Finally, in our understanding of the needs of the learner, we should be aware that the world they will confront when they leave university will require that they have the ability to work with others. Encouraging group and team learning simulates this real-world requirement.

This point takes me to an aside to highlight what is often overlooked in education, both at university and in prior stages of education, namely the identification and development of skills (alongside the key knowledge and subject understanding, which is part of their programmes). UWI's Vice Chancellor Harris, writing in the *UWI Quality Circle* (vol. 5, May 2005), says, "If we have model programmes that enable our students to acquire attributes such as leadership, entrepreneurship, work readiness, problem solving and critical thinking skills, let us advertise these." There are as many typologies of skills as there are authors writing about them, but for me it is helpful, in the educational context, to think of four generic types:

1. skills for study itself, at the appropriate level;
2. skills for work;

3. transferable skills that enable new knowledges and competencies; and
4. skills for personal growth.

It is often useful to break these types down further under the following broad headings that we should aim to address at all levels of education, from primary to tertiary:

1. communication
2. application of numbers
3. information technology
4. working with others
5. improving own learning
6. problem solving

We cannot assume that these skills are possessed at an appropriate level when students come to us, nor can we assume that they will be unconsciously attained to the level appropriate to a graduate or postgraduate. Quality-enhanced teaching will be explicit about addressing these skills – as Vice Chancellor Harris says, if we deliver and enable the development of these skills, they should be advertised and explicit. There will be discipline differences, but communication skills are important to the natural scientist just as much as numeracy skills are important to the arts graduate or social scientist – albeit different in their complexity.

I earlier referred to the diversity of the modern student body and I want now to return briefly to that point, under the heading of flexibility. In the past, university education was broadly of one type (campus based) to one kind of student (well-educated, with a strong matriculation background, typically eighteen to nineteen years old on entry, and with high-level study skills and study orientation). Today, at the undergraduate level alone, students are much more diverse.

Different modes of study prevail today: full time, part time, campus based, distance learning and flexible learning (mixtures of online, distance, independent and campus learning). These different modes require different approaches and make different demands on staff and students. We have today learners with different needs: mature students who have been away from learning for a long time and with a diffidence about their abilities; students

with physical disabilities, whose needs we must meet through the appropriate use of resources (such as hearing loops, accessible locations, and so on) and students with learning difficulties, such as dyslexia, Asperger's syndrome, or with medical conditions that can impact on their learning. In this broad diversity are students who have potential which we must help to realize, and they have a right to equality of access to the opportunities that higher education offers. To meet their needs, we must be informed about best practice and conscious in our practice that we deliver.

For me, this is reflected in building skills responsively, developing my teaching so that it reaches all my students and not just those like me who learn as I do, and come with the knowledges I have. Rather, in my teaching I strive to listen to the feedback from my students and continuously enhance what I do in order to provide richer and more accessible learning opportunities for all.

If we are successful in the reflective practice that makes for a good teacher, then we will make a difference in the students who graduate from our programmes. They will have up-to-date and relevant knowledge and skills because we have kept abreast of our subjects and continued to develop our teaching methods and conveyed our enthusiasm and commitment to our subject areas. The students will be flexible and open learners, able to engage with new domains of knowledge and learning long after they have left the classroom. They will be self-evaluators, able to reflect on their strengths and weaknesses and able to identify the resources to develop themselves further as the future requires of them. Importantly, for themselves, for society and for the reputation of the university, they will be employable, flexible and entrepreneurial.

So, let me draw some of these threads together and share what I understand to be the means by which we achieve this culture and reality of quality enhancement so necessary to the success of the university and its students. The sheer diversity of our students today means that we must have student involvement in our processes. We need actively to seek their input, to talk with prospective students as well as current students to ensure that our programmes are relevant, well designed and well delivered. We need to develop new curriculum areas, often in subjects that cut across conventional disciplinary boundaries, so that the higher education we provide is relevant to soci-

ety's needs and attractive to students who might not be interested in conventional university courses. Recognizing that students are our clients is a controversial approach, but it is one that prevents us from marginalizing their engagement with education.

Recognizing that we are now in a more consumer-oriented context also means recognizing a responsibility to keep our student stakeholders informed, and the importance of this to quality enhancement is that it encourages them to be active learners rather than passive recipients of teaching.

Quality enhancement – the progressive development and improvement of what we do – can only happen if we have informed staff. This means staff who are abreast of their fields, connected to their subject areas and professional networks, and aware of pedagogic development and research. Staff need to be active learners, too. Support staff, like academic staff, need to be engaged with the priorities and understand and rise to the challenges that the university faces.

Good staff development enables networking and supports the shared understanding that is critical to quality enhancement. Undermining the conventional separation of academic staff from support staff, and developing a shared understanding of a common purpose, is a major step in enhancement.

Networking and communication outside the university are also critical. Good stakeholder communication with others in the education system means that we will know better the strengths and weaknesses of our future students and what they have acquired from primary and secondary schooling and what they need from higher education. Stakeholder engagement with employers and, indeed, our own graduates once they are in the world of work will help us to know and understand better the environment to which our current and

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prospective students will graduate and simultaneously prevent a view of higher education as somehow remote and out of touch with reality.

We will know that we are appropriately continuously enhancing our teaching and that we are appropriately re-engineering what we do to meet the needs of the twenty-first century when we are able to see and have externally validated quality programmes; quality graduates; nationally and internationally relevant programmes; and a vibrant university community of staff (management, academic and support) and students

To achieve this objective, our practice must be research informed and learner led. We need to be clear about the skills and knowledges our students are expected to acquire and to be able to demonstrate when they leave university. We also need to enable students to recognize and understand those competencies so that they are able to apply and develop them as they move from higher education into the world of work and contribute to the further development of the society and the world in which they live.

Re-engineering for the twenty-first century is not something that can happen without conscious effort. By focusing on the learner and on how and what we teach, by actively reflecting on what we do, how it meets the needs of our increasingly diverse students, and how we ensure that all are able to achieve, by involving others in the review and updating of programmes and methods of teaching, learning and assessment, we will make a difference, gain informed ownership by students, staff and stakeholders, achieve the continuous improvement that is a key to future health and success for the university, make the university a centre of knowledge growth, research and informed use of data, and be world leading and regionally relevant.

# How the Way We Teach Affects Student Learning

## Implications for Quality Enhancement

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CHRISTOPHER KNAPPER

Colleges and universities exist to educate students, and their main “product” is student learning. Hence a major concern of the quality enhancement in post-secondary institutions must be on what is learned in university, and how effectively that learning is transferred to life and work situations.

There is abundant indirect evidence that attending college or university yields benefits (for example, in terms of job satisfaction and lifetime income [see Riddell 2003]). Less certain are the effects on learning, especially in a context where there is only a loose coupling between the subject matter studied by individuals and the jobs they hold after graduation. Hence the interest in many educational commentators and employer groups on acquisition of generic “learning-to-learn” skills, in particular lifelong and life-wide learning (Knapper and Cropley 2000).

There have been many attempts to investigate the student experience of higher education. At a micro level, it is possible to ask students about their experience in a particular course or programme, for example, by means of in-depth interviews or focus group discussions (see Knapper 2003). At a macro level, a number of Canadian universities conduct exit polls of their graduating students that include not just overall measures of satisfaction but more

detailed questions on perceptions of learning outcomes and teaching quality (for example, Queen's 2003). In the United States, many universities participate in the annual survey of "student engagement" (NSSE 2004). Hong Kong has undertaken extensive research on the learning activities and experiences of its university students (see Armour, Cheng and Taplin 1999). Australian universities measure student perceptions of the learning climate by means of the course experience questionnaire (Ramsden 1991), and results for all institutions are available on a public Web site maintained by the Graduate Careers Council of Australia. Generally speaking, students are positive about the experiences at university, including their perceptions of the quality of teaching and learning, though this rosy picture may partly reflect some response bias (responses are often not received from students with negative experiences or those who have dropped out) and cognitive dissonance (causing students to rationalize negative experiences by exaggerating their value).

My focus here is on changes in students' learning approaches over their time at university. The emphasis is not so much on how much students learn but on change in learning processes, and how these processes are affected by instructional interventions (teaching) and institutional learning climate. The discussion is based primarily on data from research conducted by scholars over the past two decades in different national post-secondary systems. I end by presenting some of my own recent research on the transfer of learning experiences and approaches from university to work settings.

## Measuring Students' Learning Approaches

Recent research on university students' learning has been particularly concerned with the way that information and ideas are processed and conceptualized. Investigators have identified different learning approaches, measured changes in learning approaches over time and tried to discover the determinants of such change.

This research derives from a number of individuals working in different countries but relying greatly on a cross-fertilization of findings and methods of inquiry. The work is associated with the names of scholars such as Marton

and Säljö in Sweden, Entwistle and Ramsden in England, and Biggs, Kember, Trigwell and Watkins in Australia and Hong Kong. (For a fuller historical account of the work of these groups, along with relevant citations, see Knapper 1995b and Knapper and Cropley 2000.)

These researchers have identified and described different learning approaches, beginning with the classic papers by Marton and Säljö (1976a, 1976b), who first used the terms “deep” and “surface” approaches to learning, later renamed by Entwistle and Ramsden (1983) “meaning orientation” and “reproducing orientation”. Deep learning refers to an approach that emphasizes the pursuit of meaning and understanding, with deep learners seen to be intrinsically motivated. The act of learning is its own reward, and the major goal of the learner is to integrate new learning and ideas with their existing understanding. Surface learners, on the other hand, are primarily motivated to meet minimum task requirements (for example, to pass the course), and they see learning as mainly a matter of reproducing information without any particular interest in its meaning.

Of course, we all frequently engage in surface learning just to get through the many tasks we face in our everyday lives, and surface learning may indeed be appropriate for many routine matters. But to meet the challenges of change and complexity in modern society, university students inevitably need to use learning approaches that stress depth (in the sense of conceptual understanding and integration of new knowledge with existing ideas) in order to solve complex and often novel or unanticipated problems.

The original work by Marton, Ramsden and others involved a complex process of interviewing students (and in some cases observing them perform learning tasks such as summarizing a passage of prose) to determine whether they adopted deep or surface approaches to learning. However, in the early 1980s, Ramsden and Biggs developed scales to measure approaches to studying and student perceptions of the learning environment (see Ramsden 1983; Biggs 1985). The existence of these instruments (the approaches to studying questionnaire and the course perceptions questionnaire) made it considerably simpler to gather data from large numbers of students, and this has stimulated empirical investigations into deep and surface learning orientations in many parts of the world.

## Factors That Influence Learning Approaches

What sorts of learning approaches are used by university students, and how are they affected by characteristics of the institution, especially by teaching methods? An early study at the Australian National University by Watkins and Hattie (1981) reached some pessimistic conclusions. It involved an ambitious longitudinal investigation of 540 students as they proceeded through their undergraduate programmes, with approaches to study measured by both questionnaire and personal interviews. The research revealed that students' learning orientations in fact became progressively more surface over the three years of their university studies, and Watkins and Hattie attributed their results primarily to the examination system, which, they concluded, discouraged adoption of deeper learning approaches.

More optimistic conclusions can be drawn from an investigation by Ramsden and Entwistle (1981), who studied over two thousand British university students enrolled in sixty-six different academic departments in the humanities, social sciences, sciences and engineering. There was no universal pattern of change in learning orientation over time, but some departments, across all the disciplines studied, did foster adoption of deeper learning approaches by their students. Such departments were characterized by "good teaching", "greater freedom in learning" and "avoidance of overloading". Good teachers were defined by Ramsden and Entwistle as instructors who tried to understand student difficulties, were ready to give help and advice on study methods, and took care to pitch material at an appropriate level. The authors defined "freedom in learning" as allowing students a choice of tasks to complete course requirements, and a choice of learning methods to accomplish these tasks. Other characteristics that appeared to promote deeper learning included setting clear goals and standards for academic work, vocational relevance (perceived links between what was being studied and students' later lives and careers), positive social climate (good relations between students and teachers), and less emphasis on formal teaching (attending classes) compared to a stress on the importance of individual study.

Several years later, Bertrand and Knapper (1991) did a partial (and much more modest) replication of the Entwistle and Ramsden study in three aca-

demic departments at the University of Waterloo (Canada), using questionnaires adapted from the 1981 research. Student learning approaches in the three departments were found to differ markedly in the predicted directions, and these differences persisted over time. They were also associated with aspects of teaching and academic climate identified by Ramsden and Entwistle (Knapper 1995b).

Kember has also shown links between the orientation of individual teachers and a change in their students towards deeper learning approaches. Kember developed a scale to measure teaching values and beliefs, and distinguished, following Barr and Tagg (1995) between “subject-orientation” at one end of a continuum, and “student- or learning-orientation” at the other. Teachers holding more learning-centred orientations, and who encourage more active learning and interaction with students, appear to promote deeper learning than teachers who hold more subject-centred values (Kember and Gow 1994).

Although the work cited above has been done mainly with student populations in Europe, Australia and Asia, the findings about links between teaching methods and learning outcomes receive some support from American research that has adopted quite different methodologies. For example, in a massive project that involved twenty thousand students, twenty-five thousand academic staff, and two hundred institutions in the United States, Astin (1993) showed that the characteristics and behaviour of teaching staff had major implications for student development. In particular, opportunities for student-staff interaction had “positive correlations with every self-reported area of intellectual and personal growth” (p. 383), and there were similar positive effects associated with opportunities for interactions among students themselves. In contrast, the sheer number of hours devoted to teaching was unrelated to cognitive development, suggesting that it is the *quality* of staff-student contact, not the quantity, that is of critical importance.

Pascarella and Terenzini (1991) analysed the results of over twenty-six hundred empirical studies dealing with the impact of higher education on student learning and development. They concluded that student learning is “unambiguously linked to effective teaching, and we know much about what effective teachers do and how they behave in the classroom” (p. 619). Such behav-

hours include the instructor's ability to establish rapport with students, interpersonal accessibility, feedback to students, active learning strategies, opportunities for students to interact with their peers and "a curricular experience in which students are required to integrate learning from separate courses around a central theme" (p. 619). Writing about the implications of their research for policy and practice, Pascarella and Terenzini conclude that academic departments should strive to "create environments that attract and engage students in both intellectual and interpersonal learning" (p. 653).

## Learning Approaches in Work Settings

My colleagues and I have attempted to build on this body of research to understand approaches to learning in the workplace and factors in the work environment that encourage particular learning approaches. Our work has involved developing scales that will measure approaches to learning in the workplace and the organizational climate affecting learning, using adaptations of instruments originally devised to measure learning in university students. Perhaps surprisingly, there is very little evidence about the transfer of learning approaches from school to other situations. Pascarella and Terenzini refer to the notion that attending university "provides the basic intellectual, analytical, and interpersonal competencies that permit one to effectively learn new occupationally relevant skills on the job" (1991, 432). However, their exhaustive review revealed very little empirical research bearing on this link, in contrast to the large number of studies that have demonstrated relationships between attending university and salary or career success.

Our initial study (Knapper 1995a) was done with 226 Canadian cooperative education students who were on extended work placements. Four provisional findings emerged. First, it was clear that the work did involve learning, and respondents were comfortable describing their workplace as somewhere that they engaged in learning on a regular basis. Second, individuals were generally consistent in their approach to learning across work and university settings: if they adopted a deep approach in their university studies, they tended to have a similar approach at work. Third – and perhaps surprisingly – the

requirements for deep learning were greater in many of the work settings than they were in university. Fourth, despite problems with the psychometric properties of the scales, there appeared to be a relationship between deep learning and the characteristics of the workplace – in particular, the quality of supervision, workload and the degree of choice and control in the work setting.

The two scales (the approaches to work questionnaire and the workplace climate questionnaire) have now been refined in a series of studies involving many hundreds of respondents. These have included bank employees, nurses, physicians and Queen's University alumni working in a wide range of settings (Delva et al. 2001; Kirby, Knapper and Carty 1997). Although much more needs to be done, we believe we have instruments that are reasonably robust, and that are helping to shed light on the interrelationships between organizational environment and learning approaches at work.

We have found that the deep-versus-surface distinction characteristic of school and university learning is somewhat more complex in the workplace. Although there is a clear deep dimension, surface learning can be of two types. The first we have called "surface rational" (routine surface-level tasks necessary to get the job done) and the second we have named "surface disorganized" (here the individual sets very low learning goals and struggles to achieve them).

Analysis of data from the workplace climate questionnaire revealed three key factors. The first we called "good supervision" (the extent to which supervisors or managers encourage independent learning and creativity); the second was "workload", and is self-explanatory; and the third was "choice-independence", and reflects the amount of freedom employees enjoy to organize their own programme of work, including necessary learning.

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Having developed scales that we feel have reasonable reliability and validity, we went on to investigate links between employees' learning approaches and workplace characteristics. Data from our alumni and bank employees shows that there are indeed significant correlations between factors on the two scales. For example, choice-independence is positively correlated with deep learning and negatively with both types of surface learning. Good supervision is positively correlated with deep learning and negatively with surface-disorganized learning. Finally, the highest significant correlation is between surface-disorganized learning and a perception of heavy workload. Interestingly, these results are quite similar to findings on the approaches to learning adopted by university students, summarized above.

More recently, we have found a similar pattern of correlations for our sample of physicians, and our data also show that workplace climate and learning approaches are meaningfully related to doctors' pursuit of continuing medical education opportunities (Delva et al. 2001). For example, those with a deep approach prefer to pursue further education independently, rather than taking traditional courses. They are also strongly inclined to be self-motivated for continuing professional education, whereas those with a surface approach respond to externally imposed requirements.

## Conclusions

The most important aspect of higher education quality is the extent to which institutions foster meaningful student learning, and hence the key criterion for judging the effectiveness of colleges and universities should be the quality of student learning they engender. Learning encompasses both acquisition of knowledge and skills and development of generic learning competencies and approaches that are often referred to as lifelong and life-wide "learning to learn".

There is substantial evidence that how students are taught, what learning tasks and experiences they encounter, and how instruction and curricula are organized have a profound effect on these generic learning approaches. It also

seems likely that such approaches persist beyond higher education settings and transfer to the workplace.

A major challenge for universities, especially at a time of resource constraints, is to organize teaching so as to maximize learning effectiveness. A major barrier to change is the fact that most faculty are not trained for their teaching role and are largely ignorant of the research literature on effective pedagogy (see, for example, Knapper 2004). The need for change is urgent, and a number of commentators have offered suggestions on how this might be done (for example, Biggs 1999; Kember 1997; Prosser and Trigwell 1999; Weimer 2002). Ideas include

- using teaching methods that stress student activity and task performance rather than just acquisition of facts;
- providing opportunities for meaningful personal interaction between students and teachers;
- providing opportunities for collaborative team learning;
- employing more authentic methods of assessment that stress task performance in naturalistic situations, preferably including elements of peer and self-assessment;
- making learning processes more explicit and encouraging students to reflect on the way they learn;
- setting learning tasks that encourage integration of information and skills from different fields; and
- planning curricula that focus on realistic student learning outcomes rather than disciplinary traditions and faculty preferences.

All these suggestions have support from the literature on student learning, some of which has been cited above. All have been implemented at some institutions, but are not common in most. Changing to a new educational paradigm is difficult and disruptive. But it is essential if higher education institutions are to maximize students' learning experience and equip graduates with the skills they will need for a future that will require not just traditional knowledge and skills but the flexibility and ingenuity to meet unforeseen challenges. These will be seen as the hallmarks of quality as society and higher education enter an era of unprecedented change.

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# Quality Assurance of Transnational Education in the English-Speaking Caribbean

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## Introduction

### Concepts of Transnational Education

Internationalization, cross-border education and trade in education constitute a hierarchy of three common terms used to refer to the international nature of education (Knight 2003). Internationalization is described as the most comprehensive term; cross-border education is one component of internationalization, while international trade in education characterizes some cross-border activities. Cross-border education refers to a wide range of international activities in education which relate to academic linkages and agreements, development/aid projects and commercial trade initiatives (Knight 2003). Trade in education services is interpreted as a subset of cross-border education and generally refers to activities having a commercial or for-profit purpose. In this article, transnational education refers to the trade in education services in the context of the liberalization of tertiary education and includes developments in distance education, such as the Internet.

## Quality Assurance and Accreditation

The term quality assurance is used in a general sense to include “audit, evaluation, accreditation, and other review processes and elements” (Knight 2003, 13). Accreditation is seen to function as “a seal of approval to academic operations” (Farrington 2001, 70). Accreditation is a mechanism for ensuring the approval or recognition of qualifications by a reputable authoritative body.

## Manifestations of Transnational Education in the English-Speaking Caribbean

In its January 2005 interim report, the University of the West Indies (UWI) Task Force on the Liberalization of Higher Education summarized the status of the impact of liberalization in the English-speaking Caribbean (Beckles 2005). The report recognizes that a shortage of critical skills is a principal hindrance to the region’s economic development and that there is thus a need for a quantum leap in the capacity to deliver quality education and training to citizens who demand, as their civil right, increased access to tertiary education. It notes that Caribbean governments, the principal stakeholders of the UWI, have taken steps over the last decade to invite foreign providers of education and training to assist in capacity building, as a means of attracting lucrative foreign direct investment and of contributing significantly to their gross domestic product.

Further, reference is made to a proliferation of off-shore universities in the region. These foreign “for profit” universities initially targeted overseas students exclusively. However, in recent years, nationals of the host country now feature noticeably among the clientele. Additionally, some institutions have been granted national charters from host governments and, consequently, have changed their status from off-shore to on-shore.

Currently, over one hundred foreign universities are operating in the English-speaking Caribbean, and the number is still growing. The unstructured and unregulated increase in institutions appearing to offer quality academic programmes is now a matter of significant concern within the region.

The interim report of the UWI task force acknowledges that the tertiary education landscape has changed dramatically and that open competition in a “knowledge marketplace” is now the order of the day.

The foreign providers offer a range of academic programmes leading to a wide range of certification, such as Associate, BSc and MSc degrees, MBAs, and doctor of medicine. The mode of delivery, while largely face-to-face, also includes distance, online and correspondence (Hosein, Chen and Singh 2004). The expansion of “for profit” foreign universities in the Caribbean is the most visible expression of the liberalization of global trade in higher education. The creation of greater choice and the widening of access through resource sharing, resulting in capacity building, are positive effects of the global joint venturing.

## Open and Distance Education and the Role of Information Communication Technologies

Information communication technologies (ICTs) in the region are seen as the engine fuelling the growth of cross-border tertiary education and training over the Internet. Further, the digital divide has grown so tremendously that it leaves CARICOM tertiary-level institutions in an uncompetitive position (Hosein, Chen and Singh 2004).

Where open and distance universities are concerned, there are several programmes operating in the English-speaking Caribbean which involve residence at a campus for short periods or engagement in regular group sessions. Such sessions may be at a distance from the provider or conducted via teleconferences or with local tutorial support. There exist sixteen sources of distance education programmes from reputable external providers in the English-speaking Caribbean. “Many distance education programmes (such as UWI’s own) rely heavily on local tutorial support and thus demand that their providers take some care about the quality of such local teaching. . . . [P]rofessional organisations often evaluate those who wish to provide teaching for their qualifications” (Brandon 2003, 25).

ICTs constitute the most significant factor in the growth of borderless higher education and, given the importance of “connectivity” in borderless education, it is predicted that an increased use of new ICTs will fuel further the quality and expansion of, as well as access to, higher education (Middlehurst 2001). It is projected that distinctions between traditional and distance providers will disappear, to be replaced by mixed-mode education, substantially centred on communication and information technologies (Middlehurst 2001, 9). Given the cultural preferences in the Caribbean for face-to-face interaction, this is likely to be a development that would further place foreign providers in greater competition with local tertiary-level institutions.

## The Quality Assurance Challenges Posed by Transnational Education

The increase in cross-border education by public and private higher education institutions poses new challenges for quality assurance mechanisms (Knight 2003). There is the added concern regarding international standards or criteria having the potential to jeopardize the sovereignty of national systems, thus resulting in unhealthy standardization. The General Agreement on Trade in Services (GATS) and other bilateral agreements precipitate the necessity of these issues being accorded urgent attention (Knight 2003). UNESCO, the Organization for Economic Cooperation and Development and the Council of Europe are key organizations that have made the transnational nature of higher education a priority.

The increase in local, regional and international education providers, the use of new delivery modes, and the possibilities for increased student choice and mobility all complicate the already difficult issues of credit transfers, advanced placement, articulation, recognition of qualifications and accreditation.

The importance of countries taking the initiative to determine the quality of the education they want offered within their borders is supported by the UNESCO Declaration on Higher Education (1998), which emphasizes the importance of providing assistance to developing countries to strengthen national educational systems rather than imposing “foreign models”.

The CARICOM tertiary education environment can be characterized as one in which individual countries are at different levels of development in terms of legislation, policy and procedure to govern access to their respective tertiary education markets.

Concerns about transnational education in other developing countries, such as Mauritius and India, resonate in the English-speaking Caribbean. These include (1) the possibility that foreign providers may not share the same national values and priorities, since their purpose is to find the most cost-effective way of providing education; (2) the potential for quality to improve as a result of competition with reputable international institutions, but also for quality to be lowered if low-quality providers offer “canned” degrees; and (3) quality education offered by reputable international providers being accessible only to the privileged few who can afford it.

The local tertiary education sector is concerned about the inferior or irrelevant programmes that foreign tertiary-level institutions might offer and its ability to compete in an environment with resource constraints. CARICOM governments are concerned that, in the context of the GATS, private providers, operating on large economies of scale and quick return on financial investments, will not focus on appropriate curricula consistent with national developmental goals and social needs (Hosein, Chen and Singh 2004, 32). Nonetheless, the sector is confident about its sustainable market share and its traditional reputation for quality.

Bearing in mind the importance of the credibility of higher education programmes and qualifications for students, employers, the academic community and the public, the quality of all forms of cross-border education becomes a serious issue. In this regard, the issues that will be discussed, with a focus on UWI’s three main campus countries (Barbados, Jamaica, Trinidad and Tobago), are as follows:

1. national accreditation councils and the monitoring of imported education;
2. domestic regulations for setting qualifications, quality standards and licences;
3. provisions for monitoring the quality assurance programmes of foreign

- providers and the equivalence of the programme content to that delivered in other jurisdictions;
4. collaboration between local and foreign providers and relevance to local needs; and
  5. the importance of a regional accreditation mechanism.

## National Accreditation Councils and the Monitoring of Imported Education

The status of national accreditation bodies varies considerably among countries in the region. The University Council of Jamaica (UCJ) is a legal statutory body which has been operating for over fifteen years. While the majority of institutions accredited by the UCJ are local, the council also accredits programmes offered in Jamaica by overseas institutions. The Accreditation Council of Trinidad and Tobago (ACTT) was established in 2004 and has begun to function. The act to provide for the establishment of an accreditation council recognizes it as the principal body in Trinidad and Tobago for conducting and advising on the accreditation and recognition of post-secondary and tertiary educational and training institutions, programmes and awards, whether local or foreign. In Barbados, the Barbados Accreditation Council Act 2004–2011 has been signed into law. However, the council to administer this legislation has not yet been set up. When established, the council is expected to have a wide remit. For the time being, the Ministry of Education in Barbados registers institutions that meet specified criteria. This is not a verification of quality but simply permission to operate. In the case of Barbados and Trinidad and Tobago, the establishment of the accreditation councils represents these countries' first step towards the development of a seamless education and training system and a national qualifications framework.

### *Functions of the Councils*

The functions of the accreditation councils in Barbados, Jamaica, and Trinidad and Tobago include the registration of local, regional and foreign-

based institutions that offer educational courses in the respective countries; advising on the recognition of foreign-based institutions and their awards; developing and maintaining a unified system of credits for institutions; and establishing relationships with national regional and international accreditation bodies. The councils also have the responsibility to protect the interests of the public by providing information on the quality and recognition of programmes of study and institutions. In theory, the councils then can act as a watchdog to determine the quality of provision of regional and international higher education institutions.

Whether the accreditation councils of Barbados and Trinidad and Tobago will possess the capacity to deal with the influx of programmes expected with the further liberalization of the tertiary education sector will have to be assessed. The procedures likely to be involved are expensive and time-consuming, and may require substantial resources. In the case of Jamaica, however, foreign providers needing to have their programmes accredited by the UCJ meet all costs related to the process, including visits of members of UCJ to the institutions in their countries of origin.

*Domestic Regulations for Setting Qualifications, Quality Standards and Licences*

With respect to the liberalization of the tertiary education sector, the role of CARICOM governments is seen as a regulatory one, ensuring that frameworks exist to maintain quality in service, qualifications recognition, licensing and accreditation. Regulations of the national accreditation bodies or relevant ministries govern all local institutions, public and private. Regulations for incoming tertiary-level institutions have not been made specific or different from those for local tertiary-level institutions. These regulations address the confirmation that the institution/programme is accredited by an appropriate accreditation body; making public the standards for registration and the accreditation of the programmes of foreign providers (Jamaica); and establishing licensing bodies or boards to regulate the standards of all professional groups and, in particular, the teaching profession (Jamaica) (Hosein, Chen and Singh 2004, 33).

### *Provisions for Monitoring Quality and Equivalence*

The UCJ reports that each foreign provider has to submit a proposal for which the council has prepared guidelines in a questionnaire format. Specific information relating to accreditation status in the home country, for example, is sought. Based on UCJ's acceptance of the proposal, a team or a representative from the council visits the country of origin campus of the provider to determine the nature of the programmes and assess the institution from which the programmes are offered. Depending on their findings, the institution may be granted registration, which allows it to operate in Jamaica.

Conditions to be met by foreign institutions applying to be accredited in Trinidad and Tobago include proof that the institution is accredited in its country of origin; having qualifications accredited in the country of origin; and having programmes requiring specialized accreditation accredited with the relevant recognized professional body in the country of origin.

Regarding the accreditation in Trinidad and Tobago of foreign programmes being offered through local affiliation arrangements, institutions must satisfy conditions relating to the supervision of the parent institution and comparable quality of the programme to the counterpart in the country of origin. Post-secondary and tertiary qualifications awarded to individuals as a result of studies abroad will be recognized by ACTT on its determination that the programme was accredited by the relevant authority in the foreign country at the time of the award. Institutions providing distance education are now expected to be guided by the principles of the ACTT in such areas as curriculum and instruction, facilities and technology, administration, and finance.

### *Collaboration Between Local and Foreign Providers*

There is a measure of collaboration between foreign providers and national institutions in the English-speaking Caribbean. In terms of regional colleges and universities, extra-regional articulation and accreditation arrangements with foreign universities are in place for about 50 per cent of institutions (Roberts 2003). Foreign institutions in the region operate either virtually or in various types of commercial presence, often forming partnerships with local tertiary-level institutions with which they may have a financing relationship.

Bridging the cultural gap between the offerings of foreign providers and those with a national/regional developmental thrust is another area of concern. In Jamaica, overseas institutions are asked to identify the Caribbean material and demonstrate from the bibliographies of their course outlines the extent of the Caribbean material they will be including. Examples, case studies, research studies and projects are expected to be Caribbean based. Although this is a concern raised by the UCJ, it really depends on the interest and commitment of the provider to ensure that this is done. There remains, therefore, the issue of effective monitoring.

In Trinidad and Tobago, the government has decided to proceed with caution for the time being, monitoring the partnership arrangements between indigenous public and private institutions and foreign providers. It has taken the stance of awaiting the advice of CARICOM in view of the imminent establishment of the Caribbean Single Market and Economy and its provisions for the employability and mobility of Caribbean citizens, and in recognition of the fact that its decisions regarding the programmes of foreign providers will have implications for other CARICOM countries.

### *The Way Forward: A Regional Accreditation System*

International developments in quality assurance and accreditation as described by Van Damme (2002) provide the English-speaking Caribbean with the opportunity to identify elements suited to the regional tertiary-level institutional culture. National accreditation councils are well advised to consider seriously these developments and their usefulness within their respective national contexts. Indeed, these developments underscore what has become clear within the region: that the liberalization of the tertiary education sector highlights the importance of a regional accreditation system in the Caribbean that will facilitate the seamless movement of students, faculty members and researchers, the transferability of credits and the preservation of intellectual property rights (Hosein, Chen and Singh 2004, ii).

CARICOM has already established a regional mechanism for accreditation, equivalence and articulation to guide governments in setting up their own national mechanisms. In response, Belize, Guyana, Jamaica, Trinidad and Tobago, Barbados, St Kitts, and Suriname have established national systems

to monitor tertiary education providers and to establish standards of performance.

Although the development of national bodies has taken place with some collaborative effort, initiatives to establish accreditation agencies have been undertaken within national boundaries. Each of the larger territories (that is, Jamaica, Barbados, Trinidad and Guyana) has its own agency, but for the smaller countries, the establishment of one national agency for the Organization of Eastern Caribbean States is under consideration.

The recent implementation of the Caribbean Accreditation Authority for Education in Medicine and other Health Professions was an initiative undertaken in the face of the withdrawal of the General Medical Council of Britain from accreditation of medical education in universities of Commonwealth countries, including the UWI. This addresses one major area of study, but the broader regional accreditation of tertiary and higher education institutions and programmes is a priority. Some of the issues with which a regional body would have to be concerned include

- a framework outlining Caribbean standards of tertiary education;
- rationalization of methods of assessment;
- policies to limit and/or seriously monitor the registration and functioning of extra-regional providers within the Caribbean;
- a framework to allow for credit transfers, articulation and advanced placement;
- proposals for national, regional and international accreditation;
- partnerships in transnational education, which include collaboration on quality assurance and mutual recognition issues; and
- benchmarking.

Governments and institutions must become fully apprised of the conditions of the GATS, and where there has not yet been commitment to the agreement, careful consideration be given to its provisions and conditions. Where, as in the case of Jamaica, there has already been unconditional acceptance of the terms of the agreement, strategies for dealing with its implementation must be developed and designed to preserve education as both public good and personal gain. Maintaining high regional standards is seen as equip-

ping regional institutions to successfully compete with international tertiary education providers. The CARICOM initiative should be seen as providing an overarching framework into which the national bodies would connect. While arriving at consensus among so many nation-states is challenging, there is no doubt as to the imperative to create a network in which quality systems and accreditation arrangements converge and are harmonized in the context of the increasing international trade in higher education. These must also be extended to less traditional modes of learning, such as distance education and e-learning.

Meanwhile, the Caribbean Regional Negotiating Machinery has recommended that CARICOM countries take advantage of this opportunity to create niches for exporting education. Potentially lucrative areas exist in tourism, medicine and education. Information and communication technologies, which facilitate the cross-border reach, are believed to allow CARICOM countries to maintain competitiveness and provide the infrastructure for distance education and online programming. The Caribbean must now organize itself to be not just importers of transnational education but exporters also. Quality assurance will prove to be key to its success.

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# Special Education

## Current Trends, Future Possibilities

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MARY DIXON

Special education in the region owes its origin and its energy more to parent advocacy than to government initiatives. Persons from each island state can relate a story of a parent who, frustrated with trying to find appropriate services for a child with a disability, started a programme for that child and then found other parents with the same needs. Joining together, they form associations and encourage other parents and well-wishers to join. These associations have formed linkages with churches, service clubs and agencies with a welfare focus. Working together, they have lobbied governments for educational services for their children with disabilities.

Today, special education services are being offered in most countries of the region with different levels and stages of organization, and with varying levels of public and governmental support. Education for students with disabilities is mostly offered in special schools according to disability, with those students with multiple disabling conditions being served in schools for the dominant disability. In the smaller countries, the practice of mainstreaming has been carried out more by default than intent.

Governments have become involved in the provision of special education as a byproduct of provision for primary education and, more recently, education for all. Once committed, however, these governments have embraced the concept and have been providing funding for programmes.

Students with disabilities generally receive their education in a separate system, with schools being organized for students who are deaf, blind, mentally

retarded, learning disabled or physically disabled. Most of these students are moderately disabled. They are in special schools staffed by a mix of special education trained and regular trained teachers who have benefited from in-service seminars and workshops.

Students who are mildly disabled are usually served in the regular school system with little or no support services. In some regular schools there are resource rooms intended to provide assistance on a one-to-one or small group basis for students experiencing difficulties in reading or math. These resource rooms often fail to achieve their objectives, however, as principals see them as the solution to all the learning difficulties of all the children in the school. Although they often start off with between ten and twelve students, and much energy and promise, before long they are attempting to serve fifty to sixty children, or more, and they become a dumping ground for students whom teachers have grown weary of trying to teach.

In some countries of the region, attempts have been made at mainstreaming those students with mild disabilities who it was felt would benefit from such a placement. A few of these schools have been successful, as parents have been strong advocates for these programmes. In other schools, the children who are mainstreamed are in programmes that run parallel to the those provided by the host school, with students joining in in the arts, religious education and physical education. Students with low-incidence disabilities, such as blindness, are often served by itinerant teachers. In Jamaica, this service is offered primarily at the secondary level, while in Trinidad, Belize and St Lucia, itinerant services are offered across the education system. The success of these arrangements has been a result of the degree of interest shown by the principals and the willingness of parents to become partners with the schools.

Training for personnel has been mainly training teachers to work in special schools. Mico College in Jamaica has been the premier institution providing training for teachers regionally. Mico has trained special education teachers for over fourteen English-speaking countries of the region. Programmes are currently offered at the diploma and degree levels. At the diploma level, training is offered in mild disabilities, deaf and hard of hearing, and blindness and visual impairments. The training in mild disabilities equips teachers to work with children and youth who are mildly mentally retarded, mildly behavioural

disordered and mildly learning-disabled. At degree level, the two programmes are delivered in collaboration with the Department of Educational Studies at the University of the West Indies, Mona: multiple disabilities, and educational assessment and instructional planning. Students trained in these programmes are in high demand and are usually sought for employment before they graduate.

A needs assessment carried out in 1995 by Sijtze Bergsma, a consultant from the Netherlands who worked at Mico College, found that the approximately 58 per cent of special needs children were served in special schools in fourteen English-speaking Caribbean countries. It also showed that, based on the estimated needs, there were not enough teachers being trained yearly. It is the intention of the Mico College to complete the restructuring process, which was started about four years ago, by the next academic year. With this restructuring, we plan to bring all our programmes to degree level, in order to increase the level of efficiency in managing the programmes. Our offerings will become

- mild and moderate disabilities;
- moderate and severe disabilities;
- deaf and hard of hearing;
- blindness and visual impairment; and
- educational assessment and instructional planning.

We have already had preliminary discussions with the Caribbean Council for the Blind about also addressing the issue of low vision.

The recent Task Force on Education in Jamaica has made recommendations relating to special education which include the following:

- Embark on a “child find” to ensure that special needs children are identified and referred for testing and appropriate services.
- Implement a system for the early detection of children with special needs, to begin at the early childhood level.
- Introduce mandatory training (coursework) in the nature and needs of special children.

- Include diagnostic and prescriptive teaching for all pre-service and in-service teachers.
- Embark on public education programmes for awareness and understanding of special needs.
- Provide focused education to parents of special needs students.
- Include special needs students in the regular classroom setting with the appropriate support services and instructional materials for the different groups of learners, including the resource room where necessary.
- Improve on provision for special sitting of examinations for special needs students.
- Foster and facilitate acceleration and enrichment for the gifted and talented at all levels, and implement a small number of well-resourced schools coupled with one-day-per-week “pull-out” regime for the exceptionally gifted.

Many of these ideas are already being practised to some degree. However, their success is still dependent on the goodwill of principals and teachers who are committed to doing their best for these students. There is a lot of lip service being paid to these ideas, but as they are not backed by legislation, they are nearly impossible to enforce.

So what of the future? Where do we go from here? How do we ensure that children who function at either end of the ability continuum receive the education best suited for their needs? There are no easy answers. Several factors serve as challenges to accomplishing education for all:

- lack of legislation to ensure/enforce compliance;
- too large, too overcrowded classes;
- too high student-to-teacher ratio;
- limited physical resources;
- location of schools in relation to where students live;
- reluctance of the general public to treat these students as persons;
- limited numbers of trained teachers to work in resource rooms, a mainstream setting or as itinerant teachers; and
- an education system which is driven by examination results and thus sees disabled students as a liability.

We need to look again at what is possible. What can we do with the limited resources we have? How, as professionals, can we lobby governments to enact and enforce legislation that will give muscle and teeth to their pronouncements? We will need to begin with how we organize delivery of services. We must conceive of special education not as a set physical place or time but as being on a continuum, delivered when needed, to whomever needs it and for as long as it is needed, not as a substitute system but as a complementary one. We could then realize that not only those children with obvious disabilities can benefit from special education, but that all learners having difficulties, whether intermittently, limited, extensively or pervasively, could be well served. With this kind of thinking, it would not be unusual for a grade 4 student who is capable of doing grade 6 mathematics to be allowed to join the grade 6 mathematics class; and in the same way, a grade 6 student who is reading at the grade 4 level can be tutored at that level so he can achieve success and then be assisted to improve his reading skills. School would then be focused on what the students need to learn rather than on how much curriculum the teacher has to cover, whether the students learn or not.

With this more flexible way of approaching the education of students, it could be possible to place students in the least restrictive environments where they could really benefit from the education being offered there. In this way, we could include more of our children in quality educational programmes. An outcome of this would be that more students with disabilities would be successful at the primary and secondary levels and would be better equipped for adult living and future educational endeavours.

# Outcome Measures of Successful Adjustment to Adult Living for People with Disabilities

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CELENE A. GYLES

## The Issues of Outcome Measures and Adult Adjustment

It is generally expected that children will develop and grow to become fulfilled and well-adjusted youths who will meet and manage the challenges of adult life. Parents have visions of their daughters and sons becoming accomplished in vocations that will make them financially independent. They think of their children making families and integrating into the society as good, cooperative citizens.

Post-school outcomes have been useful indicators of adult adjustment. However, there are many factors that contribute to successful adjustment in adult life.

### Attributes for Success

Successful people know what they want and they persistently go after it. These individuals set major goals, set timelines, develop specific plans to attain their goals, determine the benefits that reaching their goals will bring, stave off dis-

couraging influences and thoughts, and build coalitions with others who share similar goals and who will engage with them in mutual exploits (Sands and Wehmeyer 1996). Garfield (1986) suggests that successful people in any field excel at making decisions, self-managing their behaviour and adapting to changing circumstances.

The same success behaviours apply to people with disabilities. Studies were conducted with a group of adults with learning disabilities to determine why some were successfully adjusted and others were not, and it was found that those deemed to be better adjusted take control of their lives and surroundings, have a desire to succeed, have well-thought-out goals, are persistent, adapt to their environments, and build a social support network that facilitates their success. Follow-up studies have provided information on some of the critical outcomes that impact on the quality of life of people with disabilities.

A number of follow-up studies that have been done to track graduates and school leavers with disabilities in order to examine adult outcomes. These studies indicate that adults with varying disabilities who are well-adjusted have been more self-fulfilled, socially competent and relatively well-integrated into their communities. In contrast, those who are less well-adjusted seem to encounter problems that negatively impact on the quality of their lives. Results of these studies further show that training and educational preparation are crucial to the successful transition from school to work, enabling students to become well-situated in different areas of life.

## Follow-up Studies

Early follow-up studies in the United States in the late 1980s examined the factors associated with employment status of youth with disabilities who exited high school five years earlier (Hasazi, Gordon and Rowe 1985; Edgar 1987). The studies were prompted by the heightened concerns of parents, educators and rehabilitation professionals during that period. The nationwide survey sampled youth with a variety of disabilities, and was designed to glean information on current occupation, employment history, post-school education and vocational training exercises, social service utilization, and cur-

rent marital and residential status. All the graduates came from a background where they had received special education training and services. The results obtained showed that over one half of the sample was employed, most found jobs through a network of family and friends, and that educational and vocational experiences were more likely to predict successful employment outcomes.

Later studies in that country (Benz, Yovanoff and Doran 1997; Frank and Sitlington 2000; Wehmeyer et al. 2000) determined that attributions for success were training components that were necessary in the curriculum to prepare students for successful post-school adjustment and adult living. Attributions for success are what an individual considers as needed elements to make him or her successful in life. These included self-determination (that is, the ability to set goals, make choices, decide on a plan, carry out plan, change and evaluate), self-advocacy (that is, the ability to communicate desires, seek rights, preserve self), and skills for determining options and making and communicating choices to others.

A British nationwide study (Robinson 1993) surveyed people who were blind and partially sighted to ascertain the challenges they faced in their adult lives and to provide improved services to them based on specific concerns identified in England. The result showed significant gaps in the provision of services, educational preparation and training, and at least half of the individuals, especially those in the older age group, lived in poverty and isolation. Training and support were suggested as possibilities for improving individuals' quality of life.

In Canada (McConnell 1999), a parent-guided programme on adolescents' career decisions for students with disabilities was determined to be an essential aspect of transition to adulthood and success experience for the workplace.

Social contracts and social networks have been the focus of a number of studies. In a nationwide study of blind and visually impaired Dutch adolescents aged fourteen to twenty-four years, conducted over a five-year-period, the focus was on social support. The functional aspects of networks proved to be important for the adjustment and well-being of the adolescents with blindness and visual impairments (Kef 2002).

## Status of Post-School Outcomes in Jamaica

Students with special needs in Jamaica are given exposure to educational opportunities that are designed to maximize their academic and vocational potential. Schools for students who are deaf and hard of hearing, students with visual impairments, and students with mental and physical disabilities to some extent address the preparation of the students for employment, independent living and community living. These schools have designed their curricula to include skills that are necessary for competing for skilled jobs in the workforce.

The 1999 Green Paper of the Ministry of Education, Youth and Culture emphasized the importance of providing a wide array of skills and competencies that are necessary for integration into the marketplace. The paper further highlighted the case of students of higher education, whose training must be more than the traditional subject content curriculum.

### Post-School Outcomes Associated with Employment Success for the Blind and Visually Impaired in Jamaica

Research in outcome measures for post-school adjustment is near non-existent in Jamaica. This line of investigation had not been pursued for people with blindness and visual impairment in the country. A 2002 study of graduates and school leavers who are blind and visually impaired focused on issues of post-school outcomes, primarily employment success. The investigation was carried out to identify the factors associated with successful post-school adjustment of blind and visually impaired adults, measured by their income level, job satisfaction and problems on the job. The absence of research information on disability outcomes in Jamaica necessitated empirical investigation to support advocacy and programme planning, and to inform policy for maximizing the potential of people with disabilities in the island.

The economic and employment activities of some blind and visually impaired people showed them to be financially self-sufficient, while others seemed not to fare so well. A questionnaire was designed to gather data per-

taining to education and transition training, attributions for success, self-determination and employment status.

The respondents were individuals with blindness and visual impairment who graduated from the School for the Blind (the country's residential educational facility for teaching the blind and visually impaired) and from regular secondary school during the period 1980 to 2001.

There were forty-four respondents (twenty-eight males and sixteen females), aged nineteen to fifty-one years. The largest age group was in the range thirty-one to forty years old. Of the group, thirty-three respondents were blind and eleven were low vision or visually impaired. Twenty-three respondents lived in St Catherine, a neighbouring parish to the capital city, Kingston.

The study sought to find out

- the relationship between the respondents' background characteristics, their educational training, transitional training, self-determination, attributions for success and their employment success;
- the relationship between the respondents' educational and transitional training, self-determination, perceived attributions for success and their employment success; and
- the best predictor of the respondents' employment success.

The results indicated the significance of background variables (such as who lived with others or lived alone, age, marital status, whether low vision or blind, tertiary education, income level), education and transition training, and self-determination on employment success and successful adjustment. There were significant correlations with training and self-determination. Research has shown that a functional relationship exists with transition training, educational training and self-determination for people with disabilities.

Attributions for success factors (such as self-advocacy, self-esteem, communication skills and so on) showed significant correlations among themselves and with educational training. These were not unusual findings, since research has shown that, in most instances, people who have attained a level of educational achievement are likely to be more socially and personally successful. It is no different for people with disabilities.

The employment success factor showed significant correlations with self-

determination. Several of the respondents who perceived themselves as successful attributed this success to educational achievement, being employed, experiencing insignificant problems on the job, feeling a sense of satisfaction with the job, having good social interactions and the feeling of well-being that came as a result of their economic empowerment.

Of the study variables (educational training, transitional training, self-determination, and personal, social and educational attributions for success), the results showed that only self-determination was a significant predictor of employment success. Regression analysis conducted to assess the predictive power of the study variables on employment success indicated that the higher the self-determination, the higher the employment success as measured by income level, job satisfaction and problems on the job.

## Implications for Post-School Adjustment and Employment Success

It is recommended that educational aspects, such as transition training, self-determination and attributions for success, be incorporated in programme development and structure. Training and preparation specifically addressing adult living for people with disabilities is important and necessary for success in the workplace and successful adjustment in adulthood.

Outcome measures for successful adjustment to adult living for people with disabilities is an important area of focus to fully prepare young people for productive lives. Typically, focus should be on the development of a wide array of skills and competencies and on the acquisition of skills that can be applied. Moreover, work-based activities should make it possible for young people to learn skills in authentic, real-world settings, while familiarizing them with the demands and rigours of the world of work.

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**Outcome measures for successful adjustment to adult living for people with disabilities is an important area of focus to fully prepare young people for productive lives. Typically, focus should be on the development of a wide array of skills and competencies and on the acquisition of skills that can be applied.**

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# The Twice-Exceptional Child

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CAREY PHILLIPS

The concept of children with dual exceptionalities, or what may be more commonly referred to as the “twice-exceptional” child, is by no means new. However, it is an area that, unfortunately, has received little attention, especially in the Caribbean. The earliest studies found on the twice-exceptional child, carried out in 1989 (Boodoo et al. 1989), emphasized the importance of not only identification of children who fell into this category but also the provision of appropriate services.

But what exactly is a twice-exceptional child? The twice-exceptional child, simply put, is one who is gifted and has a disability or sensory impairment. These may include, but are not limited to, the following:

- learning disabilities (specific and non-specific)
- autism
- deaf-blindness
- deafness and hearing impairments
- developmental delays
- mental retardation
- blindness and low vision
- physical disabilities
- speech and language impairments
- traumatic brain injury
- multiple disabilities and health impairments

In order to fully understand this population, we must understand the wide and varied categories of disabilities and sensory impairments as well as the current accepted definition of “giftedness”.

Although the idea of giftedness was being studied as early as 1869 by Galton, there was no clear definition until the twentieth century. Definitions of giftedness have advanced from the original one put forth in 1925 by Terman, who defined this population as “those who score in the top 2% on standardized intelligence tests”, to the most recent one, developed by Joseph Renzulli (1986), which states that

Giftedness consists of an interaction among three basic clusters of human traits – these three clusters being:

- above general abilities,
- high levels of task commitment and
- high levels of creativity.

Gifted and talented children are those possessing or capable of developing this composite set of traits and applying those to any potentially valuable area of human performance. Children who manifest or are capable of developing an interaction among three clusters require a wide variety of educational opportunities that are not ordinarily provided through regular instructional programs.

## Difficulties Faced in Identifying the Twice-Exceptional Child

Identification of children who are gifted and talented is done in a variety of ways using different methods, but must take into consideration the elements discussed in the definition above. Galton’s idea that giftedness is both general and specific is also helpful at the point of identification, because we now know that giftedness can be measured in quantitative and qualitative terms.

George (1997) indicates some of the more popular methods used for identification of academically gifted or talented children, which include

- observation,
- checklists (which may be general or specific),
- rating scales,
- intelligence tests,

- achievement test batteries, and
- creativity tests.

In all methods, however, there are advantages and disadvantages.

Teacher observations and judgements are necessary, but may not be objective. It is believed that teachers who are trained and experienced should be able to identify those students who may be gifted and academically advanced. However, children who may not conform to regular classroom behaviour patterns may be overlooked. Falling into this category may be children who are demotivated and children with social, emotional and behavioural problems as well as students with learning disabilities.

Checklists are convenient and easy to use, and also provide a quick reference guide for identification. Checklists, though, may not be relevant for use in all cases and are best used by both teachers and parents. Information gathered using this instrument should form part of the identification process but should not be limited to this instrument, because responses may be underestimated or overemphasized.

Whether they are general or specific in nature, checklists are sometimes seen as unreliable as many of the items lack specificity, especially for use with students with disabilities and impairments.

Intelligence tests are useful, especially when utilized in conjunction with informal methods such as checklists and teacher observations. They are specific and may provide accurate and reliable information on learning potential but may not be highly effective for students with emotional problems or those from different cultural groups.

Specific ability tests are generally used to determine levels of ability in areas such as art, music, science or mathematics, but they are often viewed as narrow in their scope and lacking in reliability and validity, especially for students with exceptionalities.

Individual intelligence tests, on the other hand, are found to be very reliable in determining a child's reasoning ability. Unfortunately, the disadvantages far outweigh the advantages as they do not measure learning potential and cannot predict achievement. The disadvantages are that they are expensive, they take a long time to be administered and, as a result of the fact that

there are currently no regionally developed tests out of the Caribbean, there is always the issue of these tests being culturally biased.

In the process of identifying persons who are academically gifted or talented, children with disabilities and impairments are often forgotten. In their review of literature, Johnson and Corn (1989) found less than ten articles focusing on gifted and disabled students written after 1981.

In one survey of children with cerebral palsy, conventional methods of identification are seen as inadequate because of the inability of students to respond to items verbally and their lack of experiences, which result from their lack of mobility and in turn artificially lowered their scores.

Other factors that make some of these tests inadequate for the physically challenged are the fact that they require hand movement or indication of responses by pointing or touching and these movements often cannot be effectively performed. Finally, they attempt to compare students with disabilities with their non-disabled peers. Whitmore and Maker (1985) therefore recommend that students with impairments and disabilities be compared with students of similar status.

Where sensory impairments are concerned, a study conducted by Furth (1973) indicated that although students who are deaf or hearing impaired may be just as intelligent as their hearing counterparts, only an estimated 15 per cent of the gifted population who fell into this twice-exceptional category were being provided with opportunities extended to the general gifted population. Children who are deaf and hard of hearing are not being identified or given the opportunity to reach their full potential due to a lack of appropriate resources. Turnbull (1986) reported that only 59 per cent of what happens in a regular classroom is understood by a deaf child without an interpreter.

As with students with other disabilities and impairments, students who are blind and visually impaired may be difficult to identify as a result of the delays in concept development, which may be a direct result of the lack of experience rather than lack of ability. Also, lack of experience may further prevent the display of gifts and talents possessed by these students. With appropriate services provided early, students with visual impairments who are gifted can be identified.

In identification of students with learning disabilities who are also gifted,

the difficulty arises because there is no distinct profile of this population. Identification should therefore be based on a wide cross-section of information ranging from standardized tests, informal observations by teachers and parents, and records of current and previous school performance.

It is important when considering twice-exceptional children that students with attention deficit hyperactive disorders are not forgotten. Webb and Latimer (1993) suggest using a variety of instruments, such as achievement tests, intelligence tests, personality tests rating scales, and checklists completed by teachers and parents over an extended period, with clear explanations on the items being measured, in order to ensure specificity. It is important to note, however, that in the United States alone, there are currently over twenty-one definitions of gifted and talented being used in the education system.

Reiss (2000) noted that the main difficulty in identification of gifted students with disabilities is the ongoing problem of “defining each population”. She further states that professionals in the area of gifted education often have separate definitions than other special educators in defining populations and use differing terminology, and so minor differences in semantics may play a significant role in the underrepresentation of students who are gifted and have disabilities or who are twice exceptional.

It is encouraging to note that there currently exists within the education system of many Caribbean islands policy documents that address special education and each group of exceptionality individually. They do not, at this time, address the twice-exceptional child, however. It is believed that in time programmes will be in place regionally to address the needs of this diverse but very real population.

In addition to identification, another important step that must be taken to ensure quality education for all children is to include in teacher-training pro-

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grammes information relating to children at both ends of the intellectual spectrum. While the teacher-training programmes in Jamaica for primary, secondary and early childhood education currently include a small component on exceptional students, there is a need to ensure that all teachers are knowledgeable of signs to look for that indicate differences in children. It will not be possible or practical for everybody to become a special educator, but the existing five-hour component included in the course “Psychology of Education” is not enough. It is a start, but still inadequate. This is, of course, separate and apart from existing special education major courses.

Identification of the twice-exceptional child is a diverse area, but, given what we know today about this population, it is clear that a variety of methods and resources exist. If carefully chosen and carried out by qualified professionals, these can be used to identify most of the students in this category who can then be catered to, educationally and otherwise, using various strategies intended for that population.

Regardless of the method of assessment, however, identification is very important. As research has shown, children who are not identified early, and provided for, are likely to fall into the category of gifted underachiever. This issue of underachievement is another matter, for another time. But it is interesting to note that in *TORCH* magazine (produced by the Ministry of Education in Jamaica in 1976), in his article on gifted children, Stephens warned that if programmes were not put in place, Jamaican society would pay the penalty.

It was not ironic, then, that sixteen years later, on the television programme *Tuesday Forum* (7 September 1993), prominent psychologist Ruth Doorbar, in highlighting a study she carried out with psychiatrists Frank Knight and Freddie Hickling, revealed that studies had been conducted in the General Penitentiary and found that 13 per cent of inmates on death row were officially identified and classified as being gifted.

Some strategies and suggestions that have been found to be successfully utilized by teachers of twice-exceptional students include the following:

- Permit students to choose in educational settings by allowing them to highlight their individual strengths, as the teacher may not be aware of some of these.

- Allow students to choose their topics and areas of interest.
- Use interest and learning style inventories to become familiar with strengths of the gifted students with disabilities.
- Make instructional decisions based on each student's learning preferences and learning style and allow them to develop their individual strengths.
- Provide opportunities for students to work independently as well as in small groups or with peers who have similar interests, regardless of disability.
- Integrate various content areas with instruction to allow students the opportunity to connect areas of related interest to new concepts.
- Discuss instructional strategies with special education teachers and other professionals who work along with the child.
- Try to include all the senses where possible.
- Provide specific instruction in organizational skills.
- Find and use any technology, accessory or aid that will make the learning process easier.
- Do not take time away from students' strong areas to compensate for their weak areas. For example, if a student is an exceptional and gifted painter but is dyscalculic or has a learning disability that affects his or her ability to process information for mathematical computation, do not withdraw art time in favour of math.
- Encourage students to develop friendships with other gifted students whose interests may be similar.
- Give children opportunities to demonstrate their strengths outside as well as inside the classroom.
- Encourage parents to discuss their observations and explore with them how their child may learn more effectively at home and in school.
- Finally, look for or help to implement holiday and weekend programmes for twice-exceptional children that provide opportunities for them to be in settings with similarly abled peers.

Teaching the twice-exceptional population is no easy task, but if teachers bear in mind that all children can learn if they are taught in a way they can learn, then half the battle will already have been won.

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# Context and Curriculum for Basic Education for All

## Perspectives from UNESCO Windhoek

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The concept paper for this conference captures the challenges facing education for the twenty-first century. It essentially focuses on re-engineering learning at all levels in order to develop individual competencies for high-performing economies, while at the same time preserving and disseminating those qualities that value human beings in all their diversity. This must be done in a world in which it sometimes seems that survival depends more on conformity than diversity, and in which various forces seem to make it more difficult for the weak to compete, while extolling the virtues of competition.

How can the education systems of weaker economies help countries to address these challenges? UNESCO is the UN agency charged with leading advocacy for and monitoring access to quality education for all. The Education for All (EFA) movement was first launched in Jomtien in 1990; reiterated in Dakar in 2000 and eventually encapsulated as two of the millennium development goals, the guideposts for human development agreed by 189 countries at the UN Millennium Summit of September 2000.

I have been asked to focus on primary education and on UNESCO's perspectives. As such, the paper will focus on the international education development goals as agreed at Dakar and in the Millennium Summit; outline

UNESCO's mandates in these areas; and outline some challenges to quality primary education for all and some initiatives taken by UNESCO, in partnership with the United Nations and other development agencies and bilaterals in addressing these challenges, with specific reference to countries in the UNESCO Windhoek Cluster (Angola, Lesotho, Namibia, South Africa and Swaziland). In so doing, I will make some reference to the Caribbean situation in order to illustrate the challenges of context and the opportunities and limitations of curriculum in addressing these challenges.

The paper ends on a note of cautious optimism, that while quality education continues to be buffeted by societal forces, it still remains a necessary instrument in the struggle both for quality livelihoods and quality lives, and the role of the United Nations (and with it, UNESCO) remains relevant and important, despite the buffeting that it, too, has undergone in recent times.

## International Education Development Goals

Realizing that a new century would soon be born, at the beginning of the 1990s, the international community set several goals to be achieved in the last decade of the twentieth century. For education, these were set at Jomtien in 1990 and their status reviewed in 1999. This review, coordinated by UNESCO and involving five key international agencies (UNESCO, UNDP, UNFPA, UNICEF and the World Bank, as well as several bilateral donors, including DFID) culminated in the Education for All forum in Dakar in April 2000.

The review showed that significant progress had been made towards the Jomtien goals, but several, sometimes severe challenges remained. This resulted in new goals being set, now referred to as the Dakar Education for All goals. These are as follows:

- (i) expanding and improving comprehensive early childhood care and education, especially for the most vulnerable and disadvantaged children
- (ii) ensuring that by 2015 all children, particularly girls, children in difficult circumstances and those belonging to ethnic minorities, have access to and complete free and compulsory primary education of good quality

- (iii) ensuring that the learning needs of all young people and adults are met through equitable access to appropriate learning and life skills programmes
- (iv) achieving a 50 per cent improvement in levels of adult literacy by 2015, especially for women, and equitable access to basic and continuing education for all adults
- (v) eliminating gender disparities in primary and secondary education by 2005, and achieving gender equality in education by 2015, with a focus on ensuring girls' full and equal access to and achievement in basic education of good quality
- (vi) improving all aspects of the quality of education and ensuring excellence of all so that recognized and measurable learning outcomes are achieved by all, especially in literacy, numeracy and essential life skills. (UNESCO 2000)

Not included explicitly in the goals, but as important, was that the international supporters of education had in many ways failed to monitor and support the Jomtien goals and so the Dakar forum endorsed partnerships as an important mechanism towards the achievement of the goals and noted significantly: "no countries seriously committed to education for all will be thwarted in their achievement of this goal by a lack of resources" (UNESCO 2000). Equally, a viable plan was defined as one that had significant inputs and support from government and civil society. These were two key recognitions: (1) that countries may have the will, but not the wherewithal, hence the international commitment, and (2) that education for all was the business of all, not just of governments. Indeed, it is significant that all UNESCO's sectors and all divisions of UNESCO have education for all as a priority. In 2004, there was an international round table at headquarters discussing the role of universities in EFA. This conference on quality education hosted by the University of the West Indies is indeed apropos, because it recognizes and is playing out the critical role of universities in universal basic education.

Several fora in other sectors were held to herald the dawn of a new millennium and the most critical areas were encapsulated in the millennium development goals adopted by the UN Millennium Summit in September 2000. One of the goals of Dakar was captured in the wider millennium development

goals and the need for gender equity and the role of partnerships for development was repeated in this declaration of international intent. In summary, the millennium development goals, with the specific targets, to be achieved by 2015 are:

1. Eradicate extreme poverty and hunger.
  - Reduce by half the proportion of people living on less than \$1 a day.
  - Reduce by half the proportion of people who suffer from hunger.
2. Achieve universal primary education.
  - Ensure that all boys and girls complete a full course of primary schooling.
3. Promote gender equality and empower women.
  - Eliminate gender disparity in primary and secondary education preferably by 2005, and at all levels by 2015.
4. Reduce child mortality.
  - Reduce by two thirds the mortality rate among children under five.
5. Improve maternal health.
  - Reduce by three quarters the maternal mortality ratio.
6. Combat HIV/AIDS, malaria and other diseases.
  - Halt and begin to reverse the spread of HIV/AIDS.
  - Halt and begin to reverse the incidence of malaria and other major diseases.
7. Ensure environmental sustainability.
  - Integrate the principles of sustainable development into country policies and programmes; reverse loss of environmental resources.
  - Reduce by half the proportion of people without sustainable access to safe drinking water.
  - Achieve significant improvement in the lives of at least 100 million slum-dwellers by 2020.
8. Develop a global partnership for development.
  - Develop further an open trading and financial system that is rule-based, predictable and non-discriminatory. Includes a commitment to good governance, development and poverty reduction – nationally and internationally.

- Address the LDCs' special needs.
- Address special needs of landlocked and small island developing states.
- Deal comprehensively with developing countries' debt problems through national and international measures to make sustainable in the long term.
- In cooperation with developing countries, develop decent and productive work for youth.
- In cooperation with pharmaceutical companies, provide access to affordable essential drugs in developing countries.
- In cooperation with private sector, make available the benefits of new technologies – especially information and communications technologies. (UNDP 2003)

Thus, the drive for universal primary education is captured both in the education-specific targets for 2015 and the wider development targets. Moreover, it is recognized that primary education, while an end in itself, is also a vehicle for the achievement of all the other goals. Several international initiatives have been forged to lend advocacy and support to the achievement of the Dakar goals and almost all donor agencies gear their programmes towards the achievement of the millennium development goals. Thus, much less is left to chance for 2015 than had been for the Jomtien goals after 1990.

Towards this end, a team of partners support the *EFA Global Monitoring Report*, which collects data and reports annually to a high-level group on the status of the world's education, vis-à-vis movements towards achievement of the Dakar goals.

## Purpose of the EFA Global Monitoring Report

The *EFA Global Monitoring Report* is an independent report, and an advocacy and reference tool to

- chart progress towards the six Dakar goals;
- hold the global community to account;

- monitor international commitments;
- draw attention to emerging challenges; and
- highlight effective policies and strategies.

The *Global Monitoring Report* collates information annually to see whether the world is on track in achieving the goals.

The 2005 *Global Monitoring Report* highlights the importance of quality of education and where the world currently stands in relation to the six Education for All goals (UNESCO 2004). Quality matters, the report argues, because “better education contributes to higher lifetime earning and more robust national economic growth, and helps individuals make more informed choices about fertility and other matters important to their welfare”. It goes on to say that “quality education reduces exposure to HIV and AIDS: research shows that cognitive gains from basic education are the most important factor in protecting teenagers from infection. Such benefits are closely linked to the education levels achieved” (UNESCO 2004, 17). Needless to say, HIV/AIDS is a huge challenge to development and, in some cases, even to the survival of some communities. Quality education is a key to addressing this challenge.

In the appendix, I have summarized the status of the five countries in the Windhoek Cluster and five in the Caribbean, both to illustrate what is done by the report and to illustrate remaining challenges for these countries. I have consciously selected the three campus countries of the University of the West Indies as well as Cuba, which is on the top end of the Caribbean in terms of the progress towards the goals, and Haiti, which is furthest from achieving the Education for All goals.

Let me immediately reflect on two issues relevant for the context of education for all. It would be noted that for both Haiti and Angola, the statistics are nonexistent or low. In UNESCO terms, these are referred to as conflict or post-conflict countries. The effects are clear: education cannot progress in a situation of conflict. One of the greatest negative factors in achieving the goals is indeed the issue of conflict. Other than Haiti, the Caribbean has not been marked by as open conflict as the countries in our cluster (apartheid and civil war); however, one of the issues that Caribbean countries grapple with is incipient conflict and, if one is to believe the media reports, conflict in schools

themselves. It is important for policymakers to focus on conflict prevention and conflict management, areas to be addressed and resolved, lest the gains made are rolled back.

In Angola, UNESCO is forging a project with actors in the country to examine conflict management and conflict resolution. Additionally, one of our key programmes is infusing human rights and democracy through the curriculum, with carrier subjects being social studies, religious and moral education, and languages (UNESCO 2001). This was originally one of the goals of the social studies curriculum in the Caribbean. It will be worthwhile to examine whether this subject is still playing such a function in the Caribbean curriculum or has become another for purely academic study. What is being postulated here is that quality education is not just education to achieve good academic results, but education to preserve and promulgate positive social values. The prevention of conflict and promulgation of its positive and creative resolution must be on the agenda of quality primary education for all.

## The Role of Statistics

Another area of challenge for countries in the Windhoek Cluster and in the Caribbean is defining, measuring, monitoring and sustaining quality. At the international level, three principles about quality in education tend to be broadly shared: the need for more relevance, for greater equity of access and outcome, and for proper observance of individual rights (UNESCO 2004). Quality is influenced by relevant curriculum design and the capacity for development and production of appropriate materials; good school management; general management and use of relevant information; and quality teaching, itself fostered by quality teacher education systems.

Such tracking cannot be done without sound educational statistics. The UNESCO Institute for Statistics has been deemed the custodian of the world's statistics on education and makes a key input into the monitoring report. Annually, countries fill in the UNESCO Institute of Statistics' Questionnaire on Statistics of Education, and this becomes the source of data for comparative educational statistics internationally.

Among the Education for All goals that our member countries have committed themselves to is the goal to improve all aspects of the quality of education and ensuring excellence, so that recognized and measurable learning outcomes are achieved by all, especially in literacy, numeracy and essential life skills. To realize these goals in particular and education programmes in general, trends, needs and targets should be quantified in order to effectively and efficiently address the concerns. In recognition of this, ministries of education in southern Africa have for several years worked to undertake educational policy research with the aim of generating reliable information that can be used by decision-makers to plan the quality of education. A total of fifteen ministries of education, along with IIEP, have come together to form a collaborative network of the Southern African Consortium for Monitoring Education Quality (SACMEQ). SACMEQ activities include project design, training, computer-based data analyses, data archive production and dissemination of research results. Recent years have seen SACMEQ grow and emerge as an autonomous international organization.

SACMEQ's co-coordinating centre is located within UNESCO's Harare office. It has a co-coordinator and operates under the overall guidance of a management committee chaired by Zimbabwe's minister for education. Its work has three main features:

1. Ministries of education define the scope and structure of research and training programmes.
2. Programmes function as co-operative ventures that are focused on long-term capacity building.
3. SACMEQ provides useful and feasible research-based advice on high-priority educational policy issues. (Voigts 1998)

However, many, if not all, of the countries in the region are still faced with paucity of data or lack the capacity to synthesize data from different sources. This level of statistics necessarily focuses on national data and may be more useful for system planners than for regularly tracking statistics at the sub-national, institutional and classroom level. This is the reason that, for the monitoring of quality, UNESCO is also engaged in training classroom practitioners and school and institutional leaders to collect and use relevant statis-

tics to monitor the progress and performance at the level for which they are responsible.

The critical importance of educational statistics and indicators in the planning and monitoring of education programmes cannot be overemphasized. By monitoring trends and making projections on future performance, such indicators can be used to assess ongoing programmes and provide information required for the formulation of sound policies.

Ensuring quality primary education, indeed ensuring quality at any level of education, requires this systematic collection and use of information. Our office is currently working with other partners in Angola to devise a simple monitoring sheet that can be used to collect such data.

## Teacher Education

Whatever the definition of quality, no-one disputes that a critical component is the quality of the teacher. Equally important to the quality of the teacher is the conditions of service of teachers. To address this situation, UNESCO has always emphasized teacher education, and in the 1960s invested heavily in teacher-training institutions in sub-Saharan Africa. A recent study, however, showed that much of the gains made in that period had been undermined (UNESCO 2003). In our cluster, the 1980s were marked by an intense freedom struggle that affected all the countries. In all four English-speaking countries in our cluster, therefore, there is a tremendous focus on teacher education. UNESCO is particularly engaged in three.

A project funded by the Government of Japan aims at capacity-building of teachers in Lesotho. In collaboration with the Lesotho National Commission for UNESCO, the University of Lesotho and the Lesotho College of Education, education professionals are provided with training in research and consultancy skills. As the first phase of the project, training strategies were formulated in 2004. In addition, information resources related to educational research were acquired through the project.

Under the Japanese-funded project to support teacher education in Swaziland, needs assessments were conducted in the following areas:

- information and communication technology training at the teacher-training institutions, the National Curriculum Centre and the In-Service Training Unit
- information and communication technology curricula in use at schools
- management systems for teachers at the In-Service Training Unit

To follow the above will be curriculum development, training and procurement of necessary materials.

UNESCO's involvement in Angola is holistic and includes many sub-areas, since a General Conference resolution called upon UNESCP to mobilize various international partners "to come to the assistance of the Angolan people and the Government of the Republic of Angola in their efforts to strengthen the bases of National Reconstruction" (32c/com.I/DR.2 rev/ 4 October 2003, General Conference, 32e session, Commission 1).

The three elements particularly related to primary education, therefore, are the statistical and educational information management system referred to earlier, inclusive education and teacher education. With respect to inclusive education the emphasis is on developing a sign language for use in Angola, since areas of special education, as with all other areas of the social sector, would have been neglected during the years of war. So far, a national sign language is being developed and some three hundred teachers have been trained in its use. We hope our involvement will continue until education for the hearing impaired is a given in all the provinces. This will therefore help access and quality for the otherwise excluded. Indeed, for Mother Language Day 2005, this aspect of access and quality for the otherwise excluded was emphasized, because sign language and Braille were given particular attention.

With respect to teacher education, UNESCO only recently signed an agreement with Angola, the Secretariat of the New Partnership for Africa's Development (NEPAD) and the University of South Africa (UNISA) to, *inter alia*,

- promote the use of open and distance learning and continuous professional development through possible assistance, and
- collaborate in the design, implementation and monitoring of activities to

teacher professional institutions in Angola. (Statement of Intent among the Ministry of Education, Angola, UNESCO, UNISA and NEPAD, 3 March 2005)

One of the first actions in this regard is the establishment of a national qualifications framework for teaching. This is necessary because during and immediately after the war, several agencies intervened to provide some form of teacher education in order that education delivery could continue. Indeed, immediately after the war, twenty thousand teachers were trained in three-week crash courses by UNICEF to cater to the some one million children who would have flooded back in the campaign to get children into schools. This was essential in an emergency situation. Now that the country is moving towards stabilization, it is necessary to bring the different elements into one system, hence the focus of this contract.

One imagines that in the Caribbean, the focus might be more on continuously energizing older systems and ensuring that they meet the needs of today's children.

## Curriculum Content and Delivery

### Language and the Arts

The content of primary education for all remains contentious, since the challenge to deliver education to all may not be matched by the capacity to deliver everything to all, nor may it be desirable to try to deliver everything.

In the countries of the Windhoek Cluster, the issue of language, both in terms of mastery of an international language and in terms of decisions on the language of instruction, poses challenges. English is the official mode of international communication in four of the five countries and Portuguese in the other. In two of the countries, there is one national mother tongue and so instruction in schools is bilingual and the situation is more or less straightforward, although some difficulty may still be experienced in the use of the second language for instruction.

The situation is far more complex, however, in the remaining three coun-

tries, each of which has multiple recognized languages: Angola, eighteen; Namibia, eleven; and South Africa, eight. UNESCO subscribes to the view that education should encourage linguistic diversity, while respecting the mother tongue, in order to promote through education an awareness of the positive value of cultural diversity, and to make full use of culturally appropriate methods of communication and transmission of knowledge. However, the practical implications of this are mind-boggling.

Imagine the challenge of producing curricula in eighteen languages in a post-conflict situation, where education itself is now being reconstructed after almost thirty years of war. Or, imagine a situation with the population of, say, that of Trinidad and Tobago and Grenada combined having to produce curricula for the first three years of primary school in eight languages, as a matter of policy and right. That is the situation of Namibia. Yet, since the three countries under discussion all suffered colonialism, under which denial of the mother language was one of the mechanisms of oppression, the ideal of multilingualism remains. Especially since there are debates about whether education in a language other than one's own, or transition to the second language before proper internalization of the first takes place, can do harm to the mastery of concepts.

While UNESCO Windhoek does not have any specific interventions in languages, the organization as a whole cooperates with the African Academy of Languages/Académie Africaine des Langues (ACALAN). Concern about language is related to concern about identity and also to the role of the arts in basic education. Language is, in more ways than one, the expression of our cultural identity, for through it we transmit knowledge to future generations. We use language, moreover, as a storehouse for knowledge about our environment, history and science. Quality education must incorporate indigenous culture and knowledge. More than merely ensuring the capacity to read and write, indigenous literacy should encompass awareness of the whole body of traditional knowledge.

“There is a lack of mediation and creativity everywhere, especially in schools. The arts are missing from our lives and we are giving way to violence.” This is what the famous violinist and conductor Lord Yehudi Menuhin saw around him at the close of the last century, after having devoted his life

to music and the quest for a better world. Art activities and creative teaching methods play a role in reinforcing self-awareness, self-confidence and interest in others. Art teaching methods demand personal and physical involvement through play and creativity, which makes the aesthetic experience a positive one for learners.

Launched in 2000, a UNESCO programme aims to place art education at the heart of formal and informal education, recognizing its critical contribution to children's cognitive and sensorial development. Art education also contributes to fostering mutual respect among cultures. Following regional assessments and research, the World Conference on Art Education in 2005 will focus on appropriate modalities for introducing art education into primary education.

## Science and Mathematics

In his first address to a University of Namibia graduation (16 April 2005), His Excellency Mr Hifikepunye Pohamba, the newly elected president of Namibia, noted,

The African Continent was colonized, perhaps with the exception of Ethiopia, because technologically, the African people lagged behind their European counterparts in areas such as weaponry. . . . Thus, today African leaders have every reason to be concerned because regrettably, today the technological gap between Africa and the industrialised countries is getting even wider. . . . I am of the view that the technological gap between Africa and the developed countries can only be adequately addressed through education.

In our cluster of countries, there is therefore a great concern with mathematics, science and technology. Yet, in many developed and developing countries, science education is in crisis. Pupils' attitudes to school science decline progressively across the age range of secondary schooling, and fewer and fewer students are choosing to study science at higher levels and as a career.

With the exception of South Africa, the number of tertiary education institutions may be limited. Therefore, the capacity of the institutions to produce graduates in science who would, in turn, become science teachers may be lim-

ited. Where there are teachers, their knowledge may be inadequate, and so what is passed on to students would also be problematic, thus continuing a problematic cycle. UNESCO collaborates with the Southern African Association of Mathematics, Science and Technology Educators, embracing teachers from primary through tertiary education in an effort to address these gaps. Moreover, there is also a special effort to assess needs and encourage approaches to enrol more girls in the areas of science, mathematics and technology, since even though there may be gender parity in total enrolment in some of the countries, there is gender disparity in terms of subject area enrolment.

### The Use of Information and Communication Technologies

In an effort to extend the reach of such teachers as do exist, UNESCO has embarked on an initiative in mathematics and science education through the use of information and communication technologies. With twenty thousand learners who study grades 10 and 12 (secondary education) through distance mode, the Namibian College of Open Learning (NAMCOL) is the largest academic institution in Namibia. UNESCO is currently supporting NAMCOL to develop Web-based learning material for grades 10 and 12 (equivalent of O and A levels) mathematics and science. Under this pilot project, two hundred randomly selected NAMCOL learners and NAMCOL professional staff, including curriculum developers, area coordinators and subject tutors, are receiving relevant training, ranging from basic computer skills to Web-based material development. Additionally, a manual on how to produce e-learning material will be developed (Shaketangue 2005).

Although this example deals with secondary education, there is potential for exploring the use of such technologies for primary education. Indeed, UNESCO has worked with various partners in exploring the use of information and communication technologies in adult basic education, working with adult-education facilitators in the development of materials for new learners. Given how much more readily children take to information and communication technologies, there are indeed possibilities for primary education here.

## Impact of HIV/AIDS on the Education System

The greatest threat to universal primary education in southern Africa is HIV/AIDS, in terms of the impact on students, teachers and the capacity to deliver quality education. The HIV/AIDS epidemic has dealt a heavy blow to development efforts, of which the education sector has not been spared. With an estimated percentage of adults (fifteen to forty-nine years) living with HIV/AIDS of 28.9 per cent in Lesotho, 21.3 per cent in Namibia, and 38.8 per cent in Swaziland in 2004, the problem is evident (UNAIDS 2004). It is reported that increasing number of teachers have died due to HIV/AIDS-related cases, while many may be absent due to illness or care-giving of others. With these losses, ministries of education have to develop coping mechanisms to train new people, which in extreme cases has meant the introduction of “crash courses” of two weeks as well as training of paraprofessionals. UNESCO, with other partners of UNAIDS, has responded with the Global Initiative on HIV/AIDS in Education (EDUCAIDS), an attempt reinforce action to prevent further infections and to address and mitigate the long-term impact of the pandemic in a holistic fashion. The description can best be captured in a long quotation from the UNESCO Windhoek concept paper “The Global Initiative on HIV/AIDS and Education Namibia” (19 April 2005):

The losses to HIV/AIDS are not only affecting teacher numbers, but learners as well. In some countries, primary enrolment rates have declined, and this has been attributed to the increased death rate among school age children and the inability of orphans to meet school costs. However, it has been difficult to monitor the trends and to project how countries are progressing in achieving their goals due to inadequate data.

What is needed is an all-inclusive generic program that is simple and standardized, yet comprehensive and sensitive to the particulars of Namibia and applicable and adaptable to its community. Such a program must provide a template for decision-making and well considered policy options on issues such as:

- Enhancing planning and management capacity to deal with the impacts of the epidemic on the demand, supply and quality of education.
- Teacher training to enhance knowledge, skills, motivation and the capacity of teachers to serve as role models in including children affected by AIDS.

Training programs must bring in other professionals, such as young doctors or medical students when important topics are avoided or neglected because of embarrassment or apprehension.

- Curricula for different age levels and for different levels of previous preparation. They have to deal not only with knowledge, skills and attitudes, but also ways of coping with grief, loss and death and include messages on compassion, care and support for people living with AIDS (Psychosocial Support).
- HIV/AIDS workplace policies for the Ministry of Education, schools as well as other institutions.
- Education finance mechanisms to guarantee the rights of education to orphans and vulnerable children as an integral part of Education for All. This may entail scholarship programs for teenage girls for secondary education, school food programs, abolishing school fees in primary education, etc.
- Developing flexible alternatives to formal education timetables, calendars and curricula so that affected children can benefit from education otherwise inaccessible, etc.
- Schools as sanctuaries for children – not places of risk, abuse and exploitation but of learning, growth and care. In particular they have to be welcoming and supportive of AIDS-affected children: places where they can get food, psychosocial support, life and livelihood skills, etc.

Schools as learning and resource centres for the community in cooperation with other community organization, to build awareness, to provide prevention education, to promote attitudes of care and compassion, to initiate campaigns for reducing discrimination, information and skills for exposed groups, and to foster practical abilities to make a living.

It is often, and truly, said that HIV/AIDS goes beyond being a health problem and is indeed an issue of development, which, if not addressed, will see gains made after decades of political and socioeconomic struggle rolled back.

The Global Initiative for HIV and AIDS in Education, piloted by UNESCO and adopted by all the co-sponsors of UNAIDS, applies the developmental, holistic perspective to the whole education system, planning and management, teacher professional management from recruitment through

health and psychosocial support, student enrolment, retention and care, and curriculum content and delivery.

If ever there was a contextual change that called for courage and innovation, it is the impact of HIV and AIDS. In Namibia and other southern African countries, the struggle is publicly engaged. The UN System in Namibia, for example, has a declaration of commitment to accelerate the fight against HIV/AIDS and an active workplace programme to prepare its own staff to deal with the challenges. The Teachers' Union, with the assistance of UNESCO, has prepared and is implementing a policy on HIV/AIDS. Youth groups, led by the YWCA and YMCA, prepared a strategic plan for youth on HIV/AIDS, and on the last World AIDS Day, a march through the city was led by the prime minister and the minister of education. In the Namibia Ministry of Education, as part of the planning division, there is the HIV/AIDS Management Unit and in the programming of the new Education Sector and Training Plan (ETSIP), there is a working group on HIV/AIDS, looking at its integration across all facets of education. The Global Initiative against HIV/AIDS will work out of this coordinating unit and with the whole system.

In Lesotho, not only was a government strategic plan adopted (Kingdom of Lesotho 2005) but the entire cabinet was publicly tested, so that other citizens would know their status. In societies that have traditionally been very reticent in discussing matters related to sexual relations, there are open discussions and advertisements in the media addressing prevention, physical and social care, and the mitigation of impacts.

## Conclusion

Universal basic education for all is an ideal embraced by the international community at Jomtien in 1990, in Dakar in 2000 and again as part of the Millennium Development Goals by the UN Millennium Development Summit in September 2000. Several gains have been made towards this ideal internationally and in the particular context at which I have been looking, the five countries of southern Africa that form the UNESCO Windhoek Cluster.

The countries have embraced the ideal. There is a movement for the reconstruction of the education system in Angola that was endorsed at a national consultation; an education sector strategic plan that is the subject of public debate in Lesotho; an education and training sector improvement plan is being programmed in Namibia; a country plan for education is in existence in South Africa; and this year an education for all plan was launched in Swaziland. All five countries realize that health, social and economic development, and their survival as viable countries depend on equitable, quality education. But the challenges are great.

The challenges of context relate to geography, in many cases, low-density population on difficult terrain; a history of exploitation; colour segregation and armed conflict that has resulted in great disparities; and in three of five cases, a multiplicity of language leads to the real dilemma of choosing between an international language in which various texts might be easily available, as against many local languages that are psychologically more accessible by various groups. There is also the age-old question of content and delivery methods. Can the one basic education curriculum include the arts to deal with questions of identity and being and the sciences to address the challenge and the threat of globalization? Can the new technologies, which are expensive, in situations of scarcity assist in addressing the problems? And all this in a situation where access and quality are impacted on by HIV/AIDS?

What from this will I draw as salient implications for the Caribbean? It would be the continuing passion for education in southern Africa that one suspects is on the wane at home. It is the up-front grappling with the challenges of HIV and AIDS, which one suspects is not as evident at home. Marked, too, is the continuing engagement with the United Nations in four of the five countries, to maximize the opportunities that can be provided to deal with the challenges. And perhaps the most salient lesson, internecine conflict rolls back and prevents access and quality education. In some cases, the survival and freedom of a people left no choice. In a Caribbean context, there are choices; we should make the positive ones, preventing conflict where possible and managing it creatively where necessary. This is the imperative for quality education.

## Education statistical profile (1990–2000/2004)

	Adult Literacy (%) (15 yrs & over)		Youth Literacy (%) (15–24 yrs)		GER Pre-Primary (%)		NER Primary (%)		Drop out Primary (%)	Transition to secondary
	1990	2000–4	1990	2000–4	1998	2001	1998	2001		
<b>Caribbean</b>										
Barbados	99.4	99.7	99.8	99.8	82.2	89.1	99.7	99.8	–	98.0
Cuba	95.1	96.9	99.3	99.8	102.0	110.6	98.9	95.7	31.2	95.7
Haiti	39.7	51.9	54.8	66.2	–	–	–	–	–	–
Jamaica	82.2	87.6	91.2	94.5	83.6	86.8	90.3	95.2	12.8	95.2
Trinidad & Tobago	96.8	98.5	99.6	99.8	59.8	63.0	92.9	94.1	–	97.4
<b>Southern Africa</b>										
Angola	–	–	–	–	–	–	61.3	–	–	–
Lesotho	78.0	81.4	87.2	–	24.9	21.4*	64.5	84.4	45.6	66.1
Namibia	74.9	83.3	87.4	92.3	20.1	23.4	77.9	78.2	13.7	81.6*
South Africa	81.2	86.0	88.5	91.8	24.2	35.1	91.3	89.5	42.6*	91.9*
Swaziland	71.6	80.9	85.1	91.2	–	–	77.7	76.7	41.8	76.2

\* 1999/2000 data

Source: UNESCO, EFA Global Monitoring Report 2005.

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