

CHAPTER 7

DEFINING A QUALITY ASSURANCE TOOL FOR WEB-BASED COURSE DEVELOPMENT AND DELIVERY AT THE UNIVERSITY OF THE WEST INDIES DISTANCE EDUCATION CENTRE

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ABSTRACT

In 1992, the University of the West Indies (UWI) took a decision to widen access to UWI programmes and courses by incorporating distance education as an integral part of its operations. Based on this decision, UWI was transformed from a single-mode to a dual-mode institution, with the University of the West Indies Distance Education Centre (UWIDEC) being created in 1996 to facilitate distance delivery. UWIDEC's operations involve a mixed mode of delivery featuring audio-conferencing, printed materials and face-to-face tutorials. UWIDEC, like many other distance education institutions, has recognised the potential of Information and Communication Technologies (ICTs) to enhance distance education course delivery. In particular, the ability of specific technologies to encourage collaboration and interaction regardless of time and space has great appeal and potential for distance education in the region. To this end, UWIDEC has been incorporating the use of ICT into the delivery of its programmes and courses, taking a "blended learning" approach. There is, however, a recognition of the need to ensure the quality of the programme offerings, particularly in the light of the new move towards the use of ICT. UWIDEC currently has a set of quality assurance procedures for the development of its print materials. These procedures, however, do not provide for quality in the use of contemporary ICTs, including web-based tools. This study explores the process being adopted by UWIDEC and the challenges faced in the development and use of a culturally appropriate quality assurance tool specifically for web-based course development and delivery.

1. BACKGROUND

1.1 The University of the West Indies

The University of the West Indies (UWI) is a regional university which is supported by and serves 16 English-speaking countries—Anguilla, Antigua and Barbuda, the Bahamas, Barbados, Belize, British Virgin Islands, Cayman Islands, Dominica, Grenada, Jamaica, Montserrat, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, the Republic of Trinidad and Tobago and the Turks and Caicos Islands.

The university began teaching in 1948 as a university college affiliated with the University of London, and was chartered to be a university in 1962. UWI now has campuses at Cave Hill in Barbados, St. Augustine in Trinidad and Tobago and Mona in Jamaica. The total student body, which was 33,363 for the 2004/5 academic year, is distributed amongst the Faculties of Law, Humanities, Science and Technology, Social Sciences, and the School of Clinical Medicine and Research at Cave Hill; Arts and Education, Medical Sciences, Social Sciences, and Pure and Applied Sciences at Mona; and Engineering, Humanities and Education, Medical Sciences, Science and Agriculture, and Social Sciences at St. Augustine.

1.2 UWIDEC and distance education in the region

UWI is now a dual-mode institution. In addition to the three main campuses, the university has centres in all of its non-campus Caribbean countries, which form part of a network that is managed by the University of the West Indies Distance Education Centre (UWIDEC).

UWIDEC was established in 1996 to expand the university's initiatives in distance education. This was in recognition of the fact that transition rates to tertiary and university education were/are much lower than expected (Kambon & Busby 2000) and this may be due to a lack of access, particularly for those prospective students living under less privileged circumstances. Kambon & Busby (2000) point out that the Caribbean countries have made significant progress in the education sector with regard to the provision of equal access to primary school and overall literacy rates. They point out that in the English-speaking Caribbean, a larger share of national income is allocated to education than in any other region of the developing world, averaging around 5.5 percent compared to 3.4 percent for Latin America and 4.2 percent for Africa (IADB 1999). While this is the case, expenditure on education is more focused on primary and secondary education. UWI, as a regional institution, therefore recognised the need to widen access to programmes by providing distance education options.

Currently, UWIDEC offers three full undergraduate degree programmes, a Certificate in Gender and Development Studies and an Advanced Diploma in Construction Management at its 30 centres located throughout the English-speaking Caribbean. These programmes are offered using a combination of synchronous (real time) and asynchronous (delayed time) interaction. The synchronous interaction is facilitated through the audio-conferencing system of UWIDEC and face-to-face tutorials, while print materials and some computer-based activities and resources comprise the asynchronous component.

2. INCORPORATING CONTEMPORARY ICTS IN UWIDEC OPERATIONS

Prior to the setting up of UWIDEC in 1996, the university's initiatives of distance teaching were implemented through UWIDEC's forerunner, the University of the West Indies Distance Teaching Experiment (UWIDITE). The core technology used by UWIDITE was audio-conferencing, which linked a few remote sites across the region to facilitate the synchronous delivery of selected courses and programmes (Kuboni, Thurab-Nkhosi & Chen 2002b).

The UWIDITE telecommunications network has since been upgraded under UWIDEC and has been expanded to incorporate other technologies to support file transfer, computer-mediated communication and Internet access. The network itself now comprises 30 sites located in the 16 contributing countries of the UWI that are connected via a leased circuit to form a wide area network.

Increasingly, ICT (especially the Internet) is being used in distance education to create learning environments in which learners, tutors and learning resources can all be networked (Frydenberg 2002; Marshall & Gregor 2002). Adoption of the Internet in the Caribbean, however, lags significantly behind that in the United States and other developed countries. Further, Internet adoption is uneven within the Caribbean region; for example, in 2003 approximately 37 percent of the inhabitants of Barbados were Internet users compared to 6 percent for St Vincent and the Grenadines, and one percent for Haiti and Cuba (ITU 2004). Given this low and uneven adoption of ICT in the region, it is necessary for UWIDEC to provide access through its sites.

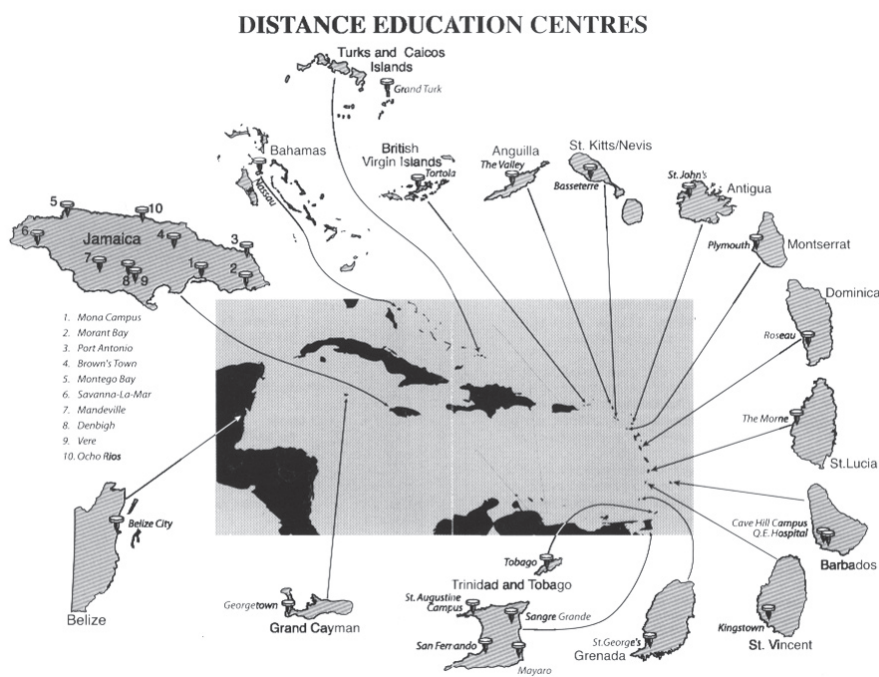


Figure 1: Map indicating UWIDEC sites

Each site is equipped with one or two audio-conference rooms as well as a computer laboratory of at least 10 computers that are connected in a local area network. These computers are installed with Microsoft Windows and Office Professional software and have multimedia capabilities.

UWIDEC now employs a mix of media in the delivery of the university's distance programmes, with pre-packaged print materials being the core component supported by face-to-face tutorials, audio-conferencing and some online elements.

While the UWIDEC network provides the connectivity for the online delivery mode, the WebCT learning management system, on which the initial online teaching/learning environment was built from 2000 to 2004, is physically located on the St. Augustine campus on a server that is housed in the Information Technology Services Unit of the campus. The UWI St. Augustine campus has a dedicated connection to the Internet and the WebCT server shares this connection with other servers on the campus. In 2004 UWIDEC took a decision to move to an open-source learning management system (LMS), "Moodle," for all future online course elements. This decision was based on assessments conducted by both the UWIDEC Web Administrators and the Mona Information Technology Services Unit of various open-source learning management systems (MITS 2004). The assessments considered usability features and help facilities, support for technology staff, customizable look and feel and discussion forums, e-mail, file exchange, synchronous messaging, calendar, automated testing and scoring, group work and student tracking. The two main reasons for switching to Moodle were, first, to avoid the significant licensing costs and the dangers of lock-in associated with closed-source enterprises; and second, and perhaps more important, because of the fact that learning management systems are evolving constantly. An open-source LMS such as Moodle allows the user to build features relevant and specific to the user's needs, while maintaining a fairly consistent look and feel.

Moodle is currently used by more than 1800 educational organisations around the world to deliver online courses and to support face-to-face courses. The term "Moodle" stands for "modular object oriented developmental learning environment." As an Australian slang expression, however, it means "to toss around an idea in your head for a while to look at different aspects of it."

3. WEB-BASED LEARNING: AN OVERVIEW AND CHALLENGES

3.1 UWIDEC and Web-based learning

With the growing use of Web-based technologies in formal education, different modalities are emerging in which the computer-networked environment is being used for instructional delivery. UWIDEC's approach to the use of the Internet between 2001 and 2005 falls at the lower end of Eastmond's (1998) continuum¹. During this period, UWIDEC St. Augustine had a web-based component in just eight courses.

The online elements of seven of these courses were the subject of a research study conducted by UWIDEC St. Augustine (Kuboni, Thurab-Nkhosi & Chen 2002a; 2002b). The incorporation of web-based elements in the course delivery packages presented a number of challenges. For practical purposes, these challenges have been grouped into four categories, using Whitely's (2000) criteria for measuring quality in distance education, viz., academic, administrative, technological and financial.

¹ Eastmond explains that this type "allows students to participate in e-mail exchanges with instructors and other students, support on-line research in libraries ... and may also make use of on-line discussion groups..." (p. 34).

3.2 Academic challenges

Motivating academic staff to develop courses in a timely fashion, including setting assignments and assessing assignments and examination-scripts, has always been one of the major challenges impacting the quality of DE programmes. This challenge affects not only the timeliness of the course delivery, but also the quality of the materials produced. Shorter deadlines result in less than ideal course development processes and ultimately disregard for, or short-circuiting of, quality assurance procedures in place. To help overcome the challenge of motivating academic staff, supportive policies are needed in the university to “help instructors understand how their distance learning activities correspond to strategic university initiatives, and thus, provide a contextual base” for them to work on (Lee & Dziuban 2002: 71).

Currently, the move toward asynchronous delivery utilising various combinations of multi-media and Internet-based technology at UWIDEC has created a number of additional academic challenges, foremost among these being the adequate preparation of staff and students for this shift. Within the region many students and lecturers are uncomfortable with the teaching and learning environment generated by the use of multi-media and online learning in particular. Some lack the skills and capabilities to manipulate the technologies, others are not willing to learn and still others have little or no access to the necessary hardware or software to enable them to be participants in Web-based learning. In a study done in 2001 on the readiness of UWIDEC students for online learning, it was found that only 53 percent of the subjects sampled deemed themselves very capable of creating and editing files and 51 percent rated themselves at a similar level in accessing and using the Internet (Kuboni, Thurab-Nkhosi & Chen 2002a).

It was also recognised that while many of the students were not ready for online learning, others were capable and ready. This suggested that any online courses developed by UWIDEC must be able to cater to students at both ends of the capability scale. UWIDEC must also consider the quality of existing online courses in a competitive environment in which students are able to compare UWIDEC’s offerings to those offered elsewhere.

3.3 Administrative challenges

Administrative challenges faced by UWIDEC arise largely from the fact that UWIDEC spans 30 sites in 16 countries. Maintaining clear communication and streamlining registration, examination and student tracking processes within an online environment is constantly impacted by the varying human resource abilities and strengths of individual countries/states. Additionally, there are challenges that arise from administrative practices that have been developed for on-campus education. Facilitation of the required changes “must take place through administrative leadership to catalyze positive changes throughout the institution” (Lee & Dziuban 2002: 71).

3.4 Technology challenges

The rapid rate at which technology is changing and the ability of the institution to respond to these changes is a major challenge. There are inconsistencies with regard to capabilities of sites for accommodating online teaching and learning. For example, during the 2004/2005 semester, one course offered an online quiz as part of the student assessment. Some sites were unable to administer the online quiz and opted instead to do a face-to-face version, some giving the following reasons:

“...we are still without computers.”

“... the computers are outdated.”

“... there are 35 students in the course and only 3 functioning computers in our lab.”

“We have approximately 60 students and 6 computers. In addition, Information Technology classes are scheduled for the computer lab.”

UWIDEC must also ensure that, even as technologies become more advanced, appropriate technology and adequate equipment are acquired to meet the needs and capabilities of the institution and its stakeholders.

3.5 Financial challenges

As UWIDEC continues to expand, costs of running the institution also increase. While economies of scale may be enjoyed in some areas such as mass production of course materials, other areas require large investments of capital. These include facilities for students to enable them to use new technologies, costs associated with increasing and enhancing student support, adequate staffing and infrastructure. Commercial learning management systems can be very expensive and therefore difficult to maintain over time as recurrent costs rise, and so, as said earlier, UWIDEC decided to switch to the open-source product Moodle. This switch in learning management system presents other challenges including training of staff, migration of courses and orientation/re-orientation of students and course developers.

3.6 Specific quality assurance mechanisms

“Quality” has been defined in many ways (e.g., see Harvey & 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 eLearning and cross-border or transnational education” prompt the need for change (Campbell & Rozsnyai 2002: 24). The challenges outlined in the previous subsections highlight some of the unique characteristics of the distance mode of delivery and, more specifically, a blended approach to distance education in the Caribbean region. These characteristics set distance education apart from conventional education and suggest the need for specific quality-assurance mechanisms. Otto Peters makes the point that distance education is best understood as an industrial operation, where tangible products are created and distributed following “the industrialization principles of rationalization, division of labour and mass production. The teaching process is gradually restructured through increasing mechanization and automation” (Peters 1967: 13). Thus, criteria for measuring quality vary between conventional systems of education and distance education because criteria for the latter need to incorporate the industrial aspects of the process.

The Institute for Higher Education Policy (IHEP 2000) identifies seven quality indicators for distance education. These include:

- Institutional support—This goes beyond adequate infrastructure and includes such considerations as incentives for professionals, a written technology plan, electronic security
- Course development—a peer review process, minimum standards for course development, a team approach

- Course structure/design—quality of advance organisers and access devices, learner-centredness, clarity of objectives and content
- Teaching/learning process—learner-centred versus instructor-centred, peer interaction, self-help
- Student support—counselling, tutorials, administration
- Faculty support—appropriate training and relief provided to enable staff involvement
- Evaluation and assessment—system in place for the evaluation of the effectiveness of programmes/courses

4. QUALITY ASSURANCE AT UWI: DEFINING A QA TOOL FOR UWIDEC

In August of 1996, just as UWIDEC was created, another new entity, the Board for Undergraduate Studies (BUS), also began its duties, with one of its responsibilities being to plan and direct a system of quality audit and quality assurance for the UWI (OBUS 1997). The definition of quality adopted by the BUS for its work at UWI is one of “fitness for purpose” (OBUS 2000). However, as noted by the former Director of UWIDEC, Professor Badri Koul, although there is an official UWI policy on quality, the institution has not documented a clear position on “the issues of standards and or quality assurance in the case of distance education” (Koul 2003). In the absence of specific guidelines for distance education within the quality assurance framework of UWI, UWIDEC has been planning and directing the evolution of such a framework specific to its evolving blended approach.

4.1 The existing quality assurance processes and procedures

The BUS identifies two variations of the quality assurance process at UWI, namely an internal and an external process. The internal process is concerned with the quality of the learning experience of the student, while the external relates to the outcomes of the teaching/learning process.

At UWIDEC, internal and to some extent external quality assurance processes and procedures have been implemented for various aspects of institutional operations. Most of these processes, while existing in written form in various policy documents, have not been documented as part of a comprehensive quality assurance policy. Moreover, there are gaps in the existing processes, which have been identified by Whitely (2000) and Koul (2003). Using the Institute for Higher Education Policy (IHEP 2000) quality indicators to provide a framework, Table 1 outlines the current UWIDEC processes for quality assurance.

Table 1: The existing UWIDEC processes for quality assurance

QUALITY INDICATOR	UWIDEC PROCESS/PROCEDURE	WHETHER DOCUMENTED
Institutional support	<ul style="list-style-type: none"> ➤ Fees paid to academic staff as an incentive for course development ➤ UWIDEC courses recognised for assessment and promotions ➤ Support staff providing course administration assistance and facilitating communication with non-campus sites for course coordinators 	<p>✓</p> <p>UWIDEC Statement of Policies and Principles</p>
Course development	<ul style="list-style-type: none"> ➤ Team approach ➤ Standards for ideal course development process documented and agreed to by all three course development teams ➤ Standards for when the ideal course development process breaks down ➤ Writer and editor procedures 	<p>✓</p> <p>Curriculum Development Handbook and Quality Assurance Process and Procedures</p>
Course structure/design	<ul style="list-style-type: none"> ➤ Clear instructional design process ➤ Use of graphics, photos and illustrations ➤ Professional page composition ➤ Built-in student exercises and practice opportunities ➤ Professional printing and binding 	<p>✓</p> <p>Course plan forms Style guides Templates</p>
Teaching/learning process and student support	<ul style="list-style-type: none"> ➤ Local tutor support ➤ Audio-conferencing ➤ Student Support Officer 	<p>✓</p>
Faculty support	<ul style="list-style-type: none"> ➤ Course development training 	<p>✓</p>
Evaluation and assessment	<ul style="list-style-type: none"> ➤ Course evaluation ➤ Research Officer 	<p>✓</p>

4.2 A tool for online learning

The challenges identified earlier all impact on UWIDEC's ability to deliver quality online programmes. It was therefore recognised that, in addition to addressing the challenges through relevant policy and administrative changes, it was necessary for the organization to devise some way of ensuring that quality standards were met at every stage of the course planning, development and delivery process. To this end, the curriculum teams on each of the three campuses agreed to develop a quality assurance tool to guide the planning and development of online courses in particular, since this was the "newest" addition to the delivery mix.

Recognising that benchmarking and other quality assurance tools were gaining popularity as universities realised the importance of quality assurance in tertiary education (Inglis 2005), the curriculum teams decided to use an existing quality assurance tool (a benchmarking rubric) that had been developed, tried and tested by a research team at the University of Botswana (UB), which faced challenges similar to those of UWIDEC. The selection of this tool was due mainly to the fact that one member of UWIDEC St. Augustine's curriculum development team had been involved in developing it and saw the similarities in the challenges faced by both the institutions operating in developing contexts with limited resources (Lee, Thurab-Nkhosi & Giannini-Gachago 2005). The UB benchmarking rubric was based on, but not limited to, i) benchmarking research done for the WebCT Exemplary Course Awards Rubric; ii) research done by Billings, Connors & Skiba (2001) on quality of web-based nursing programs; and iii) the US-based Flashlight Program that conducts research on the use of ICT in educational programs. The curriculum development teams at St. Augustine, Mona and Cave Hill, with permission from the team leader of the UB research group, reviewed the UB's benchmarking rubric and arrived at a format and specific criteria to be covered in a quality assurance tool for UWIDEC. While the UB benchmarking rubric was essentially an evaluation tool to be used at the end of course development, it was felt that UWIDEC should develop a quality assurance tool to be used throughout the course development and delivery process. The criteria used by UWIDEC were informed by international criteria established for measuring quality in distance education (ADEC 2002; IHEP 2000; Michigan Virtual University 2002).

Based on the criteria, and UB benchmarking rubric, the UWIDEC quality assurance tool was designed to be used during three stages of course development, namely pre-production, production and evaluation. A series of teleconferences were held to arrive at the draft quality assurance tool given below.

Table 2: UWIDEC quality assurance tool

	ACTIVITY	PERSON(S) RESPONSIBLE	TIMEFRAME	ASSUMPTIONS	MEASURABLE OUTPUT	REMARKS	SCORE
PHASE 1: COURSE CONCEPT (PLANNING)							
1	An eLearning course development checklist has been completed	Course developer and instructional designer	Will be set when course writer's contract is signed	A separate, comprehensive tool that identifies the elements in a course plan exists	A course concept outlining choice and combination of media, content areas and assessment		
2	Clear student learning objectives have been developed.	Course developer and instructional designer			Student learning objectives stated clearly in the course plan		
3	Clear performance criteria set	Course developer and instructional designer			Assignments, rubrics for students		
4	The course plan includes active learning, i.e., case study, problem based, anchored learning, etc.	Course developer and instructional designer					
5	The plan includes opportunity for student-to-student interaction	Course developer and instructional designer					
6	The plan includes opportunity for student-to-instructor interaction	Course developer and instructional designer					
7	The plan includes the use of additional resources, e.g., links, presentations, audio, video files	Course developer and instructional designer					
8	The plan includes the appropriate use of technology tools for the objectives	Course developer and instructional designer					

ACTIVITY	PERSON(S) RESPONSIBLE	TIMEFRAME	ASSUMPTIONS	MEASURABLE OUTPUT	REMARKS	SCORE
PHASE 2: PRODUCTION PREPARATION						
9	Draft course content has been prepared in manageable segments based on the course concept	Course developer and instructional designer				
10	Draft content and course concept have been reviewed	Instructional designer				
11	Draft content has been edited	Editor				
12	Relevant copyright information has been requested	Editor				
13	A consistent, visually appealing course design has been developed	Graphic designer				
14	Web site structure has been defined, i.e., areas for course, pages in these areas	Web designer				
15	HTML pages have been developed and uploaded	Web designer				
16	The homepage not only provides information and guidance, but it is also engaging	Web designer and graphic designer				
17	The course outline provides all the information required by the students in the course	Course developer and instructional designer				

	ACTIVITY	PERSON(S) RESPONSIBLE	TIMEFRAME	ASSUMPTIONS	MEASURABLE OUTPUT	REMARKS	SCORE
18	Course schedule contains all the information on assignments and assessment dates	Course developer and instructional designer					
19	Consistent guidance available for students and easy to access	Web designer					
20	Easy to navigate through course components	Web designer					
21	Easy to navigate through the content	Course developer and instructional designer					
22	All segments have manageable amounts of information	Course developer and instructional designer					
23	Learning activities are part of the course content delivery	Course developer and instructional designer					
24	Accessibility issues are addressed	Web designer					
PHASE 3: STUDENT SUPPORT CRITERIA							
25	Course orientation designed	Team					
26	Tutors assigned for the course	Course coordinator					
27	Communication tools developed for the course	Team					
28	Response time for communication decided on	Team					

	ACTIVITY	PERSON(S) RESPONSIBLE	TIMEFRAME	ASSUMPTIONS	MEASURABLE OUTPUT	REMARKS	SCORE
29	Learning styles are considered throughout the material	Course developer and instructional designer					
30	All chats and discussions will be moderated	Course developer					
PHASE 4: STUDENT AND COURSE ASSESSMENT AND EVALUATION CRITERIA							
31	Assignments developed to encourage critical thinking	Course developer and instructional designer					
32	Self- assessment activities have been developed	Course developer and instructional designer					
33	Opportunities for student inputs into assessment criteria	Course developer and instructional designer					
34	Course evaluation	Team					

It was decided that this tool would be used on a pilot basis as new online courses were developed so that revisions to the tool could be based on practical experience. Out of these experiences, several issues have emerged.

5. USING THE TOOL: LESSONS LEARNT

5.1 *Adequate timeframe*

To benefit from the outcomes of the use of the tool, there must be adequate time for planning a course to allow for changes, questioning during the development and delivery process, reflection on the process and finally amendments when required. Courses that are being developed while they are delivered do not allow for application of the tool.

5.2 *Consistent application*

To be effective, the quality assurance tool must be applied consistently throughout the process. Application during the planning and development stage, while omitting the evaluation stage, for example, devalues the tool and reduces its effectiveness.

It should also be recognised that a decision to use the tool requires application to ALL the courses with an online component and not just to the ones that we may have more time to work on. This requires commitment by staff on all campuses involved in the course development and delivery process.

5.3 Responsibility for applying/using the tool

Specific individuals should be assigned responsibilities for applying the tool in order to ensure consistency of delivery. The various levels or phases of the planning and delivery process to which the tool can be applied generally determine the person(s) responsible for its application. For example, during the course planning stage, the curriculum specialist should assume responsibility for ensuring that the criteria identified for quality are met. Clear guidelines on who is responsible for what activity must be given at each phase of course development.

5.4 Follow-up

Decisions and action must be taken on data obtained from the quality assurance tool, and clear timeframes developed and specific actions taken to address any problems or challenges identified. Advantage must be taken of the relative ease of making changes and adjustments to courses in an online environment.

5.5 Expectations

The quality assurance tool for web-based learning at UWIDEC is a work in progress. As UWIDEC evolves and increases the use of Internet technologies, however, tools such as the quality assurance tool will become increasingly important for putting in place the necessary checks and balances. While much more work needs to be done on the quality assurance tool, every effort has been made to ensure that in its development, consideration was given to the specific challenges faced by students and staff of UWIDEC. In this regard, it is intended that, as the process continues, the tool will emerge as an integral part of the web-based course development and delivery process.

6. TOWARDS A CULTURE OF QUALITY

Notwithstanding the challenges faced in using the tools for quality assurance, UWIDEC's attempts to implement and maintain a system of quality assurance point to the engendering of a culture of quality. While thus far the move towards a culture of quality for distance education has been driven largely by individuals within the distance education system, there is recognition by the BUS (the body responsible for quality in the UWI) that quality processes and procedures for DE must become a part of the broader quality assurance framework.

Other key factors that have been instrumental in building a culture of quality include agreement and cooperation between the campuses on the need for quality assurance and the commitment of staff involved. There have also been "push" factors driving the culture of quality. These include increasing competition from foreign universities, a regional focus on quality assurance and accreditation and the demands of a more informed and vocal student body.

While there is co-operation and commitment between the three campuses, the issue of maintenance of enthusiasm and buy-in for a culture of quality is a difficult undertaking, particularly from the entire UWIDEC network. There must be constant reminders about the benefits of maintaining and enhancing quality assurance processes and procedures, and implementation must be seen to take place from the top downwards, with sanctions for those who fall short of quality benchmarks. The maintenance of a culture of quality requires vision, but more importantly unrelenting action to reverse situations of inertia and disregard for efficiency.

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