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Use of External IT Certification for Engineering Technology at the Bermuda College

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Abstract:
The Bermuda College[1], founded in 1975, is a two year community college located on the island of Bermuda, over 600 miles east of North Carolina. It offers associate degree and certificates programs in Liberal Arts, Hospitality, Business, and Applied Science and Technology.

In addition to the internal examinations offered by the College, all students sit external examinations (see Appendix for implementation details) from organizations such as City and Guilds International[2] (CGI), Automotive Service Excellence[3] (ASE) the National Center for Construction Education and Research[4] (NCCER), and the National Joint Apprenticeship and Training Council[5] (NJATC) for their disciple specific skills. This allows students the opportunity to ply their skills in markets far afield from Bermuda.

However, all technology students need a solid grounding in Information Technology (IT) skills, so a search for an appropriate internationally valid IT examination was undertaken. In the spring of 2000, the Faculty of Applied Science and Technology (FAST) conducted a pilot study using the International Computer Driving Licence[6] (ICDL) certification, developed in Europe in 1997 as the European Computer Driving Licence (ECDL). ICDL was introduced to the FAST students in the Fall of 2000. Students were offered the ICDL curriculum training and they had the choice of taking the ICDL official examinations for external credit. In the last three academic years, all technology students followed the ICDL curriculum and a dozen received full external certification in addition to internal college credit. Offering external certifications as a value-added products assists with recruitment, while employers are pleased to hire students with known skills.

Introduction
In 2001, the faculty of Applied Science and Technology (AST) decided that all certificate students entering their first semester should take a range of subjects called the 'Technical Common Core', in order to ensure that they were reaching a basic standard in such core

competencies as math, physics, construction safety and communications before embarking on their technical major.

The syllabus for each competency was discussed and decided upon. In the area of communications, the faculty divided the competency into two: the traditional written, and the ever present and increasingly important information technology, i.e., 'computer skills'.

Many choices presented themselves when the faculty was discussing where to set the standard and how much content to include. Virtually everything needed to be based on the ever-present Microsoft standard, the norm in business applications today. The existing internal choices were; a Bermuda College 100 level CIS course, and individual adult education courses in areas such as Microsoft® Word, Excel, and Office[7].

Very new on the scene in Bermuda was the ICDL package of basic computer skills modules. ICDL was introduced to the Island and the College as an all in one, ready to go, internationally recognized standard for computer literacy by the Computer Society of Bermuda[8] (CSB) with financial support from the Bermuda National Training Board[9] (NTB) in January 2000. With this 'off the shelf' package right on our doorstep, it didn't take long for us to decide this would be our IT standard for technical education as it gave us a 'two for one' result: internal College credit and an external certification.

Fortunately for AST, the ICDL Bermuda teaching lab and test centre was by this time housed right in our building, a customized computer teaching suite, set up to deliver the ICDL syllabus. Our students were registered in a one-semester 2-credit course called CDL001. This course was essentially identical to the ICDL syllabus, the software was used to teach the skills in the seven individual application modules: Basic concepts of IT, File management, Word Processing, Spreadsheet, Database, Presentations, and Internet/Email. Students paid a flat fee (25% of the standard fee as a result of subsidies from NTB and the Fidelity Investments Group[10] in Bermuda) to ICDL Bermuda, which registered them for a Skills Card and gave them access to the teaching software and one attempt at each test.

When time came for students to take the assessment in these applications, they accessed the ICDL test software, and took the test. When given their score immediately after the test, if their score was 80% or higher they were signed off on their ICDL Skills Card as having reached the level recognized internationally as competent, and had that grade submitted for internal College purposes. However, as the College pass level was lower, a student could choose to keep any test score from 50% as satisfactory for the purposes of a grade for the College.

Application
Despite the obvious advantages of an 'off the shelf' internationally recognized IT qualification, several problems arose. The ICDL series of modules is quite intense in pace and content for a one-semester course. Students entering with little or no computer literacy found ICDL very challenging. Suggestions were made to deliver it over two semesters, but we continued to offer it every semester and those who did not pass the first

time, could retake the course at any point before graduation. There was some internal resistance to the ICDL (computer folks are a territorial bunch) and those used to presenting skills in a certain way or, who had developed courses previously, resisted the 'package deal'. Another difficulty that we in effect manufactured for ourselves was in the course number we allocated to CDL. With modules being the order of the day in technical certificates, everything had been numbered from 001 through to 013. By giving the courses a '0' first number the impression was immediately given that this was a preparatory course, and as such not on par with the very similar CIS120 course. Due respect was not given to the standard and content of CDL, that would have been had we designated it a 100 level course.

However, the ICDL syllabus, was a compact, ready to go, well researched, and well supported internationally recognized certification in all the basic and most often used computer skills. When taught well, utilizing a variety of teaching and learning methods, students were able to reach the standard for competency. The faculty liked the idea of a standard; it enabled them to know exactly what students came to them with, if they had a pass in CDL001. They could teach with the confidence that their students were familiar with computer skills; they could set Internet based research, electronic homework and integrate information technology into their curriculum. For the students it meant a standard approach to learning or refreshing computer skills basics. No matter whom the teacher, the content would be the same. It also meant they could earn a qualification before their main graduation with a College certificate. It gave them a real achievement early in their studies, something we have found with all our external certification to be a boost for student's confidence as they progress through their time at the College.

Results

As shown in the table below, acceptance of the program was disappointing. Most students chose to not register for external certification. A significant factor was the lack of acceptance by the teacher assigned to the course as well as the perceived difficulty of the ICDL standard. However, over three academic years, 18 students received full ICDL certification. While this is only 14% of the total number registered, it is 25% of the number who passed the course CDL001 and 54% of the number who registered with ICDL Bermuda.

Bermuda College CDL001 Registrations, 2000 to 2003				
Semester	**Registered**	**Passed**	**ICDL registrations**	**ICDL certifications**
Fall 2000	33	12	4	4
Spring 2001	11	4	2	2
Fall 2001	41	33	12	11
Spring 2002	8	2	3	1
Fall 2002	11	11	11	0
Spring 2003	10	0	0	0
Fall 2003	12	10	1	0
Totals	**126**	**72**	**33**	**18**

Lessons Learned
When attempting to introduce a package of instruction and assessment that has been developed by others and is subject to external quality assurance, every effort must be made to ensure its acceptance by those tasked with approving and delivering it. Comparisons need to be made against existing standards to prove the academic level and lecturers should be deeply involved in the pilot process, so that kinks and quirks can be identified, and choices made for effective delivery methods and additional teaching strategies given what we know about our students' potential for success in the proposed program.

Given the size of Bermuda, latching onto existing external qualifications is an effective way to introduce instruction and certification that has credence in the wider environment beyond Bermuda. Once approval and accreditation has been gained we are now tapped into a vast network of development, support, and quality assurance that is very cost effective.

The ICDL was very well accepted by some, those students that applied themselves were successful, and the Technology lecturers decided to keep the standard as their benchmark for computer skills competence. Other competing standards, for example, the Internet and Computing Core Certification[11] (IC³) should be investigated for comparison as it consists of only 3 modules; Computing Fundamentals, Key Applications and living Online (and excludes databases and presentations which were major hurdles for the Bermuda College students). IC³ may better fit the level and time constraints of the BC program.

Conclusions
An external IT standard is suited for assessment of a technology program, especially in a small isolated community such as Bermuda as it gives students a real world benchmark for their skills. More work needs to be done by the College administration to get "buy in" from faculty and students to ensure successful adoption of an external IT standard. Alternate IT certifications should be investigated to see if they are more suitable.

References

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Appendix

All students in the Division of AST sit external exams at one point or another.The Electrical Wiring Technology students follow the curriculum for the National Joint Apprenticeship and Training Council (NJATC) and sit pre set exams from them at intervals during their training, usually at the end of each module. Grades are recorded (min 80%) and sent to NJATC for processing for Certificates.

The Automotive Technology students follow the Automotive Service Excellence (ASE) curriculum and sit their external exams in May of each year once they have completed the required theory and practical training. Exams are set each year, are sent under tight scrutiny and only released to ASE authorised examination invigilators on the day of the exam.

All Plumbing, Automotive, Electronics, HVAC and Wood Technology students start with the National Centre for Construction Education and Research (NCCER) Core Curriculum, consisting of six modules, Basic Safety, Math, Hand Tools, Power Tools, Blueprint Reading, and Rigging. The results of the pre set written and performance tests are sent to the local sponsoring unit (the Construction Association of Bermuda) and then on to NCCER for registrations and issuing of the initial Core Curriculum Certificate. This Certificate is the start point for these students (except Automotive) to add progressive levels of NCCER Certification in their discipline. NCCER exams are pre set and are both written and practical in nature and occur at the end of each module. Once results are obtained for an entire level (70%minimum in each module and all practical tasks passed) they are recorded and sent to the sponsor and NCCER for processing and issuance of Certificates.

Grades obtained by students in their external exams are used for purposes of recording internal Bermuda College grades as well. Other courses in general education are added to round out the Bermuda College Certificate.