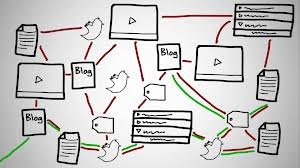


**Policy Exploration**

**Massive Open Online Courses**

**MOOCs: The Promise and the Realties**



**University Office of Planning & Development**

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**MOOC Policy Paper**

*Introduction*

MOOC’s or **Massive Open Online Courses** are a recent development in distance education, the first course being offered in 2008 (Marques, 2013). “Massive” refers to enrollment and technically there is no limit to an online offering but there are other constraints on size depending on the objective of the course. “Open” speaks to a number of variables to include access, equity, and ownership of content. “Online,” of course, means that it can be accessed over the Internet via computer, but only with those who have high bandwidth connections. “Courses” can mean anything from a formal, credit-bearing course to those that are not accredited but in which knowledge is gained or even created (Educause, 2013). There are at least eight types of MOOC course structures and their associated business models range from totally free to tuition-bearing courses. A [3-minute video](https://iversity.org) by *iversity* provides a quick overview of how MOOCs work in general. A more open version is contained in a [4-minute video](http://www.youtube.com/watch?v=eW3gMGqcZQc&feature=player_embedded) that is aligned with the *Connectivism* theory explained later in this paper.

*Background and History*

Distance education started in the 1830s with correspondence courses. Each time a new media technology became widespread it was used as a medium for teaching/learning. Radio and TV came along with their educational programmes but the communications was one way and the student had listen/view at a particular time (termed synchronous or real time). Audio and video cassettes were next and allowed asynchronous (anytime) learning (Marques, 2013). Telephone/audio-conferencing then video-conferencing employed synchronous interactive learning and in the latter case the use of videos. The computer was used as a “teacher” with programmed instruction before the Internet (1993) and afterwards to network both synchronous and asynchronous instruction with a full range of multimedia (text, voice, video, animation, etc.). At first, web-based course design was fully online, but then blended learning became popular with part delivered face-to-face and part online.

Technology not only comes in the form of a gadget (electronic equipment) but the “know how” of a process. One of these processes fits in the category known as ‘learning theories.’ Educators have always wanted to know how the human brain learns and which independent and mediating variables are most responsible for it. The earliest formal theory was *Behaviorism* which was based on stimulus-response with its origins in Pavlov’s famous dog experiments. *Cognitivism* (1960s) came later and used the analogy that the brain is like a computer (input, processing, storage, output, etc.). *Constructivist* theory posited that each person actively “constructs” knowledge subjectively from learning experiences by adding new knowledge to what they have previously learned. The most recent and the one that has influenced MOOC development is *Connectivism* (Bell, 2010). This theory posits that learning is a function of how networked we are. If knowledge cuts across many disciplinary boundaries, is always changing, and is also a social product, then it cannot be contained in a book or a fixed (bounded) course, it must be as large as the networks that exist in real life. MOOCs attempt to expand the boundaries of a course without making it overwhelming—a very difficult balance to maintain. As a consequence it is not necessarily a good place for beginning learners or foundation courses, where too much information can be a distraction.

Up until the introduction of MOOCs, all students were typically enrolled in an accredited course for which tuition was paid. There was a growing movement to provide more access and equity in the education system because it was viewed a public good (intellectual capital development) and became known collectively as “open.” Open can have a number of dimensions, but it does not necessarily mean all of these things in a given case:

1. More access by disadvantaged groups (rural, poor, handicapped, imprisoned, etc.)
2. Lower/no prerequisite knowledge barriers
3. Free of tuition costs (or heavily discounted)
4. Free use or sharing of content given by authors or copyright holders (collectively known as OER or Open Educational Resources)
5. The right to modify original content and distribute
6. Anytime, anywhere access to the course
7. Open source technologies like course management systems (e.g., MOODLE) commonly known as online classrooms
8. The postings of all students and teachers is open for all to view or question
9. Open to experimenting with new learning activities, software, or technologies
10. Open means that students can learn from sources other than the teacher, like each other, experts, interacting with content, software, webcams, etc.

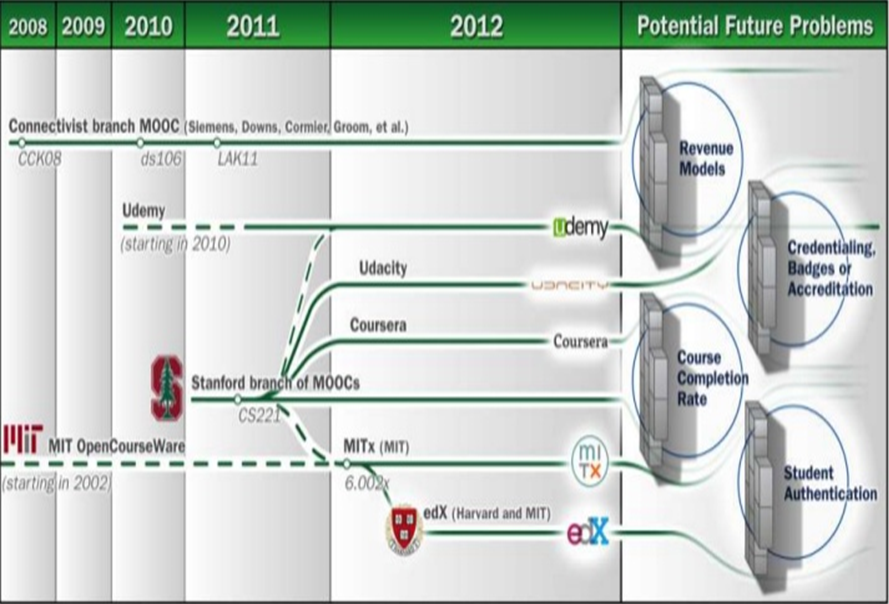
*Players & Sector Development*

The first MOOC that was actually called a MOOC was delivered in 2008 and entitled “Connectivism and Connective Knowledge/2008” (CCK8), created by Canadian educators Stephen Downes and George Siemens and had 2,200 students. In 2012, “Introduction to Artificial Intelligence” had an enrollment of more than 160,000 students in 190 countries (but only 25,000 finished the course). It was designed by two Stanford Professors Thrun and Norvig to provide a quality online learning experience. They were so excited about their experiment that they created the start-up [Udacity](https://www.udacity.com/) in 2012 (Marques, 2013). This company earns revenue by having two classes of products, one free and the other has a fee. It is a common Internet model like antivirus software. The free version provides a few features, but the premium version provides all features.

Shortly after Udacity, [Coursera](https://www.coursera.org/) and [EdX](https://www.edx.org/) appeared later in 2012. Unlike the stand-alone Udacity, Coursera and EdX generate revenue by partnering with large universities. The forerunner of EdX and MITx was [MIT Open Courseware](http://ocw.mit.edu/index.htm) which publishes course outlines and materials but does not provide a teacher or a class and is still in operation. [Udemy](https://www.udemy.com/about/) uses a different business model in which corporate sponsors fund a wide range of courses that include but go beyond professors to include best-selling authors, celebrities, and leaders in business, to name a few. The US-based firms and their evolution can be seen in Figure 1. The “Potential Future Problems” are discussed later in this paper. Outside of the US, in 2012, the Open University (UK) was building its own MOOC platform, [Futurelearn](http://futurelearn.com/), launched in 2013, as did Australia’s [Open2Study](http://moocnewsandreviews.com/aussie-collaborative-launches-new-mooc-platform-open2study/)  and [iversity](http://www.iversity.org/) in Germany (Marques, 2013).

The World Bank has been financing many educational programmes in developing countries and is now partnering with Coursera to deliver a pilot MOOC in Tanzania for IT skills (EduTech, 2013). So it appears that their strategy is approach institutions who are in the full-time business of MOOC design.

To get an idea of the types of free MOOCs offered, some delivery platforms being used, and partnering universities click on [FREE MOOCs](http://www.mooc-list.com/?gclid=COqct_LQ4rsCFUho7Aod7lIAEA) .



*Figure 1*: Evolution of MOOCs (source: Phil Hill, 2012)

*Types of MOOC Courses*

It may sound like a MOOC is a particular type of course but there are many variations in MOOC types. Changing anyone of the following variables could constitute a course derivation.

1. **Cost** - most are free but some require tuition
2. **Accreditation Status** – accredited or certificate of participation (assessments are made in the case of accredited courses)
3. **Enrollment** – Some have specific cohorts that must all enroll by a certain deadline while other formats permit participants to join at any time
4. **Duration** – Many are short 8-10 weeks, some match semesters, and others are open-ended with no deadline (self-paced)
5. **Faculty** – Some are delivered by one faculty member and others are team delivered, some are non-academics with publicized expertise in the topic
6. **Synchronicity** – Some courses are delivered asynchronously (no real time events), synchronous (require all to be present at certain times for live interactions), and others are mixed
7. **Assessment Structure** – Some have formal examinations others have more informal assessments like computer-scored quizzes, still others have no assessments at all
8. **Feedback** – Some have faculty or tutor feedback or assistance, others rely on peer-to-peer assistance, and others use computer-generated feedback
9. **Content Sources** – Some supply all the content from the institution while others utilized Web-based content, external experts, or mixtures of all
10. **Content Production** – Some have faculty-produced content (knowledge transmission) and others have student-created content or a mix
11. **Size** – Size varies and has been as high as 160,000 but the average size is much less than that; defined qualitatively, it is a size beyond which a traditional class with lecturers and tutors can handle in terms of providing feedback or correcting submitted work or tests

Clark (2013) has created a taxonomy of at least eight types of MOOCs. Note the variations are prefixes to the MOOC term.

1. ***transferMOOCs*** *–* Transfer indicates a traditional course that has been converted to a MOOC format and is teacher-led, *Coursera* products fall into this category
2. ***madeMOOCs*** *–* these are created from scratch using a quality team-based approach and employ sophisticated software interactions and avoid “talking heads” (taped lectures) instead using Udacity-type [hands-on-board](http://www.youtube.com/watch?v=eRqUE6IHTEA) for explaining conceptual material, with challenging assignments and use peer-to-peer feedback because of the great numbers of students
3. ***synchMOOCs***– Have fixed start and finish dates with deadlines for assignments and assessments which is thought to motivate students to complete their work
4. ***asynchMOOCs***– More flexible start and finish dates and looser assignment deadlines so that it is more student paced
5. ***adaptiveMOOCs***– Could be called customized MOOC’s because a lot of background data is obtained on the student which provides personalized paths through the course to maximize students goals or interests given their prerequisite knowledge starting point and learning goals
6. ***groupMOOCs***– Utilize small and collaborative groups that are mentored and rate each other’s work, this was tried as answer to the high dropout rate experienced in many MOOC’s
7. ***connectivistMOOCS*** *(cMOOCs)*– Here course content is not predefined but generated through networks, conversely xMOOCs focus on traditional knowledge transfer of pre-defined content
8. ***miniMOOCSs***– Mini refers to the duration of the course which could be hours to days, not weeks, and many are commercially based with tight, clear objectives, therefore they move away from the university semester model

*MOOC Course Development*

The expertise and resources required to develop a MOOC can be extensive depending on the type of course being developed (Kellogg, 2013). Courses can range from being very sophisticated (e.g., madeMOOCs) to “shovelware” (shoveling-up traditional classroom learning materials by putting them online, that is, not designing for the affordances and constraints of the online environment). Because the whole world is watching in a MOOC scenario, a flop would be a global embarrassment and have serious repercussions for the institution’s image.

Proper MOOC development requires a highly professional team of specialists such as subject matter experts, curriculum design specialists, multimedia specialists, videographers, artists, programmers, animation specialists, network and server specialists, and may involve actors or required travel to distant locations for filming (Kellogg, 2013). Marketing specialists are required to make the MOOC known globally (if the institution is not Harvard class) to ensure a Massive enrollment. The investment required could be significant and it could take upwards of year to produce a quality product. After the prototype is created it must be tested on several levels with different target audiences to fix pedagogical and technical problems. There is no sure way to know the magnitude of the response and if it is greater than the servers’ capacity to handle the traffic the program could crash or could run much slower than normal thus frustrating the end user (especially in streaming content). DeJong (2013) provides a graphic picture of activities:

But MOOCs are not terribly cheap for the colleges and partner platforms producing them. Building a MOOC is tricky work. It involves writing lecture scripts, rethinking course structure, creating a slew of multiple choice quizzes, adapting grading software, filming lectures and (sometimes) discussion groups, editing footage, and building a course page. Once the course goes live online, someone has to pay for chat feed monitors, glitch repair, and a squad of tutors and administrators.

In terms of cost, Udacity budgets US$200,000 for each course it makes and EdX charges a quarter of million dollars plus US$50,000 every time it is rerun (DeJong, 2013). These are firms who have all the professional technical staff required that work on MOOC design on daily basis. Georgia Tech estimates that their developmental (not delivery) costs for the first year of their computer science program would cost US$15,000 per student (DeJong, 2013).

To attract a global audience one must have a professor (or equivalent) with global credentials who is much sought after (Carson & Philipp, 2012). This presents several problems. Some of these professors are brilliant but absolutely boring when lecturing (if video lectures are utilized). Some professors have no desire to be on the world stage or may not like teaching that much even in a traditional classroom and prefer to spend most of their time researching. Further, they need training and it has been the author’s experience that very few professors (compared to lecturers) attend technology training sessions. The involvement in both the design and the delivery of the MOOC can demand a lot precious time out of the professor’s busy schedule.

The institution must decide on its credentialing policy. Full credit-hour accreditation would force the institution to have a very high quality product with many safeguards which would drive up expenses even more. Alternatively, it could issue paper certificates of participation that have low employer recognition. Many MOOC providers are now utilizing “badges” (Educause, 2012). The idea comes from boy/girl scout/guide badges of achievement in certain areas and other badges worn on military uniforms (e.g., sharpshooter, skydiver, etc.) and such. While they are only as good as the institution issuing them they at least provide a digital verification system that employers can check out independent of the student. Finally, the most sophisticated way to demonstrate competence is by creating a digital learning portfolio that has the actual assignments, projects, papers, videos, and other evidence of learning and performance (O’Rourke, 2004). This is on the frontier of authentic assessment and requires a lot of work to produce a structured portfolio that can make sense and powerful case to anyone viewing it.

After all the investment the response could be dismally poor and yet the institution is still obliged to deliver the MOOC to protect its reputation. There is no direct revenue generated, as it is free, and one cannot compete head-to-head with globally recognized institutions on topics that are their strengths.

*The Promise and the Reality of MOOCs*

The touted benefits for students to utilize MOOCs are:

1. It provides increased access by reducing the economic, institutional (admission requirements), pre-requisite knowledge (or certification), and geographical barriers
2. It allows the learner to focus on what learning is important to them
3. It allows the learner to have recognition for learning experiences outside a formal system (transcript, degree, diploma)
4. It allows employers to recognize this specialized employee learning (via badges)
5. It provides a path for continuous professional development

The benefits the institution could realize:

1. It increases the visibility of the institution (which can affect rankings, attract faculty and students, research partners, etc.)
2. It provides a platform to engage in public service (especially to underserved populations) thus fulfilling its social mandate to the community or region and funders (if non-profit)
3. As a professional development platform, it keeps practitioners up to date in their fields, and hence, tied to the institution
4. As a feeder course, students will become familiar with the institution and then possibly enroll in paid courses or programmes after their MOOC is completed (Marques, 2013)

There are many issues that have surfaced over the five year history of the MOOC ‘experiments:’

1. **High dropout rate** – Completion rates are often less than 10% (Educause, 2013). Because most offering are free there is no financial investment in the course which can produce lower levels of commitment, a second major cause would be with those students who are either new to online learning or new to the topic, the students who perform best in MOOC are those with advanced degrees in their field (Shullenberger, 2013).
2. **Student authentication** – As in any online course the institution must ensure that the person on the other end is a student and not a sit-in taking tests or writing papers for them
3. **High Investment** – Institution-based MOOCs are free to the students yet require massive resources from the institution (as outlined previously) that could be used elsewhere (Educause, 2013)
4. **Technical expertise in design** – Even universities that have the expertise of Educational Technology/Distance Education departments are treading carefully before committing to a MOOC program (Dennen & Chauhan, 2013); they know the problems with teaching/learning even in small online classes of 20
5. **Professors taken away from research and other teaching duties**
6. **Professors need to desire to teach online and need special training therein** (Carson & Philipp, 2012)
7. **Time zones/cultures/languages** – Global teaching requires sensitivity to delivery constraints, if a real time session is done during prime Eastern Time, it could be 2 am at a student’s location; what allowances are made for different languages and being sensitive to all participating cultures (Penfold, 2013)?
8. **Recognition of badges** – MOOCs typically do not produce credit-hour transcripts for successful completion, what would be offered to students and how would that credentialing be recognized in by employers or other stakeholders?
9. **Cost of failure** – The cost of failure is global embarrassment and in this game an institution only has “one shot at the bear”
10. **Feedback is often from peers** – Because of the overwhelming numbers, a single professor or even a team of tutors cannot provide the quality feedback that a traditional online course can where student-to-lecture/tutor ratios hover around 20:1
11. **Assessment** – There are two problems here, the first is student authentication discussed earlier, and the second is the type of assessment; computer generated quizzes can self-correct and peers can use criteria-bases evaluations to grade one another, but if essays or other non-computer scoring assessments (like assignments or projects) are utilized who will grade and provide feedback for tens of thousands of students?
12. **Research and mine data to produce improved second offering** – Online courses generate a mountain of data that needs to be shifted, classified, and analyzed for implications of learning effectiveness and student satisfaction, extensive modifications may need to done before the second cohort can be enrolled
13. **“Half-Life” in enrollment** – If the first offering brings 30,000, the second offering could bring a lot less than that maybe 5,000 (unless it becomes wildly popular), and by the third offering it could almost completely lose its Massive nature (under a 1,000); using a 10% completion rate, a cost per completed student must estimated; in this scenario 30,000 + 5,000 + 900 = 35,900 with a 10% completion rate the total costs must be spread over 3,590 students, which may cost more than a student enrolled in a regular university course

*UWI Context for MOOC’s*

UWI is currently exploring the possibility of utilizing MOOC’s but has not stated a rationale for their use which is a common problem in institutions of higher learning (Grajek, Bichsel, & Dahlstrom, 2013). This problem was also evident when UWI adopted online learning—what was the rational: To make learning more convenient, to reduce costs, to extend the catchment area, to free up physical classroom space, to generate more revenue, to improve the quality of learning, or some other reason? This is important as rationale informs the type, objectives, and the design of MOOCs. Several rationales discussed before are:

1. Promote institutional visibility
2. Provide a public service
3. Continuous professional development
4. Feeder pathway to paid enrollment

Does UWI have the required skills and is it willing to make the required investments to design and deliver a successful MOOC? As the *Educational Technologist* for the St. Augustine campus (2007-10), the author can assert that the quality of our partially online courses were very weak in design, that is, in taking advantage of the affordances of the online environment (many were “shovelware” as mentioned earlier). MOOCs require a much more sophisticated, expensive, and team-based approach. While in 2009 at the *e-Learn 09* Conference, the Principal Clement Sankat stated that “e-learning must be at the centre of everything we do.” Yet, there was only one Educational Technologist to service approximately 500 lecturers on campus. The resources were never forthcoming.

If UWI views the rationale for MOOCs as a possible revenue-generating program, there are serious problems with that position. The first is that a vast majority of MOOC classes are free and require substantial upfront investments in the program design. The second is that we are in competition with world-class universities if we choose similar course topics. If we choose topics that are unique to our region then the Massive in MOOC starts to shrink, as it will most likely be a specialty topic not of interest to the masses. We have very few professors with global recognition--which is essential. Direct revenue appears not be an option but indirect revenue in terms of visibility, feeder programs, or regional assistance are possible but may not be cost effective.

*Recommendations for UWI*

The logic in making a determination to utilize MOOCs can be summarized by considering the following decisions (in *italics*) that must be made. Advice is provided after each point.

1. *What is the UWI rationale for utilizing a MOOC?* – The rationale cannot be direct revenue generation but one of the four rationales presented in the last section
2. *How does the rationale support the thrust of the current Strategic Plan?* – Our *Strategic Plan* has objectives to increase our visibility/rank, attract world-class faculty and international students, and research partners, and be of service to the region, but are MOOCs a cost effective way to achieve these ends?
3. *Do other globally high-profile institutions have MOOCs in a given topic/subject?* - UWI cannot compete head-to-head with renown institutions
4. *Would the resultant topic be so narrow, specialized or otherwise limited that it would not attract a Massive audience?* – UWI has specialties in tropical agriculture, tropical diseases, sustainable island environmental protection, regional history and culture, but would these attract massive enrollments?
5. *How would we know what would be of interest to potential students in terms of learning objectives (Winston, 2013)?* – Some type of interest survey may be needed to narrow down popular areas of interest, or some other type of research to determine popular issues
6. *Would these students have high bandwidth connections in order to receive streaming video and audio?* – This question could be asked in the previous survey option
7. *Because MOOCs have a high dropout rate for both those without degrees and those new to topic, would we have enough of those with significant learning experience in the field to make it worthwhile?* – The research, as reviewed before, indicates that both foundation students and students without online learning experience are at risk for dropping out
8. *Do we have any world-class professors in that subject area?* - UWI cannot attract students with no-name academics, the intersection of both popular interest and available professors is a necessary condition for success (e.g., we may have world-class professors in areas where there is little popular interest)
9. *Is the professor interested and willing to be trained to deliver online to a massive audience?* – It has been the author’s experience that this group is the least represented in distance education workshops
10. *Does the professor’s department have enough tutors or teaching assistances to provide feedback and grade assignments?* – If UWI is pursuing a credit-based MOOC the recommended ratio is one tutor per 20 students
11. *Do we have the expertise to support him/her with all the specialties required to make it high quality and successful both in design and delivery?* – UWI currently has no department of educational technology or distance education and is very thin in resources even in the *Centre for Excellence in Teaching & Learning* units (formerly IDU’s) and external expertise is very expensive
12. *Do we have servers (and IT staff) with the capacity to handle high volumes of traffic and provide bandwidth for intensive streaming services?* - IT units are currently understaffed in just performing their routine duties, let alone take on a sophisticated new project in addition to the mega-project *Single Virtual University System* (SVUS) which has a much higher priority; our current servers lack of capacity restrict the number of participants in something as simple as the “Chat” function in our routine online courses
13. *Do we have the financial resources to invest in this sophisticated endeavor?* – The St. Augustine Principal told his campus Operational Planning teams that no new resources would be dedicated for any initiatives, where then can UWI find a quarter of million US dollars to fund the first MOOC?
14. *Can we find additional resources to meet hidden costs not identified in the original plan?* – Planners consistently underestimate costs and unforeseen problems emerge in any new venture, will additional resources be freed up to meet these needs?
15. *Are we willing to divert resources from other critical areas to plow into MOOC, what is cost-benefit analysis based on the rationale chosen?* – A detailed study will need to be conducted to determine the *cost-benefits* between competing uses of resources and if MOOCs are recommended an additional *cost-effective* study will need to be conducted to identify the magnitude of the return-on-investment (if any)
16. *Are we willing to distract the professor from his/her research, seeking funding, teaching, and other duties; will we reduce their other workloads to provide time for both design and delivery?* – There is an indirect cost here that may outweigh benefits that a MOOC may produce
17. *Will the professor’s efforts be formally recognized (in appraisals, promotions, merit pay, incentives)?­* – Many persons are very incentive driven and may not want to invest effort in areas without a payback, especially if they are losing rewards in other areas simultaneously
18. *Will the program get continuous top management support and support from all departments, academic and administrative to make it successful?* – This support cannot be assumed with all of the strategic initiatives in play and the substantive duties of executives, a deliberate arrangement will need to articulated and implemented to make it successful
19. *What marketing strategy would be used to make the MOOC both visible and attractive?* – This is another expense and requires a sophisticated strategy to reach those who may be interested; UWI can compare its success in recruitment campaigns to attract extra-regional students to see how well it is prepared for this task
20. *How would UWI credential successful students who complete the course?* – If the MOOC is free then there will not be enough resources to provide individual feedback on assignments or correct non-objective assessments (ones that computers cannot score); other than attendance and computer tests, on what basis can competency be verified? How do we assure student authentication?
21. *IS UWI willing to take the double risk of either under subscription (big investment for a few students) or having our MOOC flop because of faulty design or delivery (Mazoue, 2013) with Massive defections (high dropout rate, exceeding 90% in some instances, as cited before)­ -* UWI has never done this before so there would probably be a lot of learning errors committed and many delays; if we do not have sufficient in-house expertise, then we would need to contract expensive consultants to assist with the work

The last point is especially important and demonstrates the “risk-reward” principle: is the reward of the endeavor worth the risk involved? The risk is a heavy financial loss and loss of reputation, the reward is that our rationale *may* be achieved. Only when these concerns above can be answered satisfactorily, can the all-clear be given to proceed.

As a demonstration of our commitment to badges would UWI be willing to accept those UWI students who earn badges--in addition to their normal studies--and count it towards specialty areas (electives), or even when candidates are applying for a programme and come with a mix of experience, some credits or certificates, and some badges to get into one of our programmes? This can be considered a test of the degree to which UWI really believes in this new paradigm.

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