INVITED ESSAY:

Toward A Transnational Framework: Aligning Internal and External Quality Assurance Processes
William Plater

IN THIS ISSUE:

What is mLearning and How can it be Used to Support Learning and Teaching in Econometrics?
Lucía Morales

Educational Attainment: Success to the Successful
Peter John Anthony, David Gould and Gina Smith

The Laureate English Program: Taking a Research Informed Approach to Blended Learning
Debra Marsh and Christopher Johnson

Blogs, Webinars and Significant Learning: A Case Report on a Teaching Training Program for College Teachers
Rodrigo Polanco-Bueno

Published collaboratively by:
Istanbul Bilgi University ● Universidad Andrés Bello ● Universidad Europea de Madrid ● Walden University

ISSN: 2157-6254
Editorial

In this issue of Higher Learning Research Communications (HLRC), researchers and academics in Ireland, United States, United Kingdom and Mexico share their research findings after applying innovative teaching technologies and learning models in different academic, cultural, and national contexts. The research presented here covers diverse subjects such as alternative tools and learning models in the classroom, faculty training in new technologies to achieve student learning, and the application of social theory to understand educational attainment.

One innovation that is transforming the design and development of curricula is the incorporation of mobile technologies to complement the learning experience in the classroom. To this end, Morales introduces innovative research conducted at the Dublin Institute of Technology that studied the integration of mobile learning (mLearning) tools in an Econometrics course. Morales discusses the role of mobile technologies as part of the teaching-learning process, the benefits the subjects in this study encountered when using the mLearning tools, and the impact in the learning environment.

In the second article featured in this issue, Anthony, Gould, and Smith from Walden University offer a new understanding of how educational institutions can be studied as social systems by applying the concept of system archetypes. The authors compiled and compared data about educational attainment of three specific groups in the United States and provide an analysis of their findings.

Johnson and Marsh discuss the application of a blended learning model implemented by the Laureate English Program-Cambridge University Press partnership at a group of Laureate International Universities (LIU) institutions and how this model is currently the subject of a research initiative that started in 2012. The authors also share information about the first phase of the research project, how the blended learning program has been implemented in different institutions, and the experiences of instructors and students participating in the program.

To demonstrate how faculty benefit from professional training programs, Polanco-Bueno from Universidad del Valle de México shares the findings of a study aimed at identifying the effectiveness of the International Certificate on Significant Learning (ICSL) program in providing faculty strategies to optimize student learning. The author shares pre and post-tests results and experiences from the participants as evidence of faculty learning achievements.

In addition to the authors referenced above, following our previous issue dedicated to the international accreditation of higher education, we are pleased to feature an article from our guest author, Dr. William Plater, Senior Advisor for International Affairs for the Accrediting Commission for Senior Colleges and Universities of the Western Association of Schools and Colleges (WASC), a regional accreditor in the United States. In his article, Plater describes how
in preparation for the future and in response to an international need for collaboration in accreditation and quality matters, WASC has expanded its scope to accept a limited amount of applications for international accreditation. Plater also emphasizes the importance of coordinating between internal and external quality assurance activities and their significance in this time of global interdependence within a collaborative quality assurance approach.

Undoubtedly, institutions of higher education are facing similar challenges regardless of their geographic location: demands for an education that is not constrained by time or location (distance and blended education), demands for effective non-traditional forms of instruction, and institutional systems that have student learning at the center of the equation.

The articles featured in this issue provide an opportunity to reflect about the current state and the future of international higher education, the tools that are being created to advance student learning, and the invitation to work in collaboration to innovate and maintain the highest standards of academic and institutional quality.

The Editors
Editors-in-Chief
DENISE DEZOLT, Walden University, United States of America
CARLOS MUJICA, Universidad Andrés Bello, Chile
JUAN SALCEDO, Universidad Europea de Madrid, Spain

Executive Director
Carmen M. Méndez, Laureate Education, USA

Managing Editor
Fernando Neda, Laureate Education, Honduras

Senior Consulting Editors
Drummond Bone, UK
Joseph Duffey, USA
Manuel Krauskopf, Chile
Richard Riley, USA
David Wilson, USA

Editorial Advisory Board
Agueda Benito, Universidad Europea de Madrid, Spain
José Joaquín Brunner, Universidad Diego Portales, Chile
Manuel Campuzano, Universidad Tecnológica de México
Simón Cueva, Universidad de Las Américas, Ecuador
Leopoldo de Meis, UFRJ, Brazil
Ugur Ozdemir, Istanbul Bilgi University, Turkey
Ana Fanelli, CEDES, Argentina
Carlos Enrique González, Universidad del Valle de México
Hallil Guven, Istanbul Bilgi University, Turkey
Daniel Levy, University at Albany-SUNY, USA
David López, The National Hispanic University, USA
Craig Marsh, Laureate Education, Netherlands
Rogerio Meneghini, Scielo/Bireme/PAHO, Brazil
David Post, Pennsylvania State University, USA
Germán Ramírez, Laureate Education, USA
Graciela Risco, Universidad Peruana de Ciencias Aplicadas, Perú
Jamil Salmi, World Bank, USA
Susan Saxton, International Baccalaureate, Netherlands
Simon Schwartzman, IETS, Brazil
Ned Strong, Harvard University, USA
Dominic Szambowski, INTI Education Group, Malaysia
Claudia Uribe, IDB, Washington, DC
Despina Varnava-Marouchou, European University Cyprus
Iris Yob, Walden University, USA

Higher Learning Research Communications (HLRC, ISSN: 2157-6254) is published collaboratively by Walden University (USA), Universidad Andrés Bello (Chile), Universidad Europea de Madrid (Spain) and Istanbul Bilgi University (Turkey). Written communication to HLRC should be addressed to the office of the Executive Director at Laureate Education, Inc. 701 Brickell Ave Ste 1700, Miami, FL 33131, USA. HLRC is designed for open access and online distribution through http://journals.sfu.ca/liu/index.php/HLRC.

The views and statements expressed in this journal do not necessarily reflect the views of Laureate Education, Inc. or any of its affiliates (collectively “Laureate”). Laureate does not warrant the accuracy, reliability, currency or completeness of those views or statements and does not accept any legal liability arising from any reliance on the views, statements and subject matter of the journal.
Toward a Transnational Framework:
Aligning Internal and External Quality Assurance Processes

William M. Plater
Western Association of Schools and Colleges (WASC), United States
(wplater@wascsenior.org)

Abstract
This article explores the tensions between internal and external quality assurance processes, making a case for the preeminence of internal actions to ensure the capacity of institutions to respond quickly and effectively to the rapidly evolving global conditions affecting all of higher education. As the forms and means of formal and informal learning evolve more rapidly than quality assurance and accrediting bodies can adapt, institutions themselves will have to take the steps necessary to ensure that students are actually learning at levels represented by a new array of credentials and to offer credible evidence to employers and others that the credentials are indeed accurate reflections of competence. There is a place for quality assurance bodies, but these agencies will find it in their best interest to operate in the areas where they can offer the greatest societal value by articulating the standards that define integrity and quality. Both institutions and quality assurance bodies alike must join forces to recognize that expectations for what actually constitutes quality, competence, and integrity transcend national borders, cultural differences, the ages, occupations or locations of learners, and outmoded notions of prestige. It is a new era where bold ideas and strong ideals can reshape our understanding of what it means to learn throughout life at demonstrable levels of quality and competence.

KEYWORDS: International higher education, internal and external quality assurance, accreditation, Western Association of Schools and Colleges (WASC)

Nations around the world have become increasingly concerned about quality in higher education—in their own countries and in competitor nations. Concern has grown to alarm as degrees have not always led to meaningful jobs or careers because graduates are not actually prepared for work in a globalized economy. This is a concern that already transcends national boundaries, and at this very moment it is laying the foundation for a new era of global interdependence as corporations, nonprofits, and, indeed, whole nations compete for the world’s best talent. How successfully we all navigate this new era depends largely on how well we prepare our graduates for their responsibilities—as citizens as well as workers—in a rapidly changing world.
While the territory of our concern is worldwide and our perspective must always be global, success will be created one institution at a time, one partnership at a time. It is this belief that has led WASC to prepare for a future we must share by thinking about how best to serve its institutional members by engaging other nations and regions in a collaborative approach to quality assurance.

WASC is the acronym for the Western Association of Schools and Colleges, and it refers more specifically to the Accrediting Commission for Senior Colleges and Universities—the federally recognized accrediting body for baccalaureate level and higher institutions in California, Hawaii, and the US Pacific territories. WASC is one of six such bodies in the US that accredit whole institutions instead of specific programs.

WASC is a voluntary association of members committed to quality assurance. Like other US regional accreditors, WASC also has a cudgel because any institution in its government-defined region that wishes to qualify for federal funding for financial aid must be accredited exclusively by WASC. So, the concept of “voluntary” is a little misleading. But what is not misleading is the commitment to quality and to a consensus among WASC institutions around how they know what actually comprises quality.

Thanks to a federal mandate, regional associations like WASC must undergo a recertification approximately every ten years. This is a period of introspection by the WASC staff and its Commissioners, but it is also a time for seeking the advice and guidance of member institutions. Late in 2012, WASC is in the final stages of redesigning its overall accreditation process and its expectations—actually, its requirements—for those who seek or wish to retain our accreditation.

The new WASC process, effective in July 2013, is based on three guiding principles: (1) It puts student learning at the center of accreditation; (2) it respects institutional autonomy; and (3) it responds to the public interest (http://wascsenior.org/redesign). Note the emphasis on institutional autonomy.

This is the conceptual point I wish to address most specifically because it is WASC’s belief that quality, finally, rests with the commitment, the will, the integrity, and the actions of individual institutions. Yes, organizations like WASC and its US--as well as international--counterparts must play a role by articulating principles and expectations, but no amount of external control or regulation can ever replace the self-regulation that actually guides each institution. The value of a voluntary association is that its members elect to join with others who share certain values and certain standards and who collectively reflect what is in the public interest by ensuring that graduates from the programs of accredited colleges and universities actually have attained the levels of learning they claim by titles and certifications.

There is a long-standing tension between institutional autonomy, on the one hand, and the regulatory controls and indirect leverage exerted by governments and their intermediaries, on the other. As the value of education to economic development and national policy become more apparent, at least in the US, the familiar tension has given way to fears about standardization and thresholds of mediocrity that fail to ensure quality. There are also legitimate concerns about the direct and indirect costs of needless, but imposed, compliance
requirements. And now there are new worries about standards and quality across national borders.

**Internal Versus External Quality Assurance**

The tension to which I have alluded is familiar to anyone responsible for the management of an institution, and I need not elaborate on it except to say that we have incentives to take increasingly concrete and clear steps to *differentiate* the roles of internal and external actors and to *coordinate* their work so as to eliminate duplication and reduce tension. The WASC redesign has sought to do just this.

Earlier this year, the American Council on Education issued a report asserting the same thing. *Assuring Academic Quality in the 21st Century: Self-Regulation in a New Era* (American Council on Education [ACE], 2012) is a blueprint for reconciling internal and external quality assurance efforts, legitimizing both, and predicting the rise of even greater external regulation if we do not reconcile. The report claims “[m]any of the challenges identified will require significant and sustained collaboration between institutions of higher education and regional accreditors. Reforms will be meaningful and durable only if they have the full buy-in of the multiple actors needed to make them effective” (ACE, 2012, p. 27-28). More to the point, the report says, “that work must be carried out jointly by campus administrators and faculty working with accreditors” (2012, p.16-17).

The value of such a report to other nations may be tenuous, but the basic point is not. We fail to reconcile the tensions between internal and external quality assurance at our peril.

There is good reason for institutions to act voluntarily as willing partners apart from the real or implied threat of government intervention. For the vast majority of colleges and universities, educational purpose prescribes a level of quality consistent with mission, balancing such considerations as access with prestige, real capacity with scale. Put bluntly, external quality processes invariably define a floor or threshold that must be met. Internal quality processes on the other hand can—and typically do—reflect higher goals and standards of accountability—as long as someone outside is watching.

There are important and pragmatic reasons for internal quality measures as the complement to external measures and forces. These may be as simple as the bragging rights that come with rankings and prestige or in various forms of jockeying for position in competition with others for students, grant funding, and charitable donations. But, more likely, they are grounded in the realization that the best defense against greater external control is a good offense—by asserting and then *proving* that the institution itself is taking all necessary steps to define, to assess, and to report quality through various results: Degree completion, employment of graduates, effectiveness of alumni in fulfilling civic responsibilities, research funding, and the like.

Pragmatism also recognizes the value of coordination to increase efficiency and reduce the several kinds of cost that come with duplication, needless redundancy, and useless tasks. This coordination requires a dialog about what is being measured, how, and for what purpose before the assessments begin. Two of the major complaints of institutions in the US are that
they are asked for the same essential information in multiple formats, and that they are asked to provide information that has no actual bearing on determining whether an institution has attained the levels of quality called for by its mission.

It is here that associations like WASC can offer real leadership in defining what the elements of quality are by setting forth clear procedures for documenting that a threshold—a high threshold—has been met. If we are to serve our students as well as our member institutions, then quality assurance associations need increasingly to come together across national lines to agree on what elements comprise quality and what measures or standards are acceptable.

We have to develop a transnational understanding of quality that respects national, cultural, linguistic, even religious differences, while at the same time building a framework that we can all share because our graduates will live, work, practice, continue to learn, and inherit conditions that are regional if not global—climate, health, energy, water, food, personal safety, human rights, literacy—all of these issues and dozens more depend on leaders and citizens who appreciate how much they share with others and who are prepared to act as well as re-act across national borders. But there is a risk. Standards, criteria, frameworks, good ideas—all have a tendency to rigidify, to lose the dynamism that created them and the flexibility they were intended to preserve.

There is a familiar saying that we measure what we value, and we become what we measure. We need to be very careful about how we conceive of quality in the global context. If we begin measuring and celebrating the wrong things (or good things for wrong reasons) whether as institutions or national agencies, we may find that we have inversely perverted the very purpose of quality assurance by creating a rigid, ossified global system based on rankings and league tables that divide opportunities by education for the elite and by education for the masses.

This very topic was the subject of a recent meeting organized by the Organization for Economic Co-operation and Development [OEDC]. One of the majors actors on the global stage of higher education, John Sexton (President of New York University), presented a view that a careless acceptance of inadequate proxy measures of quality, such as those represented in league tables, could create a global caste system of colleges based on spurious measures that are really only ways of justifying elitism and perpetuating prestige instead of performance (Lederman, 2012, para. 10). Because of the global belief in the value of education for personal as well as national gain with the concomitant massification we are seeing worldwide, such rankings could have serious and permanent unintended consequences—especially for new types of institutions innovating to meet demand, including private, online, and for-profit colleges.

It could happen more quickly than anyone might notice, until we wake up—already locked into the caste system John Sexton fears. I believe it is the responsibility of individual institutions—working with their peers within associations such as WASC—to be the arbiters of quality and the protectors of diversity—of mission, of means, and of students served.

Moreover, in our uncertain but shared future, the only reliable guidepost to what is going to happen is that the next decade will be very different from the past due to massive global
changes. Planning based on extrapolation will no longer work, and many of the easy and familiar terms used to claim quality may no longer be sufficient.

A widely circulating YouTube video asks rhetorically but pointedly how institutions and quality assurance practices can be effective in the future when “[w]e are currently preparing students for jobs that don’t yet exist... using technologies that haven’t been invented... in order to solve problems we don’t even know are problems yet” (Fisch, McLeod, & Brenman, 2008). Quality assurance actions are necessarily retrospective—examining data about what has happened in the past—but their purpose is prospective—anticipating a future we cannot yet assess.

I think the key to preparing for the future is through institutions’ own internal quality processes, within a framework we jointly create in our associations.

In the context of our current awareness of the tension between internal and external quality controls, the WASC reform might seem obvious and self-evident, but let me assure you that it is a major departure for a US regional accredited.

What WASC is doing now will impact all of the other regional accreditors for years to come, especially in a period of dramatic change with regard to the diversification of types of institutions, the growth of online education, and the new credentials being offered as evidence of learning by unaccredited entities. Rather than reject innovations and unfamiliar forms of learning, WASC is preparing itself to deal with the unexpected while preserving an unwavering commitment to verifiable quality. It will do so in the full view of the public. As I have already said, WASC is basing its redesign on three principles: student learning, institutional autonomy, and public interest.

With regard to the public interest, WASC is the first US accreditor to make public both the reports of site visit teams and Commission actions with regard to specific institutions. Beginning in June 2012, WASC pulled back the curtain so the public can not only see what the process of accreditation entails but also what the Commission bases its actions on. This simple act of accountability, transparency, and credibility is likely to change the practices of every other US accreditor (see WASC, 2012c).

Implications for Internal Quality Assurance

The new WASC process will call upon institutions to be more deliberate and public about their own objectives for student learning. WASC’s role will be to review internal quality processes and to ensure the reliability of evidence by seeking greater agreement on definitions, data integrity, and reporting formats—aligned with both the internal uses universities make of the data as well as external expectations of WASC, the federal government, and—eventually, perhaps—specialized accreditors.

But all is not happy, or not yet. WASC has encountered several instances where the Association would like to build its own new processes on internal quality objectives, but the institutions instead see intrusion, imposition, and inequality. There are at least four such areas that may also be of equal concern among universities and colleges worldwide. These include (1) specifying and defining the core competencies that all (and I emphasize all) graduates
should have attained regardless of institutional type or mission; (2) establishing a qualifications framework for degrees—as the European Union has begun doing—that will help students and the public alike understand what a degree means and what graduates know and can do; (3) articulating an institutional duty to contribute to the public good in ways that ensure that college graduates are ready for the responsibilities of citizenship in an era of global interdependence; and (4) composing an adequately qualified academic workforce.

In the interest of time, I will discuss only one of the four contested areas to illustrate the necessity of reconciling internal and external quality measures, on the one hand, and of finding common ground with quality assurance agencies in other nations, on the other.

**Composition of the Academic Workforce**

Traditionally, data on faculty qualifications were always a key element of accreditation. There is little doubt that institutions retain full responsibility for the hiring of faculty based on their own quality standards for who is best able to provide the education at levels of attainment and quality consistent with mission. And there is little doubt that an external agency has a duty to review the institution’s contention about who can serve as faculty at what levels of education. Institutions are expected to verify that the credentials really are what is purported, and quality assurance bodies focus on policy and procedures instead of individual qualifications.

What is missing from this seemingly settled division of duties is a recognition that the composition of the academic workforce, at least in the US, has changed dramatically over the last 30 years—to the point that over two-thirds of its members are contingent—serving without the traditional institutional commitment implied by tenure (or a long-term contract), and perhaps serving on a part-time basis at more than one institution.

Institutions have historically claimed that they control quality through internal processes that define hiring, promotion, and administrative review procedures. But now, most of these well-intentioned practices no longer apply to the majority of those responsible for offering instruction. The reality of who comprise the academic workforce raises important questions about quality—and the qualifications of those offering the courses that make up the degrees. While WASC is concerned principally with the conditions it encounters in the US, the same concerns about the quality of the academic workforce vex institutions worldwide.

This situation has become even murkier in the online environment and the multi-national institutional setting. How many faculty with the relevant terminal degree are required in a program or institution to ensure curricular integrity and educational quality—half, a third, one, none? As the demands of massification and access stretch institutional and national resources alike, as technology flattens the range of offerings, and as relevant knowledge is being developed by experts outside the academy, how is quality to be defined and assessed—and by what level?

The head-long rush of many of the world’s prestige universities to create Massive Open Online Courses (MOOCs, as they are called) has raised the specter of education without accreditation. Tens of thousands of students worldwide enroll in MOOCs offered by Stanford, Harvard, MIT, and others. These courses are offered by some of the most famous researchers, but the offerings exist outside both the internal and external quality assurance measures.
Slowly—but irreversibly—colleges are beginning to accept certificates of attendance as “transferrable” credit. Can this be good for ensuring quality—even if it is commendable for expanding access? It is a change we cannot prevent, so how will we address it?

We have another example of a point of quality where collaboration between internal and external processes must be resolved—especially if we are to avoid a global caste system of higher education based on measures that may have little to do with actual student learning.

Lessons Learned

In its last major reform over a decade ago, WASC did, in fact, make some very large-scale systemic changes focused on institutional capacity and educational effectiveness. The current redesign has taken these early steps to a much higher plane of performance. In brief, WASC’s emphasis has shifted from processes to results. Let me cite a few examples that illustrate how an external agency like WASC has been able to align its requirements with internally created, defined, and sustained quality processes that lead to documented attainment.

Rubrics. By offering examples and by disclosing the ways in which it trains peer review teams to assess institutional practices, WASC has helped institutions in creating their own rubrics for defining such matters as general education learning outcomes, assessing student attainment, and documenting and reporting results (e.g., WASC, 2012b). Institutions have adopted and internalized a broad range of rubrics for their own purposes that are nearly universal in their use but perceived to be internally defined and validated. Aggregated at the discipline and institution levels, rubrics offer one easily understood measure of whether or not a college is meeting its educational objectives.

Frameworks. Even as it deals with the perception that it may be compelling institutions to adopt a standardized, reductionist framework for degree qualifications, WASC has already successfully led a majority of institutions to create their own frameworks for general education with remarkably similar and consistent expectations across the range of members, many based on the VALUE template designed by the American Association of Colleges and Universities (See, e.g., Association on American Colleges and Universities, n. d.; Lumina Foundation, 2011; & National Careers Service, 2013). This experience will be invaluable as WASC works with institutions toward accepting a qualifications framework. Currently, WASC has sponsored a pilot project for about 30 member institutions to consider the Degree Qualifications Profile (DQP) developed by the Lumina Foundation (2011) as a way to articulate the meaning of degrees—from associate to master’s levels. Such a framework or profile will also facilitate transnational understandings of what graduates are prepared to do.

Benchmarking. This quality measure is based on comparisons, as points of reference or even standards of excellence, in relation to a practice that is to be evaluated or judged—such as graduation rates or even proxy measures such as scholarly productivity. The key to adoption of such a practice is based on a faculty’s coming together to agree on what is being measured and what constitutes attainment—then comparing its own past performances with current performance or identifying peer institutions and comparing its performance with others. The main point is that the comparison is between the institution and the operational standard—not between the performance of two institutions or even two programs within the same institution.
This distinction is what makes benchmarking an internal quality process and differentiates it from the sometimes flawed application of benchmarking in rankings and league tables (See, e.g., National Institute for Learning Outcomes Assessment, 2011).

**Institutional research.** One of the major achievements of the past decade of WASC’s approach to accreditation has been the strong enhancement of institutional infrastructure for assessment. In order to be effective with internal quality processes, institutions must have a reliable and increasingly comprehensive capacity for institutional research—self-knowledge. This capacity is actually necessary for an institution to meet WASC’s fourth Standard, which requires an institution to create an organization committed to quality assurance, to institutional learning, and to improvement (WASC, 2013). The first criterion under this standard specifically states:

The institution employs a deliberate set of quality-assurance processes in both academic and non-academic areas, including new curriculum and program approval processes, periodic program review, assessment of student learning, and other forms of ongoing evaluation. These processes include: collecting, analyzing, and interpreting data; tracking learning results over time; using comparative data from external sources; and improving structures, services, processes, curricula, pedagogy, and learning results. (WASC, 2013, p.17)

The development and wise application of institutional data is undoubtedly the strongest buffer against greater external control. As a best practice and a lesson learned, this may be the single most important step a college or university can take to ensure its continued self-regulation and the ability to set its own agenda for continuous improvement. New technologies and analytic functions built into learning management systems hold the promise of establishing global learning communities that simultaneously accommodate massification with individualized, personal, and direct student-to-student interaction anywhere in the world.

**Program review.** Another pillar of WASC’s re-design has been the widespread adoption of program review as a standard of internal quality processes. Program review has long been established at many research universities committed to high quality and continuous improvement, and WASC’s role in the past decade has been to routinize the process—making it integral to all institutions. In the coming decade, the focus will be on assessing how institutions have used program review to improve the quality of their work, especially as reflected in student learning outcomes. Although there is no requirement to engage peers from outside the institution, this is now a common practice often augmented by public as well as academic members to help assess the effectiveness of degrees in meeting employer or community expectations. In the globalized marketplace of higher education, the peer review of programs will increasingly engage colleagues from other countries, and that is one reason WASC has opened itself to international accreditation. We hope WASC institutions will increasingly draw on colleagues from other nations for program reviews because of the insights and innovations in thinking that they can bring to WASC processes.

**Capstones.** Often taking the form of a senior seminar within the major or discipline, a capstone course typically focuses on a project such as a research paper, an experiment, a performance, a creative work, or a community action activity. Its value is in creating a means to assess actual student learning at the graduation level in a manner that integrates learning
across the whole degree, even if it is reflected in the application of expertise within the major or discipline. In instances where institutions are concerned about how they might best demonstrate their graduates’ attainments in the core competencies or general education components referenced earlier, the capstone provides one integral means of documenting and assessing performance. This is yet another instance of where an external agency promoted an inherently internal quality process and elevated it concurrently to an external measure with the potential for public reporting (See, e.g., WASC, 2012a).

There are many more such instances where WASC has recognized highly effective internal practices of assessing quality and has been able to spread their use by claiming them as its own external processes for purposes of public accountability. I am confident that many quality assurance bodies in other nations are already linking internal and external quality measures in the manner I am suggesting for WASC. The examples are many but the point is simple: Internal and external quality measures can be aligned for mutual benefit.

Advice for the Future

It is, of course, presumptuous for me, whose experiences are largely grounded in the United States with our specific cultures, traditions, and laws, to offer advice to institutions in other nations. The growing realization of global interdependence, however, tempts me just enough to enter into such a speculative realm. Here are some thoughts that could be cause for reflection. In each instance, the focus is on what the institution itself can do through its own insistence on quality processes while anticipating a broader application within the global quality assurance community:

Globalization. An obvious beginning point is anticipating the increased mobility of students, the nature of workforces shared within industries across national lines, and the need for our graduates to have global competencies in the face of transnational issues that affect us all. How can college graduates expect to be successful 30 years from now if they do not have the capacity to think, act, and work transnationally? Recent comments from US Department of Education official, Maureen McLaughlin, makes it clear . . . and “official” . . . that US higher education has to globalize (Fischer, 2012, para. 4-5). The rapid transformation of specialized accreditors, such as AACS, ABET, or NLN, into international bodies offers compelling evidence of the need for a new approach to collaboration on setting graduation requirements for an interdependent world. If we expect doctors to perform surgery at some safe threshold of competence whether they are in Hanoi or Honolulu and engineers to build bridges that are as strong in Santo Domingo as San Diego, should we not also expect citizens in Turkey, Mexico, India, or China as well as the US to make informed decisions on environmental issues, food security, or intellectual property based on comparable levels of intellectual skills, a shared recognition of what is in the public good, broad understandings of how things work, and similar capacities to apply specific knowledge to new contexts?

Transnational quality assurance. The next step is for our institutions and those who regulate them to consider the implications for knowing what quality is—and means—across national lines. For decades, many graduate universities have experienced the need to assess quality based on the applications of students presenting undergraduate credentials from other countries. In the US, this assessment has tended to be in one direction as a receiving nation,
and it has given American institutions a false sense of superiority in setting global standards for quality—without realizing that the world has changed around us and that other regions are innovating at faster rates than the US.

In reaction to what is clearly a growing need to interact globally, the Council on Higher Education Accreditation (CHEA), the coordinating body for all US accreditors, established the International Quality Group (CIQG), designed to “establish a venue for accrediting and quality assurance bodies, colleges and universities, businesses, foundations and others to work together to address international quality issues; to advance understanding of international quality assurance; and to provide research and policy direction” (CHEA, 2012). While this new venue may prove effective as a “forum,” it is not likely to displace individual institutions in their efforts to shape the direction of quality assurance transnationally—simply because institutions are the direct actors. Nor can an organization like CIQG supplant accreditors like WASC because they, not CHEA, have the ability to interact with institutions in establishing a balance of internal and external quality processes. However, it evidences there is now no doubt about the need to accredit specifically and locally, but to act cooperatively and globally.

Moreover, we now know that high quality teaching and learning can originate anywhere, and be accessible anywhere, thanks to global communication and affordable technologies. This still early realization has led WASC, for example, to begin a limited process of accepting applications for accreditation from universities in other countries for the purpose of learning from them and for the capacity to act as an internationally-aware quality assurance body. WASC is not engaging in one-off accreditation of American-style universities that happen to be in other countries. Instead, WASC is seeking to form a global community of institutions whose shared values and aligned practices will enable members to learn from each other, to practice collaborative innovation, and to set the global benchmark for transnational quality standards. The prospect of doing this at the agency level, as well as the institutional level, is what makes the challenges of the changed higher education ecology inviting as well as daunting.

The concurrent implication for individual institutions is for them to begin to align their own internal quality processes with global standards developed on a regional basis, where a “region” might be either geographic or functional based on where the transnational interactions occur. Individual institutions have the capacity to lead in this development long before regulatory or national quality assurance bodies can because of their ability to act quickly and decisively.

Transnational academic workforces. As suggested by the current issue of ensuring quality among an increasingly contingent faculty or workforce, institutions have a duty to review their own policies and practices with regard to how they assess the preparation and effectiveness of those offering instruction, conducting research, or directing internships and service learning. Increased travel and electronic interactions—along with economic realities—make it highly likely that those who comprise the academic workforce will be transnational and increasingly role-differentiated. As the McKinsey Global Institute [MGI] indicated in a report, there will be a growing global competition for the best faculty—especially since teachers, unlike many other work forces, can teach from anywhere in the world (2012). In citing a global “education revolution”, the report further stated:

To respond to the skills challenge in global labor markets, the traditional model for providing secondary and tertiary education will need to be transformed in both advanced
and developing economies. . . . The availability of teachers will be a constraint almost everywhere in the world and the capacity of governments to finance higher investments in education will be a limiting factor in many countries. (MGI, 2012, p.27)

If certain assessment or grading activities can be “outsourced” from a college in California to a specially-organized assessment company in India, what are the quality processes that can assure the integrity of the offering at the course and degree levels?

**Open learning and credentialing.** Just as WASC has had to learn how to engage with for-profit institutions, online institutions, and multi-regional institutions, it has also begun to anticipate open learning and credentialing. There will always be more innovations and new technologies to continually challenge assumptions and decades of experience and protocols. Several reputable organizations have begun to “bundle” credits from multiple sources in combination with assessing life experiences and assigning credit equivalencies; these organizations contract with accredited institutions who accept the evaluations of the bundler and give credit toward degrees that the accredited institution will award. Should it be possible for the “credit bundler” to seek accreditation and authority to award degrees without itself ever offering instruction?

As I noted earlier, a small but growing number of universities have begun to accept “certifications” for credit from faculty participating in MOOCs, including from faculty whose own institution will not accept the certification even when it is offered by their own faculty. What internal quality processes are at work in such instances, and what do they imply about external quality controls? Around the world, both educators and policy makers echo the conclusion of University of Melbourne’s Simon Marginson that MOOCs are the “big game changer” in international higher education (Redden, 2012b, para. 4). Marginson further said:

“Students are going to look very seriously at this option in the future,” … in that they will contrast the many thousands of dollars they would spend on education in America, Australia or Europe with the opportunity to take online courses for free from some of the world’s most prestigious institutions [and individual faculty]. … “I think it’s likely that it’s going to have an impact on the labor market.” … “It would be unrealistic to argue otherwise.” (Reddenb, 2012, para. 4-6)

On the other hand, at the 24th Annual European Association for International Education (EAIE) Conference, one of the most serious topics was concern about growing transnational fraud, ranging from merely inflated credentials to outright identify theft and purchased credentials (Redden, 2012a). There is a need; participants seemed to agree, for individual institutions to work not only with various external quality assurance bodies but with each other (Redden, 2012a). In one bold move, Sweden has created a national application system for international students to reduce fraud in credentials being proffered (Redden, 2012a). Other steps to stem the tide of abuse while accepting the inevitability of technological innovation will be apparent in months to come.

If we are moving globally away from attendance records and credit hours toward competence or performance-based measures of educational attainment, how do we set valid and credible assessments of MOOCs—and whatever comes next, because surely there will be something coming soon? Innovation will not stand still, and we have to find credible means of
recognizing MOOCs and their successors. Given their global reach, we can do so only if we act transnationally.

**Vertical alignment of learning outcomes.** As WASC has come to recognize the value—indeed, perhaps the necessity—of a qualifications framework, it has also come to understand the importance of the vertical alignment of learning outcomes in pre-baccalaureate, baccalaureate, post baccalaureate, and life-long programs. Learning attainment must be measured by something more convincing than how long someone sits in a classroom. There is a flood of reports and analyses criticizing the widely-accepted measures of the past 150 years, and none is more damning than the critique of the “student credit hour.” For example, one recent report states:

> If the U.S. is to reclaim its position as the most-educated nation in the world, federal policy needs to shift from paying for and valuing time to paying for and valuing learning. In an era when college degrees are simultaneously becoming more important and more expensive, students and taxpayers can no longer afford to pay for time and little or no evidence of learning. (Laitinen, 2012, p.16)

We have long since understood that students do not all learn at the same rate, that learning is not neatly layered by grade levels or even course levels, and that much of what we have learned by graduation will be obsolete within a decade. Both because individuals learn at different rates and because most learning is cumulative and perpetual, the articulation of learning outcomes required for specified levels of certification makes it possible for learners to progress at their own pace instead of in tidy cohorts. The mass customization of learning is now not only financially feasible but necessary as society recognizes a variety of learning styles and a range of acceptable performance levels. Competence-based assessment will slowly but inevitably replace course and module completion as the basis of certification. There is a growing recognition that the credit hour is no longer an adequate unit for measuring academic attainment.

**Reconceiving general education as adaptive education.** With all due appreciation for the systems of higher education in many regions of the world that focus on early specialization in disciplinary competence, I strongly believe that the future will reward those universities that prepare their graduates to adapt to changed conditions and to continue to grow and evolve as the forms and facts of knowledge turn upon themselves. The President of University College Dublin, Hugh Brady, speaking at a conference of the European Association for International Education in September 2012 made an astute observation about the need for European universities to move away from professional specializations at the undergraduate level in favor of general education, or what I am increasingly referring to as adaptive education. Brady indicated, “[o]n the one hand we’re always going to need ready-to-work graduates, but you also need a large number of students coming out who are deliberately trained to be life-long learners” (Reddenb, 2012, para. 16).

The only pathway through the twists and turns of perpetual and rapid changes in professions and disciplines is a grounding in general education—the core intellectual skills and broad competencies that the new WASC accreditation process is seeking to include in a more visible and transparent manner.
Conclusion

Let me conclude with one final point. I have repeatedly suggested that one of the most important differentiating factors that make internal quality assurance preeminent is the ability of individual institutions to act quickly and nimbly. Institutions, not external quality assurance bodies or governments, have the capacity to shape the future by recognizing and acting on constantly changing conditions. As the YouTube video so clearly implied, the only way to prepare for a future we cannot anticipate is to create--by design, by intention--a capacity to adapt at a rate that allows us to remain relevant.

Many successful people—leaders in and of nations—believe that we are in the midst of a fundamental, systemic shift in the nature of all education worldwide. They point to MOOCs, the rise of research universities outside the US and Europe, the demands of a growing global middle class, and even the Arab Spring. By contrast, others, mostly those who have successfully led colleges and universities through the tumultuous past four decades of astonishing transformation while preserving centuries-old forms, believe that our institutions are able to accommodate these forces through incremental change.

In reality, I believe, it doesn’t matter which perspective is right—and in fact both might be accurate predictions in their own ways. Those individual colleges and universities that attend to quality on their own terms, and as they define it, will endure if they can prove their claims about what they are preparing their graduates to know and to do. The future really does belong to internal quality control, but only so long as it can be made public and transparent. Institutions will have to document their past attainments—and especially the learning achievements of their graduates—retrospectively, but they will also have to decide how they are changing to meet evolving conditions both locally and globally. To endure is one state of being, to prosper and to lead is another.

The educational leaders of the future, regardless of the country in which they may be located or under whose rules they operate, will be those whose past record of credibility allows them to take the risks needed for innovation and whose alignment with the differentiated responsibilities of external quality agencies will be the guarantee of serving the public interest at home and abroad.

William M. Plater served as a Commissioner of the Accrediting Commission of Senior Colleges and Universities of the Western Association of Schools and Colleges from 2006 until January 2012, when he became the Senior Advisor for International Affairs. He is the Executive Vice Chancellor and Dean of the Faculties Emeritus at Indiana University Purdue University Indianapolis (IUPUI), the urban research campus of Indiana University, and Chancellor’s Professor Emeritus of Public Affairs, Philanthropy, and English at Indiana University. Plater earned a PhD in English literature at the University of Illinois at Urbana-Champaign and has been awarded honorary doctorates by Purdue University and the National Institute for Development Administration of Thailand. Versions of this essay were presented in speeches to national associations of institutions of higher education in Chile and Mexico. The views expressed in this essay are Plater’s own and do not represent either Indiana University or WASC.
References


What is mLearning and how can it be used to support learning and teaching in Econometrics?

Lucia Morales

Dublin Institute of Technology Department of Accounting and Finance, Ireland
(lucia.morales@my.ohecampus.com)

Abstract

This research project analyzed the integration of mobile learning technologies in a postgraduate course in Finance (MSc in Finance) at Dublin Institute of Technology, where econometrics is an important course component. Previous experience with students undertaking econometrics modules supported this analysis, where the researcher detected a clear need for learning support. Econometrics courses are heavily supported by the use of sophisticated statistical software, the availability of which is normally restricted to designated labs in the college. As a result, this project has developed an application that facilitates students’ access to econometrics course work, where a mobile device was used. The main objective of the project was to enable students to bring their course material home with them and use it anywhere, at any time, so that the basic material covered in class could be consulted and reviewed as many times as the students need. The results of this project are very encouraging, as evidence suggests mobile technologies can play a positive role in improving students’ learning experience. Teachers should consider using mobile technologies to support their work in the classroom. In this context, smart phones and PC tablets, the devices used during this study, have proved to be particularly effective.

Keywords: eLearning, mLearning, iPad, iPhone, website, action learning and econometrics.

In Friedman’s (2005) vision of a globalised future, the two main drivers of change include economic competition and technological advances. In this context, science, engineering, and technology education are arguably the key to success. Accordingly, the education system needs to be adjusted by integrating new technologies into its structure, programmers, and instructor training. The aim of this study is to explore the positive and negative effects of new technology in higher education. It specifically focuses on analyzing the concept and practice of mobile learning (mLearning) in higher education, and exploring how blended learning could be used to enhance students’ progress. In this respect, it is important to consider where technology might take the academic community, whether we want to go there, and whether we have a choice.
In the last few decades, numerous studies illustrated the various ways our technologically informed society has affected the system of education. Previous research showed that new technologies are conceived to be the panacea to minimizing education costs and maximizing students’ learning experiences (Naismith, Lonsdale, Vavoula, Sharples, 2004). Nevertheless, other studies showed that there are important limitations associated with the use of technology when supporting learners (Kukulska-Hulme, 2009; Lowendahl & Harris, 2009), and that barriers must still be overcome in order to achieve success in this domain. As a result, the main focus of this project is to examine whether blended learning can help integrate the use of technology (with a special emphasis on mobile learning technologies) into students’ learning experiences.

Project Context and Rationale

This section provides a general evaluation of pedagogical and andragogical teaching, as well as learning models and their importance in higher education. As it is a common trend among teaching professionals to confuse these methodologies, it is not infrequent that inappropriate teaching methods are used in higher education (Pew, 2007). A major problem “arises when pedagogical methods and practices are applied (in whole or in part) to situations that require” andragogical dynamics” [emphasis added] (Pew, 2007, p. 14). It is therefore necessary that higher education institutions analyze and assess the needs of potential students and adjust their teaching methodologies accordingly. Neglecting to do so will contribute to the risk of offering a product that does not satisfy students’ or employers’ demands.

Universities and colleges need to adjust their teaching systems in order to provide products tailored to individual student needs. In this respect, the role of the teacher needs to be very clear and this is where the major challenge lies. Being an instructor accustomed to interacting in a face to face environment, it is the current researcher’s responsibility to motivate and encourage the student’s learning process (pedagogical approach). Moreover, from an andragogical point of view (Pew, 2007), the motivation and desire to learn is implicit in every student, particularly in those undertaking postgraduate courses. The teacher’s role should therefore focus on facilitating and enriching the learning process. In this context, mobile learning technologies are deemed to play a central role in higher education. The use of mobile learning and the integration of appropriate technologies allow students to move the learning process out of the classroom and use their time more efficiently; it is the teachers’ role to motivate their students and, more importantly, to create a need for learning. In this respect, the fundamental responsibility of a higher education teacher is to create a learning environment that motivates and encourages the students’ learning process both inside and outside of the classroom. In this way, students will be able to gain knowledge and develop critical thinking skills in their chosen area of study. As a result, the ultimate goal should be centered on arming students with the ability to analyze problems and provide optimal solutions to real issues in their field (Marquardt, 1998).

The Aim of this Study and Research Questions

The use of electronic and mobile technologies might better engage higher education students and even change the passive attitude towards learning that teachers’ occasionally find (Naismith et al., 2004). Nowadays, many people, especially young
people, are familiar and skilled with mobile phone technology (Chan & Ford, 2007). These skills can be used to attract the more reluctant young learners and help improve their aptitude for learning. If we take into consideration that the majority of students bring their own computing/mobile devices (e.g. pocket PCs, smart phones, notebooks, tablet PCs, graphical calculators, electronic dictionaries, etc.) into the classroom (Goh, & Kinshuk, 2006), a simple question arises: “why not use those devices as a learning tool?” Such devices enable students to access eLearning content anytime and anywhere, both inside and outside of the university/college setting. This educational mobility has been referred to as ubiquitous learning or uLearning (Granić, Ćukušić, & Walker, 2009). The literature has reported that students take great pride in their work when ICT (Information and Communication Technologies) is used for learning, and has indicated that ICT motivates students in their school work (Brown, 2005; Sime & Prestley, 2005). Therefore, the implementation of ICT within the learning process can lead to positive motivational outcomes, independent work, and enhanced creativity (Brown, 2005). In this context, the present study examined mLearning technologies and their potential in higher education. More specifically, the researcher examined how a mobile device (iPhone, iPod touch and/or iPad) can transform students’ learning experiences. Hence, the main research questions addressed how teaching and learning models are supported by technology. The questions presented below focus on how mobile devices can be used to facilitate the learning process of postgraduate finance students undertaking a module in econometrics.

Main Research Questions:

1. What is the role of mLearning in delivering econometrics courses to postgraduate finance students?
2. How does the iPad or iPhone represent an initial movement towards the integration of mLearning in postgraduate finance courses?
   2.1 How can the iPad or iPhone be used to enhance student learning in an MSc. in Finance with econometrics?

The MSc in Finance at DIT is a course designed to target individuals with a strong interest in finance. In addition, potential students should demonstrate previous knowledge of finance and a basic understanding of econometrics principles. Overall, the student should have a business background and should be comfortable using technologies and standard office software. However, it is not expected that students possess advanced knowledge of specialized software like Eviews, Stata, or Rats. The course is designed to start from the basics and to progress to a more advanced level according to the course syllabus and student demand during the academic year. The students in this group were ideal candidates for this project due to the advanced level econometrics they studied. It was deemed necessary to develop and introduce support material that would help students to access their course material according to their individual needs as it was identified that teaching student required different support to be able to understand the basics of the subject. Moreover, the expectation was that the answers to the above research questions would help increase our understanding and knowledge of how mobile technologies can be used to support postgraduate finance students’ lifelong-learning experience, and how their learning can be integrated in their daily routines.
The Importance of mLearning

A review of the literature in mobile learning reveals that mLearning theories are lacking (Goh & Kinshuk, 2006; Muyinda, 2007; Naismith et al. 2004). There also appears to be little understanding of how mobile technologies relate to both traditional and innovative ways of teaching and learning. Overall, existing studies (McConatha, Praul, & Lynch, 2008, Sharples, 2000 and Muyinda, 2007) seem to agree that mobile learning is a form of eLearning that specifically employs wireless communication devices to deliver learning content and support student learning outside the traditional environment. As a result, “mobile learning has emerged as an educational application from advances in mobile computing and handheld devices (i.e. phones, smart phones, PDAs, [pocket PCs] or laptops), intelligent user interfaces, context modelling, wireless communications and networking technologies (Wi-Fi, Blue Tooth, GPS, GSM, GPRS, 3G)” (Muyinda, 2007). Nevertheless, a clear distinction between classroom and mobile learning needs to be established.

Mobile devices support the delivery of both synchronous and asynchronous learning. In informal settings mobile devices support both intentional and unintentional learning (Kelly, 2002 & Wagner, 2008b). Thus, mLearning can function as a supplement to formal teaching and learning. In this regard, advocates of mLearning recognize the fact that it cannot be used completely alone and should ideally be blended with other methods of delivery, such as face-to-face, print, and online learning. In this context, a blended learning approach is more appropriate than an individual one. The main challenge for educators using mLearning technologies rests in their ability to find ways to guarantee that students’ learning will be highly situated, personal, collaborative, and long term. Teachers must clearly understand what pedagogical and andragogical teaching models are and how they should be integrated in the learning environment. This comprises a learner-centered approach that will move more and more outside of the classroom and into the learners' environment. In other words, virtual and mLearning approaches need to be considered as key models that will provide the type of education that meets students’ demands more efficiently and where a mixture of teaching models should be used.

Literature Review

The literature analyzing mLearning is recent but fast growing, with the first studies published at the turn of this century (McConatha, Praul, & Lynch, 2008). Sharples (2000), who examined the potential of mobile technologies and their role in education, was one of the first authors publishing in this area. Sharples analysed how mobile technologies can be integrated into adult education programmers with the aim of enhancing and promoting lifelong learning. According to Penga, Sua, Choua and Tsaib et al. (2009), it is only “in the last four years that explorative studies have set out to investigate pedagogies for mobile learning”. In this line of research, an early study by Hardless et al. (2000; as cited in Penga et al., 2009) “employed social constructivism and cognitive apprenticeship to support their ideas on collaborative learning and education for mobile people”. In addition, Hill et al. (2000; as cited in Penga et at., 2009) “utilize constructivism as a pedagogical model for their ubiquitous computing theory. Furthermore, Sharples (2000, as cited in Penga et al., 2009) “grounded on the idea that the human learning is highly situated” [...] suggested that the convergence of personal technology and lifelong learning (LLL) may “empower
people to manage their own learning in a variety of contexts throughout their lifetimes”. For Penga et al. (2009) further investigation of the constructivism and LLL theories may provide educators with important information about curricula development in relation to mobile learning.

According to Beale (2006) and Sharpes (2006) (as cited in Looi et al., 2010, p.155) “previous mobile learning research … has typically focused on either formal or informal settings and failed to examine the integrated and synergetic effects of linking these two contexts or environments of learning”. Given the ubiquitous nature of mobile technology, “the portability and versatility of mobile devices has significant potential in promoting a pedagogical shift from didactic teacher-centered to participatory student-centered learning. In this type of learning culture, teachers act as facilitators and learning partners rather than … experts” (Looi et al., 2010, p. 156). In conclusion, mobile learning is quite recent but its role in education is growing fast and many changes are expected to occur in the future of higher education.

**Mobile Learning Main Challenges**

This section examines the challenges faced in mobile learning in higher education institutions. In our current era, learning has evolved into a dynamic practice that takes place during the whole life of the individual. As a result, higher education institutions “must recognise that adults have blended lifestyles with multiple roles” (Kelly, 2002). Third level education has changed and is no longer only consumed by young adults with the sole responsibility of concentrating on their studies. More and more, the classroom is composed of a mixture of both young and mature students with a broad range of personal responsibilities, seeking to use their time efficiently with clear learning objectives. Consequently, higher education institutions have to manage classrooms composed of young adults starting third level education, and adults that are returning to the classroom. The latter “have to combine learning with work, family, and leisure activities” (Kelly, 2002). However, “many universities unintentionally create barriers that prevent mature students from participating in higher education as a form of lifelong learning” (Kelly, 2002). Higher education institutions “must become more learner focused [by] using [an appropriate learning paradigm] to encourage and facilitate lifelong learning” (Kelly, 2002). In this context, it is important to enable individuals to learn in a way that makes best use of their time and abilities. The role of mobile learning is deemed fundamental in this respect, as individuals will be able to use devices that contain all the information they need, and access their learning material anywhere, at any time (ubiquitous learning).

The current status of mobile learning is leaning towards enterprise mobility, “a state of technological readiness where users have full access to resources regardless of their physical location” (Wagner, 2008b). As such, “one of the self-evident uses for mobile devices, networks, and services is providing support for learning and performance at the point of demand or need” (Wagner, 2008b).
The eLearning Guild defines mobile learning (mLearning) as follows:

any activity that allows individuals to be more productive when consuming, interacting with or creating information, mediated through a compact digital portable device that the individual carries on a regular basis, has reliable connectivity and fits in a pocket or purse (Wexler, Brown, Metcalf, Rogers, & Wagner, 2008, p. 7).

Following the above definition, it is evident that mobile phones are a perfect fit for it. However, the whole research process raises some questions with regard to the iPad, as features on this device do not fulfill the requirement of fitting in a pocket or purse. On the other hand, the iPad is easy to transport in a handbag or shoulder bag which gives the characteristic of mobile to the device. Hence, Wexler et al.’s definition of mobile learning needs to be more flexible for the purpose of this study.

Mobile learning can be understood as a way of improving productivity, as it allows an individual to use inactive time in a more productive way. The key determinants of mLearning success, as perceived by users, are based on the convergence of mobile devices with existing educational technologies (Wang & Shen, 2008). This provides learners with greater flexibility by making learning material available and accessible anywhere and at anytime. Moreover, the use of ICT facilitates knowledge sharing and cooperative learning among knowledge management activities.

An analysis of the pedagogical paradigm shows that “teachers assume responsibility for what is learned, and how and when something [should] be learned” (Pew, 2007). Thus, the pedagogical model is a teacher-directed or teacher-centred approach to learning (Pew, 2007). However, the andragogical paradigm is considered as a learning approach where the teacher facilitates adult learning. Along these lines, Conner (2004) identified five statements related to the andragogical model:

1) Letting learners know why something is important to learn, 2) showing learners how to direct themselves through information, 3) relating the topic to the learner’s experiences, 4) people will not learn until they are ready and motivated to learn, [and finally], 5) [the learning experience entails helping students] overcome inhibitions, behaviors, and beliefs about learning (Conner, 1997-2004, p. 12, as cited in Pew, 2007, p.17).

Consequently, there are important differences between these two educational paradigms; in the pedagogical approach the teacher transmits knowledge and controls the process at every stage; in the andragogical approach the teacher facilitates learning and supports students when needed, where a great effort is dedicated to incentivizing critical analysis and thinking, and where the learner is responsible for his/her learning outcomes.

The main challenge for teachers using any educational model is to have a clear understanding of the paradigm being implemented; in this way, teachers can adjust their techniques to the environment without the risk of failure. In the case of mobile learning, students are responsible for their own learning and the role of the instructor is to facilitate the learning process, not to motivate or worry about the students’ commitment to their own learning. As a result, the core responsibility of instructors using education technology with
students that increasingly use mobile technology is to find a way to integrate their classes into the dynamics of mLearning; along these lines students will be able to maximize their learning experience.

Bullen (1995) raised questions about the importance of andragogy and concludes that andragogy is only relevant in certain situations when it is clearly needed. According to Knowles (1980) the key characteristics of adult students can be identified as: i) self-directed individuals, ii) have a task or problem-centered orientation to learning, iii) are internally motivated, iv) have life experiences, which are a rich resource for learning, and v) a readiness to learn. However, research analyzing the appropriateness of the andragogical approach concluded that assumptions should not be made in relation to adult learners, as each individual is different and has a different level of confidence as a learner (Burge, 1988). Thus, what learners report about their learning preferences may not always manifest when they engage in their studies. Consequently, in some cases it may be necessary to adopt a pedagogical approach that helps students at the beginning of their studies, and subsequently progress into an andragogical approach. In order to succeed, mobile-learning education needs to be flexible and readily adjusted to students’ needs. It is not possible to identify one individual model that will fit all types of learners’ needs, particularly in situations where students are interacting in an environment where they have direct contact with their instructors and can decide what and how they want to learn. In this context it is necessary for instructors to adopt an andragogical-pedagogical approach, which can be used in a manner that suits the type of students they work with. It is well known that every class is different, and techniques that are appropriate with one group may not be successful with another, meaning that the teacher needs to be able to change his/her class dynamics if problems are detected.

According to Wagner (2008a), certain key developments over the past few decades have vastly improved interactive mobile devices, where the following changes can be highlighted:

1. The convergence of telephony, computer and broadcasting functions, due to the shift from analog to digital sign systems.
2. The emergence of browsers, the World Wide Web, and now the “mobile” web.
3. The broad availability of development tools that create multimedia content (SWF), video content (FLV), and document content (PDF).
4. Better device processing power, functionality and displays.
5. More powerful networks and services, including cellular, Wi-Fi, and WIMAX technologies.

Research on mobile learning suggested that the success of mobile learners depends on how strong the focus is on enterprise mobility (Wagner, 2008a). It also depends “on eventually finding common ground among trainee designers, enterprise IT managers, [...] business stakeholders, and enterprise end users” (Wagner, 2008a). However, the main challenge to be able to integrate mobile technologies in the classroom lies in the ability of teachers to take up the challenge. Additionally, prudence must be in place as the management and implementation of this learning device implies that students can get distracted by gadgets rather than use them to support their learning (Banister, 2010). Therefore, teachers need to find the right approach incorporating new technologies into
the classroom, taking care not to place too much emphasis on the actual technology rather than on the course content.

**The Role of Mobile Technologies in Education**

In contrast to traditional classroom practice, the use of mobile technologies offers many benefits to students and teachers. This is due to features such as ubiquitous learning as well as “wearable” computing and multimedia content delivery via mobile devices that allow the learner to be “connected” wherever and whenever they choose. As a result, learners are able to continue their studies outside the classroom in a way that satisfies their individual needs. The “just enough, just in time, just for me” model of flexible learning will be the key to supporting students’ demands (Peters, 2007).

The use and evolution of mobile technologies have exposed the need for restructuring traditional learning programs. The educational sector needs to move according to times with the aim of introducing “strategies, applications, and [the necessary] resources to support anywhere-anytime connections to formal and situational learning, as well as personal interest explorations” (Wagner, 2005; as cited in Shih & Mills, 2007). This is because “the academic environment has been introduced to mobile learning through the use of laptops, PDAs, and smart phones” (Shih & Mills, 2007, p.2). As a result, mobile technologies are taking solid steps in the development of technology-mediated teaching and learning (Shih & Mills, 2007). This type of technology allows people to be connected and “offers the opportunity for a spontaneous, personal informal and situated learning [to take place]” (Shih & Mills, 2007). In this case, the new paradigm of education is based on the idea of flexible learning (see Figure 1), where education is served as “just enough, just in time and just for me” (Peters, 2007).

![Diagram](attachment:image.png)

*Figure 1. The “just enough, just in time, just for me” model of flexible learning (Peters, 2007)*

As a result, the learning and teaching model that has been used in higher education in the past is becoming obsolete, and if institutions are to cope with a dynamic and challenging educational environment they need to be ready to adjust and evolve. It is
evident that mobile technologies are here to stay and failing to integrate them in the classroom might end up with an institution that will not equip its students with the skills that are demanded by employers and this will be translated in future professionals that will not be able to compete in a globalised and fast moving economy.

**Benefits of Mobile Learning**

Mobile learning acts as a main support to extend and improve learners’ “capacity[ies] to communicate and access information by allowing them to carry ‘wireless, mobile, portable, and handheld devices’” (Traxler, 2008; as cited in Koole, McQuilkin, & Ally, 2010). Moreover, Roschelle (2003) asserted that “mobile technologies in education will succeed to the extent that ... [there is] mutual engagement of a teacher and students in social practices of learning ... emphasizing learner-centered, assessment-centered, knowledge-centered and community-centered practices” (p. 271). Given that “mobile learning allows ... students maintain connections and commitments to learning activities in ways that previously were largely impossible, it also benefits the communities in which these people are not students, but rather skilled and dedicated professionals” (Beckmann, 2010). Furthermore, learning with mobile technology has clearly shown that “the mobility and connectivity of technological tools enable students to become an active participant [rather than] a passive receiver of [information]” (Looi et al., 2010).

According to Beckmann (2010):

“Educators can integrate technologies into their courses in a way that facilitates learning for all students, whether they are on- or off campus, static or mobile. However, although mobile technologies offer a new field to explore in distributing and sharing learning opportunities, and educators must continue to fine-tune their use of such technologies, the spotlight must remain firmly on pedagogical content rather than on the technology being used to deliver that content. (p. 171)."

The benefits of mobile learning and the use of mobile technologies to support students’ demands is well recognized by education and training providers (Peters, 2007). Nevertheless, there are still important limitations with regard to the implementation of this type of technology in the classroom (Peters, 2007). A study developed by Peters (2007) pointed out that one of the major constraints is associated with the age and ability of the teacher to integrate these technologies in their teaching routines. Moreover, the slow rate of change in large educational institutions is another factor to consider, as mobile devices are not designed with the education market in mind (Peters, 2007).

From this perspective, it is important to consider the implications for teachers and students dealing with econometrics material and software. Firstly, teachers need to make sure that they do not cause distraction in the classroom through the introduction of new technologies like the iPad/iPhone. The material that students need to cover and become familiar with is quite complex and dealing with specialized software at the same time can be a daunting task. Students need to master the theoretical aspect of the course and at the same time deal with its practical side, with the application of models and theory through econometrics software. Introducing devices that require the use of even more software, like iTunes, video formats, podcasts, etc., might simply add more difficulty to the course for individuals that are not technological savvy. Consequently, the teacher needs to
find an appropriate balance that adds real value to classes rather than adding difficulty to the learning process itself.

Existing Research Conclusions

Research which explored the benefits and challenges of mobile learning in higher education suggested that teachers need to adjust in order to encourage change. Teachers need to be aware that student-learning demands have evolved and as a result they need to provide more than just a lecture series to satisfy students’ needs and requirements (Stay et al., 2010). Mobile technologies are the key to helping them to achieve their goal. According to Stav, Nielsen, Hansen-Nygård, & Thorseth (2010), teachers need to provide a learning environment that stimulates enjoyable and engaging lectures. A recent report from the MacArthur Foundation has pointed out “that social-network sites, online games, video-sharing sites and gadgets such as iPods and mobile phones are now fixtures of youth culture” (Hansen, 2008; as cited in Stav et al., 2010, p. 182). Therefore the question is: can the education system succeed without integrating these new technologies into learning programs? Considering the emerging potential of mobile technologies with a thriving growth of consumers adopting new technologies, it appears that mLearning is taking its own place in mainstream education and training. As a result, higher education institutions, and especially teachers, need to be ready to adjust to new technology. More importantly, they need to be able to integrate these new technologies into the classroom in order to satisfy students’ needs.

Research Epistemology and Theoretical Perspective

The econometrics discipline is characterized by its complexity (mainly based on disciplines like mathematics, economics and statistics) and is concerned with data analysis; with the aim of implementing models that can help the researcher/analyst understand economic and financial reality. This field of research seeks to elaborate sophisticated models that can help economists and financial analysts develop sound investment strategies, economic policies, etc. Therefore, the epistemological framework used in this field is clearly in line with the positivist paradigm, which is based on the use of scientific methods for investigating an aspect of reality (Wicks & Freeman, 1998). Alternatively, social constructionism is a theoretical orientation that “assumes that reality is constructed via a dynamic, cultural, historical and political process” (Marshall, Kelder, & Perry, 2005). According to Marshall et al. (2005), “[i]t also accepts that [analysts] construct their own pictures of reality so that multiple subjective realities are possible in every ... situation ... [via] communication and negotiation between [individuals]”. For these authors, “[s]uch assumptions about reality lead to research designs ... that encourage richer, deeper and more realistic insights into research practices” (2005). Social constructionism has a social rather than an individual focus; it looks at how individuals construct their reality and how groups of individuals communicate and negotiate their individual perceptions of reality (Young & Collin, 2004). Following an analysis of the core concepts sustaining the positivist and social constructionist paradigms, a postgraduate program where econometrics is a major component should take into account both paradigms. Considering the current economic climate, future professionals in the field of economics and finance need to be equipped with advanced analytical skills, as their jobs will require
them to gather and analyze data, design appropriate models, and interpret the results obtained in order to disseminate their findings to a wide audience.

In view of the factors outlined above, the developed study has been heavily influenced by positivist and social constructionist paradigms.

**Methods and Methodology**

This study took place during the 2010/11 academic year, with the main objective of gathering enough information to facilitate the creation of an efficient application (website and app) that could be used by students with an iPad or iPhone, smart phone or appropriate mobile devices to support students’ learning. The study was carried out with a group of 22 students undertaking an MSc in Finance at DIT. The researcher chose to use the iPad device, as it would provide a good opportunity to assess the features of this tool as well as the feasibility of its use in economics and finance programs. However, the affordability and availability of the iPad for students was considered as an important limitation to this learning strategy, especially during the current economic climate where many families are suffering monetary constraints. This should be considered in the years to come, as the current economic situation will probably put major restrictions on individuals for the foreseeable future. Being aware of this issue, and in consideration of those who do not have an iPad, the iPhone was also used to assess the effectiveness of the designed application.

This study was carried out in three main phases: a) During the first semester (September 2010 to February 2011) the website and the app for the iPad/iPhone were designed with the aim of creating a resource that would support and facilitate student learning experiences in their “Econometrics 2 with Time Series Analysis” module. The main task consisted of adjusting the module’s material to the device, and making sure that everything needed to complete the course successfully was available in the website and app. b) The students undertaking the Econometrics module during the second semester of the academic year 2010/11 (February 2011 to May 2011) were exposed to the learning website and app, where three sessions were offered to allow students use and understand them and interact with them on their iPad/iPhone. It is important to bear in mind that not every student had access to an iPad/iPhone, so the researcher gave them a loan of an iPad during this seven day period, so every student was able to test the website and the app. c) Finally, the evaluation of the website and app took place. The study was supported with two main surveys where a selection of ten students (from the MSc in Finance) and five lecturers (specialized in Economics and Finance) were chosen to assess the learning website and the app. The first assessment consisted of a general survey, where ten students undertaking the module were asked to fill out a questionnaire. The questionnaire was designed to: 1) assess the website and the app, 2) find out whether or not students perceived any kind of improvement in their learning as a result of using the website and app, and 3) find out whether or not students’ felt that classes should be supported with this type of technology in the future. With this questionnaire the researcher was able to obtain information that would further improve the website and the app and evaluate whether or not this type of learning strategy should be used in other modules. The second phase of the assessment process was considered of great importance for this study as it allowed
the researcher gain alternative views on the website and the app from the lecturing team in Economics/Finance. In this way, it was possible to obtain objective information from the academic community that would enrich the data gathered.

Research Sample Analysis

The proposed study was carried out in the 2010/11 academic year with a sample of ten students attending the MSc in Finance at DIT. The sample selection was based on the following criteria: 1) students should attend classes regularly and be aware of the material that is covered during the course. 2) Students should be familiar with the econometrics software and its role in the module. 3) Students should be able to address basic issues in econometrics and understand how mobile technologies can be used to support their learning process. The sample selection was based on these criteria as the researcher wanted to avoid any bias derived from students that were frequently absent from the classroom and do not have the skills to provide a reliable assessment of the learning material created by the researcher. The sample of postgraduate students finally selected was deemed optimal as they attend classes regularly and have the basic skills to assess the learning website and app designed for the module. It was anticipated that feedback and assistance could be provided to this group when needed as interaction with them was good. Moreover, adjustments to the research process would be possible when considered appropriate. Finally, it would be easy to overcome issues related to the access of the mobile devices used on this study in view of the fact that the researcher was working with this group of students during the whole academic year.

Data Collection Methods

This study used both qualitative (participant observation) and quantitative (questionnaires) data collection methods. Qualitative research is appropriate for researchers who seek to understand, rather than explain or predict behavior (Hogan, Dolan, & Donnelly, 2009). It is a particularly useful method when the issue under investigation is in its infancy. In qualitative research it is important that the researcher is sensitive to the perspectives of the participants in the study (Morehouse, 2011; Saldana, 2009). In this way, purposive samples can provide useful descriptive data. Random data, on the other hand, are useful when a researcher seeks to explain or predict something, rather than describe its nature (Bloomberg, 2008). Taking this into account, this study used observational methods at different stages of the project, as the iPad is a device that has only recently been introduced to the market. Therefore important limitations with regard to the possibility of drawing comparisons with other research were present.

Observational techniques were considered appropriate for this research project, as they are useful for a wide range of research problems in social sciences. Jorgensen (1989, p. 13) suggested that observational techniques can be effectively used to collect in-depth information, as this approach provides rich insights into the participants reactions. In addition, this technique can be considered sensitive to the analytical environment as it gives the researcher access to the assessment of a situation where little knowledge exists, as is the case for this project where the iPad was tested in a financial environment.

The data collection analysis took into account the disadvantages of using observational techniques in this study, which can be identified as follows: 1) Reliability
tends to be lower when data is gathered via observational techniques, as two people do not see the world in exactly the same way; each individual has different preconceptions, prejudices and preferences. Therefore each person will interpret what they see differently.

2) Another aspect to consider was the validity of this study. Validity tends to be lower when using the observational paradigm as the observer impressions might be subject to his/her own interpretations.

In order to minimize the drawbacks associated with observational methods, two different groups were targeted: students and lecturers. In addition, structured and unstructured questionnaires were used to supplement and support the data collection process. The study began with a direct interaction between the researcher and her respondent groups (students and lecturers). The main objective was to identify students' and lecturers' views on mobile learning and the use of mobile devices to support the finance discipline. Structured questionnaires were also designed to provide an appropriate structure to the research process and to try to minimise the variability of responses obtained from the unstructured interviews. Therefore, participants (students and lecturers) were asked to complete a final questionnaire designed to assess their learning experience. This questionnaire was voluntary and anonymous in order to preserve participants' rights and to comply with DIT ethics policies.

Research Design

Case study

Qualitative case studies provide researchers with the tools to explore complex phenomena, and can be used to improve our understanding of how teachers can develop and implement teaching techniques that enhance students' learning experience. According to Baxter and Jack (2008):

Case-study research is more than simply conducting research on a single individual or situation: a case study has the potential to incorporate aspects of both simple and complex situations. It enables the researcher to answer “how” and “why” type questions, while taking into consideration how a phenomenon is influenced by the context in which it is situated. (p. 556).

In addition, and with the aim to strengthen the research findings, it was deemed appropriate to combine a number of research methods. Consequently, the concept of “triangulation” comes into its own, as this type of approach is characterized by the act of combining several research methods to study a particular issue (Kennedy, 2009). Densin (1978; as cited in Jick, 1979) defined triangulation as “the combination of methodologies in the study of the same phenomenon.” Thus, through the combination of a case study based on observational methods that were supported by structured and unstructured interviews that target sample groups, the researcher was able to find a balance that helped provide rich and meaningful results.
The present case study is based on a group of 22 postgraduate students (during the second semester of the academic year 2010-11 as outlined above) undertaking the MSc in Finance at DIT. Mobile technologies were introduced to support lectures during a period of one month with the aim of exploring whether this tool would help to enhance students’ learning in econometrics. The sample used for the case study was chosen out of previous experience: the author has taught econometrics at different levels in the Institute postgraduate programs for four years (September, 2008 to May, 2011). During this time it was observed that students’ participation and understanding during classes was very low. The majority of students experienced problems following class discussions and adjusting to the new material being presented week after week. This lack of interaction and low performance among the students was a clear sign that there was a problem with the module as well as with the teaching technique used by the lecturer. It became apparent that something needed to be done to reduce the belief that Econometrics is a difficult subject, one which is hard to follow and understand. It was important to find a way to motivate students and generate interest in the subject.

After teaching this module for quite a long time the researcher found clear evidence that the students tended to struggle with the course material, and were limited in their application of basic concepts. It was also discovered that, in general, students undertaking this module showed poor critical thinking skills when dealing with financial and economic issues. This has translated into poor results on their assignments and final exam. Consequently, the author of this study considered it appropriate to develop a learning artefact (website and app) that would address these issues by supporting the students’ ability to learn anywhere, anytime. The main idea was to create a personalized application that could be used by students in their own time, without any kind of pressure or imposed requirement.

**Learning artifact**

This research project was supported by the creation of a learning artefact that combined two approaches: a website and an app to be used on an iPad. The website was designed to support class material and could be accessed by students from their computers or mobile devices. The website was structured with a front page that provides basic details on econometrics theory and modeling. Links and tabs that gave the user access to the theoretical material, tutorials and video demos were shown on the front page. In addition, secondary web pages were developed to organize and support all the individual lessons that students should cover to gain a basic understanding on econometrics. An app was designed to support and add value to the website. The aim of the app was to facilitate alternative access to the learning material on the website using an iPad.

The process of developing the website and app was quite laborious and took a significant amount of time and resources. This is important to highlight as it raises issues with regard to the feasibility of using these types of teaching approach in higher education. In addition, taking into account the current economic climate, lecturers face limitations with regard to the technologies, gadgets, etc., that can be purchased to support their teaching programs. As higher education is affected by major cuts with regard to staff and resources, it seems that this type of teaching and learning approach might not be considered efficient in the present economic climate.
Research Findings

This section provides some general comments on the research main outcomes of this study. The initial phase of this analysis lasted for nine months, during which time the researcher created the learning material (lecture notes, the website and app) to evaluate the use of the new technologies in postgraduate courses in the area of finance. Once the material was completed, students and lecturers were able to interact with the website over a period of one month, and with the app for seven days. It was considered that this time frame allowed all participants to interact with the learning material long enough to be able to conduct an appropriate assessment of it.

The main findings are divided into two sections: Firstly, the results obtained from the students’ assessment of the website and the app is briefly discussed. Secondly, the results from the lecturers’ evaluation of the website and the app are presented.

Student Results

The main findings of this study are based on the assessment provided by a sample of seven students undertaking the MSc in Finance at DIT. As ten students were initially approached and only seven chose to do so, we had a participation rate of 70%. The results showed that all students that participated in this project owned a mobile phone. This is an important result and was used by the researcher to further explore the type of technology used by the sampled students. The results showed that 57.14% of the students did not own a smart phone, while 42.86% did. This is an important limitation with regard to the use of latest technologies to support students’ learning, as it might be that not all of them are able to afford the required technology used to support the course.

Overall, the answers provided by the students to the distributed questionnaire that participated in this study assessing the benefits of mobile learning in finance have been very helpful and encouraging. The results from the student questionnaire have identified important limitations with regard to the use of technologies to support student learning. For instance, it is important to highlight the limited access that some students have with regard to newest technologies and devices. On the other hand, this study has identified great potential with regard to the use of mobile technologies and their integration into postgraduate classes, and that students are very receptive to ICT and their role in education. In addition, students’ assessment of the website and app created by the researcher has been very positive; it is clear that this type of resource adds value to the students’ learning process. As a result, new technologies should be considered useful as a teaching support and, if possible, should be used by lecturers in their teaching routines.

The results from the students’ evaluation suggest that the learning artifact created was an effective tool for changing the class dynamics, as it provided an alternative to the traditional learning approach where students assumed a very passive attitude. Overall, the use of mobile technologies helped provide an environment where students were more relaxed and less apprehensive. In general, the majority of students that participated in this project enjoyed the experience and considered that a website would add value to their
learning, as they would be able to access the material “anywhere” and at “anytime” they chose.

In terms of improving or motivating students’ critical thinking skills, the results were not conclusive as the project took part during the second semester of the course and it was not possible to assess whether the artifact contributed to the improvement of these skills.

**Academic Staff Results**

In general, the lecturers that took part on this project agreed that the website and the app provided a refresher course in basic econometrics and showed the student how to use Eviews. It was highlighted by one of the lecturers that the website and app helped build on students’ learning. For instance, one lecturer stated that “the term scaffolding-learning process is very apt particularly in relation to the Eviews section – the material is built in a logical fashion and it provides the means to access much more uses/applications of Eviews.” In addition, the lecturers concluded that the use of the website, combined with PC tables, smart phones, or any appropriate mobile technology would allow for greater flexibility, better scope for interaction among students, and more time for reflection on the course material. Furthermore, it was considered that the project allowed for a review/rethink of what lecturers in economics/finance are doing in their classrooms and in particular how teaching and learning is being developed.

To conclude, this study has provided evidence for the role of mobile technologies in higher education Institutions and how professionals in the educational sector need to be aware of the role of ICT and mobile technologies in the classroom. In line with Friedman (2005), the key drivers for success include economic competition and technological advances. Hence, the educational system needs to adjust by integrating new technologies into their program structures and training if they do not want to be left behind.

**Conclusions, Limitations and Further Research**

The present study explored the use of mobile technologies inside and outside the classroom as a way of promoting and developing independent learning and critical thinking skills in students undertaking postgraduate courses in economics and/or finance. The case study comprised students attending an MSc in Finance at DIT where econometrics is a major component, as well as lecturers in economics and finance that offered their views on the learning artifact.

The results of this study clearly support the use of mobile technologies in the classroom; mobile technologies can encourage and motivate self-directed learning making the learning process more enjoyable and interesting for students. Overall, students and lecturers recommended the use of mobile technologies to support classes. On the other hand, this study highlighted some potential problems with the use of technology in the classroom, as the introduction of new technology may lead students becoming distracted from the actual course material under study. This finding is consistent with Pew’s (2007) study which highlighted that is quite common that inappropriate teaching methods are
used in higher education. In particular, Pew argued that it’s possible that the use of technology in the classroom diverts attention away from the key activities that the teacher and the students should be concentrating on. As a result, the course interest can lie in the technological aspects of the course rather than in the designed content.

The present study provides some encouraging evidence that mLearning has an important role to play in higher education, with the potential of changing the dynamics in the learning environment, supporting active learning in the classroom, and encouraging self-directed learning outside of it. However, it is still unclear as to whether these types of technologies are an effective means of encouraging and promoting autonomous learning. This study did not include an assessment of whether students’ analytical skills, critical thinking skills, application of financial data, and exam performance improved as a result of using mobile technologies to support the learning experience.

**Study Limitations**

A number of limitations were identified on this project: Firstly, this study was concerned with the use of three different learning and teaching methods (a website, an app and traditional teaching) of supporting academic performance with the same sample of students over one semester without using a control group. The use of mobile technologies and a learning artifact were introduced during the second semester of the academic year 2010/11, when students were already receiving feedback and instruction in relation to their work in econometrics. This meant that a learning process had already taken place, and it was not possible to ascertain the extent of the effect that mobile technologies had on students’ performance. A second aspect to be considered is the teacher’s inexperience in using these devices and technologies to support teaching, which may have also impeded their full potential. In addition, the teacher had to monitor and provide support to help students understand the learning tools and it is possible that this influenced the students’ learning process and assessment of the tools. Moreover, an in line with Kukulska-Hume (2009) and Harris (2009), there are important points to consider if we are to achieve success in this domain: i) the students’ and teachers’ “real” literacy in ICT and how to integrate it in their learning and teaching. ii) the cost associated with adjusting the classroom to the continuous advances and progress in new technologies. iii) time constraints associated with teachers’ other work responsibilities (i.e., teaching, office hours, administrative duties, research, etc.). These issues need to be considered in order to draw robust conclusions on the potential of mobile technologies to improve the learning experience.

**Further Research**

Taking into account the points discussed above, it is clear that further research is necessary to assess the “real” potential of mobile technologies to improve and motivate students’ learning in econometrics. Future research should explore strategies of integrating the type of learning artifact developed in this study as a tool to be integrated in the classroom in a way that is effective and efficient, rather than using it solely to help relax the classroom atmosphere. Future research should consider using a sample of students who have had little exposure to econometrics. Moreover, future research should explore how to manage and integrate these devices in the classroom in order to minimize
distraction and maximize learning, a point highlighted by Banister (2010). Another issue suggested by Peters (2007) is how the limitations that age, ability, and time can affect the teacher’s ability to integrate these technologies in their teaching routines. An investigation of these factors will further our understanding as to whether the introduction of new technologies in the classroom is viable.

References


Lucia Morales - What is mLearning and how can it be used to support learning and teaching in Econometrics?

International Review of Research in Open and Distance Learning, 8(2), 1-16.


Educational Attainment: Success to the Successful

Peter Anthony, David Gould and Gina Smith
Walden University, United States (peter.anthony@waldenu.edu)

Abstract
Systems archetypes are patterns of structure found in systems that are helpful in understanding some of the dynamics within them. The intent was to examine educational attainment data using the success-to-the-successful archetype as a model to see if it helps to explain the inequality observed in the data. Findings indicated that this archetype is useful in explaining the variation, and there are several other terms and concepts that are helpful as well as the terms / concepts: success-to-the-successful, the rich get richer, Pareto’s law, Zipf’s law, and power law distributions are related and sometimes used interchangeably.

Systems archetypes are, as Senge (2006) noted, patterns of structure found in artificial, natural, and social systems. These archetypes, few in number, provide a toolkit for thinking about social systems such as corporations, government agencies, military organizations, and educational institutions, among others. These archetypes are helpful in understanding patterns of structure within systems. This article considers one specific archetype, success-to-the-successful (STS), to examine educational attainment level in the United States.

Meadows (2008) described STS as competition for resources. Whether in business, education, or even ecology; those who are successful attaining the most resources tend to expand their success further and further, sometimes at the expense of those who have minimal resources. In business, leaders use knowledge, experience, and organizational politics to expand their success. Meadows provides an example of the game of Monopoly that resembles business success where players compete to buy property and expand hotels that bring more and more success as the game continues. In education, how successful students are depends on availability of resources to expand knowledge, including availability of quality schools and teachers, personal desire to learn, financial status, and family and community support. In ecology, animals compete for food and safety to determine which animal rises to the success of the successful status. All walks of life compete for resources and those who are the successful will have more resources to continue to be more and more successful.

KEYWORDS: School systems, systems archetypes, success to the successful archetype, educational attainment.
Schools are Social Systems

Schools, from grade school to universities, are complex adaptive social systems, wherein a system is a set of components operating for a common purpose (Forrester, 1971), and complex adaptive systems are those exhibiting adaptation (altering behavior for survival), signal or information processing (Mitchell, 2009), competition / cooperation, and resilience, among other characteristics. Complex adaptive systems or CAS exist in an environment that includes the economy, technology, society, government, and legal, and the physical environment wherein each of these five environmental elements is itself a complex adaptive system. CAS are perturbed by changes within and among these environmental elements. Thus, a CAS is not at equilibrium, but is continually processing environmental signals or information, adapting to outside influences (threats, opportunities, or exhibiting resilience to disruptions), while CAS components interact and adapt to other internal components.

Examining school systems through the lens of complexity is of interest as general systems’ characteristics can be identified within specific systems and, thus, subsequently described. Consider the changing environment of a school system. Economic forces affect available funding, which affect school budgets for salaries, school supplies, and building maintenance. Hardware technology advances such as personal computers, tablets, and smart phones; communication technologies such as the Internet and wireless networks; and software products such as search engines, word processors, statistical packages, simulation packages, and academic courses; among other digital advances such as eBooks, offer new challenges to schools in terms of educational tools, techniques, and even the physical location. Emerging technologies such as robotics; 3D printing; virtual labs; and the digitization of biology, chemistry, and physics; simulation; and artificial intelligence will bring even more changes. Societal changes such as changing demographics; attitudes toward women, immigration, and sexual orientation; along with increased potential mobility affect school systems in various ways as well. Government tinkering with policy changes affects schools in having to adapt to a new policy flavor every few years. Finally, physical environmental changes affect school systems directly or indirectly given various societal responses. For example, Hoffman (2012) noted, while there is scientific consensus on climate change, there is little public consensus that the climate is changing. This notion of a culture war may well lead to some controversy over teaching methods in schools, not to mention the current conflicting discussion in public forums. Increasing traffic congestion and busing within major cities are other physical environmental changes affecting schools systems. Taken together, these changes could appear to be more than challenging to a school system.

Primary components of schools include students, faculty, administrators, parents, and policy makers. These groups interact and adapt to each other, as well as to the external environment, as they process information in a changing world to make decisions today and for
tomorrow. For example, if some students have access to advanced technology, what should be done for those who do not have such access? This simple question becomes more interesting when grades are given as grades affect what students might do throughout their lives. This question will become even more interesting when some students have access to artificial intelligence or other advanced technologies and other students do not.

Systems exhibit resilience if they are to survive. School systems exhibit resilience by adhering to established policies, procedures, and culture to resist environmental change. One such school policy might be, not invented here; that is, policies not originating with the school system are not of value and may be a threat. Schools may strive to maintain their culture including pay structure, reward structure, values, and such. For example, schools reward students with academic grades, praise, promotion to the next class in sequence, among others and reward faculty with tenure, pay raises, and promotions. Rewards are for good behavior or following the established rules of norms, values, and conduct—essentially adhering to the established culture.

**Success to the Successful Archetype**

The STS archetype describes a pattern wherein competing groups or individuals for limited resources gain some advantage and, over time, if this advantage continues, one group or individual can significantly outperform the other group or individual. The reward is not so much as being better, but first. This behavior can be observed in school systems, wherein good behavior or performance (adhering to established rules, values, norms, and expectations) are rewarded with good grades. Students compete for grades—a limited resource—and those most successful throughout high school not only have good grades, but also have an opportunity to go on to college if the entry-level criteria is met or exceeded, as there is a limited resource—space in college, especially good colleges. The process is repeated at the undergraduate level and those students most successful have an opportunity to go on to graduate school, and then perhaps to complete a terminal degree. See the success-to-the-successful archetype in Figure 1 for a generic model. This concept is sometimes referred to as the rich get richer or Pareto’s law. That is, given a set of students in this case, the success-to-the-successful archetype expects that the distribution of degrees or educational attainment would follow Pareto’s law, where few students would achieve an advanced degree but most would have something less. Adamic (2002) noted that other terms used to describe these phenomena are Zipf’s law and power-law distributions. In each case, few agents have most while most agents have less, or few events rarely occur while most events occur more frequently. For example, few people have most of the wealth, while most people have far less; a few cities are very large, more cities are mid-sized, and most are small towns.

Historical data related to educational attainment, from Kindergarten through advanced higher education, shows success is not only an individual’s effort, but also the effort and processes from multiple stakeholders (Smith, Anthony, Elliot, Davis, 2009).
Data Collection

We collected secondary data from the United States Census Bureau for the United States, as well as for the States of Georgia and Washington as specific examples—see Tables 1, 2, and 3. This data covers the years 1990 to 2009. Educational attainment levels in 2009 were somewhat higher than year 2000, which in turn were somewhat higher than 1990, thus a gradual increase in educational attainment over this timeframe.

Findings

We prepared three tables covering years 1990, 2000, and 2009 with data from Georgia and Washington states as representative states, and the United States overall. Each table presents two degree levels and one diploma level: a high school diploma, a bachelor’s degree, and an advanced degree—a master’s or doctorate degree. These numbers are for adults over the age of 25.
Table 1. Educational Attainment – 1990 (United States Census Bureau, 2012)

<table>
<thead>
<tr>
<th></th>
<th>Advanced Degree</th>
<th>Bachelors</th>
<th>High School</th>
</tr>
</thead>
<tbody>
<tr>
<td>WA</td>
<td>7.0%</td>
<td>22.9%</td>
<td>83.8%</td>
</tr>
<tr>
<td>GA</td>
<td>6.4%</td>
<td>19.3%</td>
<td>70.9%</td>
</tr>
<tr>
<td>US</td>
<td>7.2%</td>
<td>20.3%</td>
<td>75.2%</td>
</tr>
</tbody>
</table>

Table 2. Educational Attainment – 2000 (United States Census Bureau, 2012)

<table>
<thead>
<tr>
<th></th>
<th>Advanced Degree</th>
<th>Bachelors</th>
<th>High School</th>
</tr>
</thead>
<tbody>
<tr>
<td>WA</td>
<td>9.3%</td>
<td>27.7%</td>
<td>87.1%</td>
</tr>
<tr>
<td>GA</td>
<td>8.3%</td>
<td>24.3%</td>
<td>78.6%</td>
</tr>
<tr>
<td>US</td>
<td>8.9%</td>
<td>24.4%</td>
<td>80.4%</td>
</tr>
</tbody>
</table>

Table 3. Educational Attainment – 2009 (United States Census Bureau, 2012)

<table>
<thead>
<tr>
<th></th>
<th>Advanced Degree</th>
<th>Bachelors</th>
<th>High School</th>
</tr>
</thead>
<tbody>
<tr>
<td>WA</td>
<td>11.1%</td>
<td>31%</td>
<td>89.7%</td>
</tr>
<tr>
<td>GA</td>
<td>9.9%</td>
<td>27.5%</td>
<td>83.9%</td>
</tr>
<tr>
<td>US</td>
<td>10.3%</td>
<td>27.9%</td>
<td>85.3%</td>
</tr>
</tbody>
</table>

Success to the Successful

The percentage of degrees follows the pattern expected by the STS archetype or Pareto’s law based on observation of the data, wherein the advanced degree level falls within the 20% range and the bachelor’s degree to a high school diploma fall into the 80% range. Factors that people have control over such as wealth attainment, income, and popularity also follow the pattern expected by the STS archetype or Pareto’s law as well for the same reasons. While factors such as drive, motivation, family success, competitiveness, role models, opportunity, and so on also contribute to educational attainment levels, grades earned by students are earned in part by student effort, something a student can control. The STS archetype seems a useful model to help explain the educational distribution of grades and subsequent educational attainment of students.

The STS system exists in the schools system (k-12 and higher education) thematically as a whole-system of stakeholders that all should contribute to students’ success and continued success. Smith, Anthony, Elliott, and Davis (2009) suggest the following stakeholders impact the success of students: Educational leadership, teachers, family, community, and the student.
Yukl (2006) addressed awareness of self and accountability of individual efforts as a catalyst for success. Smith et al. (2009) presented shared success in the K-12 and higher education school system with the following themes:

1. Educational leaders need to develop and provide high quality curriculum and programs that represent the technology and future needs of industry to ensure students have the opportunity to learn what is necessary for success.

2. K-12 teachers and higher education professors need to provide innovative facilitation, quality feedback, caring attitude, and genuine desire to provide the necessary information for students to embrace for success.

3. Family (home environment) needs to be supportive with a caring attitude, financial support, knowledge equivalent to or higher than the educational goals of their student family member...or provide opportunities for mentors with the knowledge and skills, to provide emotional support so students’ minds can focus on the educational opportunities.

4. Community and social support. Business leaders, community groups, and educational leaders need to collaborate to fill any gaps in knowledge, emotional, and financial needs.

5. Students need to exhibit personal accountability. If all stakeholders identified in these five themes share and collaborate all stakeholders share in STS.

With these themes collaboratively shared amongst all stakeholders, a supportive stakeholder community helped students’ succeed and work through the philosophy behind STS.

The combined efforts of multiple stakeholders can be described with the following acronym (Smith et al., 2009):

S—Sharing
U—Understanding
C—Caring
C—Creating
E—Engaging
S—Students brings
S—Success

Conclusions

From a uniform distribution of student performance in the first grade, the distribution changes remarkably as the quest for higher education continues. This distribution curve is influenced by competition for a limited resource (grades and admission to college and graduate school) along with student interest, drive, access to funding, and intellect and the resulting pattern follows
Pareto’s law or the STS archetype, wherein approximately 7% of adults have an advanced degree, about 28% have a bachelor’s degree, and about 85% have a high school education.

References


Rodrigo Polanco-Bueno
Universidad del Valle de México, México (rodrigo.polancob@uvmnet.edu)

Abstract
This paper reports on a teacher training experience for College professors in which participants were trained, taking advantage of technological tools, in two main teaching competences. First, professors were trained to use technology to enrich students’ learning outcomes. Second, they applied strategies of significant learning in the design of students’ learning experiences. The learning experience consisted in an International Certificate on Significant Learning integrated by six modules, 20 hours each. Every module of the program consisted of two consecutive webinars with online activities in between. The results showed the positive impact of the program on participants perceptions about the quality of the contents, evidence of learning and products (E-portfolios) that served as content mastery evidences, as well as learning products produced by their students.

Keywords: Webinar, Blogs, Significant Learning, Higher Education, Teacher Training.

The teaching task in Higher Education represents a significant challenge. Most Higher Education professors are excellent scholars, without any training in the competencies required to deal with the complexities of the teaching and learning phenomena. As a response to this state of affairs, Laureate International Universities has sponsored several initiatives addressed to strength teachers’ abilities to manage the teaching-learning processes. One of those initiatives was the foundation of the Center of Academic Excellence at the Universidad del Valle de Mexico in 2008 and, almost simultaneously, the beginning of the different teacher development opportunities offered by Laureate Network Products and Services (LNPS), a division within the Laureate International Universities network.

Both initiatives have two assumptions in common: their trust in active learning and their emphasis in technology. Both assumptions are in concordance with the educational models of the different universities belonging to the Laureate International Universities network. On the one hand, current pedagogical and psychological research has shown that learning is most effective when students are active participants in their learning process rather than mere receptacles of information (e.g., Benware & Deci, 1984; Gibbs & McCoffey, 2004; Prince, 2004). On the other hand, the explosion of technological advances has produced a significant shift in education in several ways. First of all, the nature of students is

---

1 The author wishes to thank Irma Merino, Mónica Porres, Elisa Flores, Sandra Moreno, Mirna Martínez and Karen Garcia for their help as instructor assistants; and to Ana Curts for her valuable comments to the manuscript.
significantly and increasingly different from the past. Nowadays, students belong to the so-called digital generation, meaning that they are digital natives. For them technology is not an option: it is their natural environment. Second, technology has broadened the possibilities for designing new learning experiences in such a way that professors often feel anxious and threatened by a powerful tool they do not know how to use to its full extent. Finally, these circumstances have reinforced the need to update teachers’ skills so they can take advantage of the opportunities of technology for designing learning environments that promote significant learning outcomes in students.

In a previous paper, Polanco and Merino (2011) described a training program for college teachers, which makes use of blogs and webinars to enhance instructors’ abilities to promote significant learning in their students. The aim of the current paper is to report on this experience and to share the results of its impact on professors’ teaching practices.

The teacher training experience was sponsored by LNPS and carried out at the Universidad Del Valle de México (UVM), the largest private university, both in Mexico and in the Laureate International Universities network. UVM is a multi-campus university network of more than 110,000 students, with nearly 9,000 teachers in 38 campuses. The size and complexity of UVM, as well as its membership to an international organization, opened an additional unique opportunity: to create a global program. In this context, an International Certificate on Significant Learning for higher education teachers was developed. The program is organized in six modules, each consisting of 20 hours, adding up to 120 hours.

**Description of the Program**

The International Certificate on Significant Learning (ICSL) is a one-year program composed of six modules demanding 120 hours of effective work from the participants. The program is intended to be a response to the demands and difficulties that professors face in their daily activities in the classroom. Some of the main difficulties detected in our teachers are: low motivation for learning from their students; superficial learning and excessive memorizing (Biggs, 1987; Rhem, 1995); and the huge boredom that students experience when they have to learn lots of information, which make no sense to their own interests and which do not answer their own queries.

**General Objective of the Program**

According to this needs-detection, the objective of the Certificate was defined and based on the principles and strategies of significant learning (Ausubel, 1960; Badia, 2011; Bandura, 1986; Baxter-Magolda, 2000; Bustos Sánchez & Coll Salvador, 2010; Bustos Sánchez, Coll Salvador, & Engel Rocamora, 2009; Coll & Monereo, 2008; Diaz-Barriga, 2006; Díaz-Barriga & Hernández Rojas, 2004; Dillon, 1988; Haskell, 2001; Hernández Rojas, 2009; Omrod, 1999; Richardson, 2002; Schön, 1983; Vosniadou & Ortony, 1989). This approach holds a substantial number of didactic strategies that help teachers design and build significant learning experiences. These strategies have two main characteristics. First, they originate from the students’ reference framework (considering their previous knowledge, questions, and interests), which helps students construct their new knowledge from them. Secondly, the learning experience seeks to help students create structures of knowledge that in turn favor deep learning of contents.
The objective of the Certificate states that “at the end of the program, the participant will be able to design significant learning experiences in order to generate in their students long lasting knowledge and motivation towards learning.”

Teachers were to develop and show at the end of each module competencies to design learning experiences that recover student’s interests, questions, interpretations, and previous knowledge. These competences would allow professors to:

1. Plan activities to organize and represent contents on the basis of significant learning principles.
2. Build potentially significant learning materials.
3. Design individual and group significant learning outcome experiences.
4. Promote alternatives for significant learning using information and communication technologies.
5. Assess the process of teaching-learning using the tools of significant learning outcomes.

**The Program in Action**

One of the main goals of the program was to offer a training opportunity that allowed Laureate professors to improve their teaching strategies by means of an online learning environment, enabling them to combine their continuous learning with their daily work. Hence, two simple, flexible, fast, and low-cost technological tools were selected. On the one hand, blogs were used to design asynchronous learning activities and, on the other, webinars for synchronous experiences. Accordingly, the ICSL program was designed in an online modality that combined synchronous and asynchronous learning experiences through 6 modules that lasted approximately one and a half months, whereby two activities were combined, as shown in figure 1.

![Figure 1. Structure of the modules on the ICSL.](image)

- **Synchronous activity (Webinar):** two Live-Meeting video-conferences, identified as webinars (seminars on the web). An introductory 2-hour webinar, in which the instructor introduced the topic of the module establishing the learning goals; followed by another one halfway the module, where the instructor reinforced learning by providing new examples and *on the air* exercises.
- **Asynchronous activity (blog):** activities such as online reading, discussion boards, and didactic material design to be used by teachers during their classes, which were carried out by means of EduBlogs. Two eight-hour asynchronous activities
were introduced: One, immediately after the introductory webinar, and the other half way the module, right after the second webinar.

In summary, each module started with a two-hour webinar, followed by a first block of online activities. These activities were carried out by the participants throughout two weeks and required approximately 8 work hours. Once the first block of online activities finished, the cycle repeated: a second 2-hour webinar and a second block of online activities took place for two additional weeks.

Webinar as a Tool of Synchronous Distance Learning

As described in the structure of the Certificate, the instructor “meets” the participants of the program at the beginning and halfway the module, in a virtual way through webinars. Those sessions ensure several objectives. First, and in particular during the initial sessions of each module, the goal of the webinar was to present the most significant concepts and notions to the participants. During a webinar session, the screen shows a PowerPoint presentation with the course content as well as (optionally) the image of the instructor transmitted through a live webcam.

Secondly, webinars give the participants the opportunity to interact with their instructor or with their classmates along the session through chats, microphones, videos, and written questions. This interaction can occur in two ways: by means of question and answer sessions, or the participation of teachers in the exercises suggested by the instructor (e.g., polls, asking participants for examples or opinions on a particular topic, or sharing experiences, etc.). In both cases, the intervention of the participant can be written (in a chat), through audio only, or through audio and video.

An interesting possibility of interaction during webinars was the use of surveys. This is a very versatile tool that allows collecting real time information in a fast and precise way with different purposes, such as that of reporting the percentage of the answers selected by the participants. In this particular case, surveys were used for self-assessing participants’ previous knowledge, as well as an instrument for gathering opinions, points of view, and information about different aspects of the learning experiences. One of the advantages of this tool is its capacity to report real time results of the survey responses.

At the end of each webinar, this survey tool was used as a session assessment device. Those surveys revolve around questions about the usefulness of the information received, how much their expectations were covered, and if the conditions in which the webinar session took place, were satisfying. In the same way as other surveys, the results can be shared in real time or not shown.

Blog as a Tool of Asynchronous Distance Learning

The instructional design of the Certificate attempted to be congruent with its content. Therefore, it was based on methodologies which, with the support of Information and Communication Technologies (ICT), intended to achieve significant learning. Among the available technological tools, EduBlogs (Educational Blogs) was selected. This tool is a blog that has been adapted for educational purposes. Its main characteristic is to present information on only one screen, where the user finds all the course content, learning
activities, reading materials, didactic support, references, and glossary. Participants can also access discussion forums in which they can exchange opinions and experiences with their classmates.

During the asynchronous sections of each module of the ICSL, each participant had access to the course site through EduBlogs and, consequently, to the activities of the module. During each of these activities, participants had to develop several learning activities, mainly consisting in:

1. Reading relevant texts on significant learning.
2. Participating in discussion forums in which they had to exchange points of view and share experiences relevant to the text.
3. Designing significant learning experiences and significant learning materials for their own students.
4. Making personal reflections of their individual learning experience and their learning outcomes.

The end products of the design of learning experiences and materials (see number 3 above) were uploaded to an electronic portfolio. They constituted the learning evidence for each participant, and they also constituted an opportunity for teachers to put into practice their own learning in a direct and immediate way. Additionally, they had the chance to receive feedback from the instructor and from their classmates, which in turn allowed them to self-monitor their advancement and achievement.

Characteristics of the Teachers Participating in the Program

A multicultural aspect was the distinctiveness of the program achieved by the enrollment of 105 active teachers of different nationalities from diverse universities (mainly Latin American) and fields of specialty. Table 1 depicts the participants of the program.

The diverse nationalities of the participants, their context, experience, age, and learning need lead the decision of the kind of technology and educational schemes to be used across the Program. The latter attempted to bring avant-garde training to the professors while responding to their needs.

Results

Participants’ Perceptions about the Quality of Webinar Sessions

In order to assess the participants’ views about the quality of the contents discussed during the webinar meetings, two kinds of opinion polls were applied at the end of the sessions. The first poll asked the participants to choose (from 6 options) the one that best described their opinion about the quality of the information obtained during each webinar. The options were: useful to my work, unbiased, easy to understand, all the previous options, and useless.
Table 1. Countries of origin and fields of specialization of the participants.

<table>
<thead>
<tr>
<th>Country</th>
<th>Field</th>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costa Rica</td>
<td>Engineering</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Health</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Social Science</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Business</td>
<td>3</td>
</tr>
<tr>
<td>Honduras</td>
<td>Engineering</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Business</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Social Science</td>
<td>6</td>
</tr>
<tr>
<td>Peru</td>
<td>Health</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Social Science</td>
<td>4</td>
</tr>
<tr>
<td>Spain</td>
<td>Hospitality</td>
<td>1</td>
</tr>
<tr>
<td>México</td>
<td>Social Science</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Health</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Business</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Engineering</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Hospitality</td>
<td>14</td>
</tr>
</tbody>
</table>

Table 2. Percentage of participants selecting the different options for “quality of information” on the different webinars.

<table>
<thead>
<tr>
<th>Quality of information</th>
<th>Webinar</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Useful</td>
<td>38%</td>
</tr>
<tr>
<td>Opportune</td>
<td>15%</td>
</tr>
<tr>
<td>Unbiased</td>
<td>3%</td>
</tr>
<tr>
<td>Understandable</td>
<td>3%</td>
</tr>
<tr>
<td>All previous</td>
<td>41%</td>
</tr>
<tr>
<td>Useless</td>
<td>0%</td>
</tr>
</tbody>
</table>
Table 2 shows the distribution of choices in percentages. As can be seen, no participant selected the “useless” option. All the responses were on the “positive side” of the scale. Under these conditions, the results were difficult to interpret and the survey was interrupted after the seventh webinar. The second poll assessed the quality of the webinar content, by asking the participants if it fulfilled, did not fulfill, or exceeded their expectations. Table 3 portrays opinions concentrated mostly on the positive side (fulfilled or exceeded). A small percentage of participants in webinars 1, 5, 7, and 12 expressed that the content did not satisfy their expectancies.

Table 3. Percentage of participants selecting the different options for “quality of content” on the different webinars.

<table>
<thead>
<tr>
<th>Quality of contents</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did not fulfill my expectations</td>
<td>12%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>11%</td>
<td>0%</td>
<td>13%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>11%</td>
</tr>
<tr>
<td>Fulfilled my expectations</td>
<td>68%</td>
<td>97%</td>
<td>76%</td>
<td>78%</td>
<td>72%</td>
<td>86%</td>
<td>83%</td>
<td>71%</td>
<td>73%</td>
<td>86%</td>
<td>68%</td>
<td>77%</td>
</tr>
<tr>
<td>Exceeded my expectations</td>
<td>18%</td>
<td>2%</td>
<td>2%</td>
<td>21%</td>
<td>16%</td>
<td>13%</td>
<td>13%</td>
<td>28%</td>
<td>26%</td>
<td>13%</td>
<td>31%</td>
<td>11%</td>
</tr>
</tbody>
</table>

Participants’ Perception about Their Content Mastery: Diagnostic and Summative Evaluation

At the beginning of the Program, a diagnosis was made of the mastery level of certain contents and abilities of the participants. For that purpose, a survey was applied to the participants in which they had to rate their level of command of certain abilities related to the learning goals of the program.

The abilities measured were:

2. Ability to manage distributed collaborative learning.
3. Ability to manage online discussion boards.
4. Ability to use Google Sites for educational purposes.
5. Ability to use webinars for educational purposes.
6. Ability to use blogs for educational purposes.
7. Ability to design learning experiences to promote significant learning in students.
8. Ability to design learning experiences to recover previous experiences or knowledge from students.
The rating scale asked participants to rate their mastery level of each ability according to the following scale:

1. Null.
2. Beginner.
3. Advanced.

The same survey was applied once again after the program had finished. Figure 2 shows the distribution of the different mastery levels for the different abilities, both previously and after the Program.

![Figure 2. Participants’ pretest and posttest about their perceptions of the mastery of the program contents.](image)

Figure 6 reveals that the initial diagnostic ratings were concentrated mostly on the null and beginner side of the scale. Very few participants (in the case of abilities to use Google sites, none) considered themselves as advanced or experts on the different contents. On the other side, the advanced and expert levels prevailed once the program ended. The changes in the pretest-posttest ratings were especially conspicuous in the case of abilities related to self-regulation, distributed collaborative learning, discussion boards, significant learning and recovering previous learning, where no participant rated a null mastery level and the majority rated advanced and expert.

**Participants’ mastery of the program contents: formative assessment.**

During the webinar sessions, both at the beginning and end of each module, an online synchronous multiple-choice test was applied to the participants of the program. The test was applied “on the air” by means of the LiveMeeting polls tool. The test assessed the understanding of the main theoretical concepts and practical applications of the module contents. This assessment allowed estimating the percentage of correct answers before and after the module.

Figure 3 shows that the percentage of correct answers increased from pre-test to post-test in all modules. The greatest learning gains were observed in modules 1 and 2, in which the difference between pre-post were 69% and 64% respectively. Module 4, on the other hand, showed the lowest learning gain (only 9%). This may be due, at least in part, by
a “ceiling effect”. As can be seen in the graph, his module exhibited the highest (35%) score in the pre-test.

![Graph showing pre-test and post-test scores for different modules.](image)

**Figure 3. Participants’ pre-test and post-test about their evidenced mastery of the program contents.**

**Participants’ products and evidences.**

Finally, participants’ achievement of learning goals were assessed by means of E-portfolios created by means of Google Sites tools. In these E-portfolios participants collected the products of the assignments required during the different modules of the Program.

Even though each participant designed the structure of their E-portfolio, the following common elements were observed in all:

1. A section for personal introduction.
2. A section for collecting participant’s learning evidences. This section constituted the “core” of the E-portfolio.
3. A section for sharing with their partners notes, comments and recommended readings.

Some examples of evidences posted in the E-portfolio were essays in which participants applied the principles and methods of significant learning in the design of learning experiences for their own students. In other cases, participants designed conceptual maps or other kinds of graphic organizers to represent some contents of their own teaching fields. Other participants recorded videos of their own classes and posted them in You Tube while others posted students’ products and evidences of their learning.
Summary and Discussion

The results explained in the previous section showed that, in general terms, the program reached (in some cases exceeded) its learning goals. Participants judged that the quality of the program was good and its contents useful for their daily job. They also perceived significant changes in their mastery of the program contents. Besides that, objective mastery tests were coherent with participant's perceptions; they also exhibited pre-post changes in their skills and knowledge. Finally, the products that served as learning evidences corroborated the mastery of the program contents by the participants.

It could also be concluded that both technological tools, blogs and webinars, are flexible and intuitive enough for teachers, with few or no experience in the use of ICT, to learn how to use them in a creative and self-managed way to enrich their teaching and learning experiences. Although some advice and technological support was necessary for some participants during the initial period of the first module, most of them did not require any kind of help.

These conditions constituted a favorable scenario for using technological tools as learning vehicles that allowed the training of a large group of professors. It can then be said that technological resources and significant learning methodologies were used to train teachers on how to use them adequately. In other words, professors learned notably to use significant learning principles to generate meaningful learning experiences in their students, with the aid of technology.

There are two features that seem to have contributed considerably to the success of the program. First, the collaborative environment that served as the background of the program. Both, webinars and blogs allowed interaction between participants that enriched their learning experience. During webinars, participants shared “on the air” points of view, experiences and examples that enhanced their personal learning. During online periods, they exchanged their interpretations and points of view about the course readings with their partners, through the discussion boards. Besides that, they had the opportunity to exchange their products with their partners and to get feedback, both from them and from their instructor.

The second feature of the program that seemed to have contributed to their success was the international atmosphere. The collaborative tasks promoted cooperation between participants, which enriched their knowledge structures with the diverse experiences provided by their peers. However, this experience would not have been so rich without the “multiculturalism” which characterized the group of participants. This feature made the exchange of ideas to be far more diverse and richer.
References


