

SMEs and Open Innovation: Global Cases and Initiatives

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Chapter 8

Innovating Elite Undergraduate Education through Quality Continuous Improvement: A Learning Enterprise's eTransformation Perspective

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ABSTRACT

This chapter investigates a mechanism of organizational innovation serving to make sense of a maturing university community involving educational executives, academic staff, and students in the occasion of a new campus development, starting in the year 2009 and realizing in the year 2013, under the auspices of a national policy benefiting the long-term development of higher education in the Macau Special Administrative Region (Macau SAR) of China. It is understood that the university as a public institution should not be operated like a business enterprise, running on profit-making initiatives; yet, without the enterprising context, the transformation of the existing infrastructure could hardly be innovated effectively, especially regarding the productivity of its staff, both academic and administrative. As a university with a staff count of less than 1000 and a history of close to thirty years, the University of Macau (UM) is ready to steward an elite undergraduate education marked by a quality learning experience that could become her branding value in the immediate future. The question is how innovatively UM could scale up in this opportunistic growth to excel for the local community. This case study is aimed to investigate from the perspective of a learning enterprise, a reflective way of forward thinking to record the author's observation and interpretation of what is entailed in this process of upbringing a relatively young university in this age-old city, Macau, famous for its rich heritage of East (Chinese) meeting West (Europeans – Portuguese). Of specific interest is the proper context of open innovation in university governance for organizational transformation. The chapter examines the accountability framework for undergraduate curriculum reform and by treating the electronic transformation (e-transformation) as one of the open innovation strategies, the chapter explores the e-transformation of the university environment, based on holistic concerns of the campus community.

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The challenge is to identify the organizational context of innovation, which lies in the realm of electronic governance (e-governance), referring mainly to the decisions that define expectations, enable empowerment, and verify performance of the systems in support of community engagement and shared responsibilities in campus development, providing a sense-making perspective to interpret what is entailed in the organizational innovation of the university in this precious occasion of campus relocation. In practice, the lessons learned behind the e-transformation of the learning enterprise should benefit all walks of our local community, including the community of the small and medium sized enterprises (SMEs).

INTRODUCTION

In their book, *Engines of Innovation: The Entrepreneurial University in the Twenty-First Century*, Thorp and Goldstein (2010) makes an interesting point: “What is most exciting about innovation is that it begins with a problem; the bigger the problem, the more significant the innovation needed. From the very beginning of our work, we have been convinced that for research universities to realize their full potential, they must attack the world’s biggest problems, and this notion is increasingly being embraced throughout academia (p.2).” In this light, the University of Macau (UM), in its 10-year development plan from 2008 to 2017, aims to become a leading university in the country (China), and beyond. It aims to produce all-round graduates with the potential to become pillars of the Macau Special Administrative Region (SAR) serving beyond Macau in the mainland of China as well as in the global community.

This chapter is going to examine what quality concerns UM has put into her radar screen of continuous improvement to support the elite undergraduate education ideal, from the perspective of a learning enterprise, receiving financial support from both the SAR Government, and from donors in the local and global community. In particular, the study is looking into an innovation opportunity granted by the Central Government of China to the SAR Government and thus to the University in early 2009, to develop, to govern and to manage a new green-field campus (to be completed by 2013) twenty times the size of UM’s current campus in an island (Hengqin), just next to Macau, located

in the mainland of China, to be connected to the SAR through a dedicated channel for convenient transportation (see more from http://www.umac.mo/new_campus_project/).

In the future campus, the buildings there will house those who will create well-paying, sustainable jobs, and provide Macau (and China) with a sustainable competitive advantage in the global economy. And such buildings are most likely our research labs, classrooms of the future, and innovation centers, where big ideas are hatched and subsequently translated into reality. Indeed, as Thorp and Goldstein (2010, p.2) characterizes: “The superhighways that will change the world are not asphalt but electronic, and rather than connecting the world’s great cities, the new superhighways provide access to most of the world’s knowledge.” Thereby, UM sets off globally for a higher purpose in organizational innovation to connect the world’s knowledge in her new Hengqin campus.

Understandably, as this study involves the investigation of some innovative learning culture through e-transformation of organizational development in the learning enterprise, such as teaching, learning, research and assessment, in the context of SMEs, the same learning experience could actually be rendered as transferable means to accomplish such business initiatives as project management in research and development, as well as product innovation. Many an SME in advanced economies have been learning to use information and communication technology (ICT) to innovate and transform their processes, products, services and business models, significantly improving

productivity and competitiveness (Hanna, 2010). Indeed, such an initiative echoes clearly the need of an open innovation strategy in today's knowledge society, being more a norm than an exception in this Internet age.

BACKGROUND

In January 2009, following a visit to Macau paid by Mr. Xi Jinping, Vice President of the People's Republic of China, UM was informed of the possibility of building her Hengqin campus and that this campus would serve as a pilot project being part of a broader collaboration between Guangdong, a province in southern China, and Macau, in the joint effort to develop Hengqin, currently an island with green fields just next to Macau, and to be substantially developed in the next 10 to 15 years through a nationally coordinated scheme of city planning. On June 27, 2009, the Standing Committee of China's National People's Congress (NPC) officially approved the University of Macau's Hengqin Campus Proposal, submitted by the Macau SAR Government in March 2009.

This approval delegates authority to the SAR Government to apply the SAR's legal and administrative systems to UM's Hengqin Campus for a duration of four decades, starting from right after the new campus has been completed and transferred to the SAR and renewable afterwards. Indirectly, this approval has increased the territory of Macau by one square kilometer, the size of UM's Hengqin campus. The new campus will offer an exciting academic environment and advanced teaching, learning, and research facilities to enable UM to pursue her objectives of offering quality undergraduate education and promoting innovation in scientific research, with the goal to develop UM into a world-class university.

Although there is no precedent to follow with such a joyful surprise, UM has expressed the commitment to preserve her traditions and values, and to strive toward excellence in the

scholarship of teaching, in the scholarship of discovery (research), in the scholarship of application (services), in the scholarship of integration (interdisciplinary bridging), and in the scholarship of leadership. To uphold such an institutional commitment, UM has also initiated efforts in fund-raising from the local and global community to joint hands in accomplishing the mission of elite undergraduate education. Thereby, besides financial support from the Macau SAR, UM as a learning enterprise is running an organization transformation scheme similar to that of a social enterprise, absorbing resources from the society to provide educational services to the community.

Meanwhile, with the advent of Internet technologies, UM is also exploring emerging technologies and examining operational examples of what an electronic institution for education might look like. With the latest round of electronic transformation (e-transformation) efforts, UM is looking for ways to improve administrative efficiency, implement faster access and response to information, enhance skills and knowledge development, and improve student learning experience. Most importantly, UM is also tackling issues in redesigning existing organizational frameworks, techniques for overcoming barriers to, and successfully implementing change.

A Clear and Vital Vision

The undergraduate experience at UM is led by a clear and vital vision, elite undergraduate education, which is embraced as UM's identification of the late Ernest Boyer's (1990) exposition of the four domains of scholarship plus the scholarship of leadership (Kouzes & Posner, 2007) as perceived by the author.

- **Scholarship of teaching:** The scholarship of teaching is the development and improvement of pedagogical practices (Braxton, Luckey, & Helland, 2002). It is believed that effective teachers engage in

scholarly teaching if they undertake assessment and evaluation to promote improvement in their own teaching practice. Indeed, scholarly teaching activity becomes scholarship of teaching when faculty members make their teaching public by opening it to review and critique by peers in their disciplines through publications and presentations.

- **Scholarship of discovery:** This is traditional research which UM considers as the scholarship of the creation of new knowledge. It requires creative and critical thought, research skills, publication in peer-reviewed journals and books, and presentations at disciplinary conferences.
- **Scholarship of application:** This form of scholarship involves the use of a scholar's disciplinary knowledge to address important individual, institutional, and societal problems. Scholars who engage in this type of work, also called the scholarship of engagement and outreach, must be able to solve problems of importance to diverse stakeholders such as policymakers, and community members, and to communicate effectively with their audiences in language understandable to persons without disciplinary expertise.
- **Scholarship of integration:** This form of scholarship makes connections within and among disciplines. When disciplinary and interdisciplinary knowledge is synthesized, interpreted, and connected, the work brings new insight to original research (Braxton, Luckey, & Helland, 2002). The products include policy papers, reflective essays, research translations, popular press publications, synthesis of the literature on a topic, and textbooks.
- **Scholarship of leadership:** This form of scholarship is meant to develop leaders for elite undergraduate education. The goals are to enable faculty to provide curriculum

direction, improved teaching, educational research and development, as well as institutional leadership at all levels of undergraduate education. It is a program in the making (Gruppen, Frohna, Anderson, & Lowe, 2003), using a variety of educational methods and provides a broad curriculum in educational theory, assessment and evaluation, research design and methods, teaching-skills development, and educational leadership.

A Framework of Accountability for Elite Education

For more than a quarter of a century, the Association of American Colleges and Universities (AACU: www.aacu.org) has repeatedly called for the academy to take responsibility for assessing the quality of student learning in college. Indeed, thoughtful and forceful leadership from within the academy itself on both assessment and accountability is more essential today than ever in many a university campus around the globe. It is convinced that educational leaders within UM are already doing good work to define what academic excellence really means in today's world. Yet, it is vitally important that UM should build on this foundation to find improved ways to demonstrate achievement of academic excellence by students and institutions. Namely, UM must respond to calls for greater accountability in ways that strengthen as well as document the quality of student learning in college.

It is believed that such accountability efforts should focus on the knowledge, skills, and capacities that are most important for today's students. They also should take into account the best campus practices already developed to advance and assess these outcomes. Borrowing from AACU's vision developed in its various reports, *Integrity in the College Curriculum* (AAC, 1985, 1990), *Greater Expectations: A New Vision for Learning as a Nation Goes to College* (AACU, 2002), and *College*

Learning for the New Global Century (AACU, 2007), the University of Macau has incorporated a quality improvement context consistent with the three elements of concerns as follows (AACU, 2008, p.1):

- A clearly articulated, collective conception of the qualities of a college-educated person
- Intentionality and coherence in educational programs to cultivate those qualities
- Assessment to determine the extent to which the desired learning has been achieved

It is important for any university to enable her campus community to answer legitimate questions about what their students are learning in college, including clear aims and outcomes of higher learning. The lack of evidence on student learning outcomes is always damaging. Yet, assessing what students have learned in colleges and universities requires a sophisticated understanding both of context and of how knowledge and skills are to be used. This means that we must hold ourselves accountable for assessing students' best work, not generic skills and not introductory levels of learning, with full respect for the diversity of institutional missions and students' educational goals in the contemporary academy. In the context of UM, the elite undergraduate education model must be accountable for a set of key learning outcomes that all college graduates should achieve regardless of their field of study or choice of residential college. The important step is to establish clarity about the kinds of learning that make a difference for all college graduates over time: as thoughtful people, as participants in the community, and as responsible all-round citizens in society.

To ensure that every student experiences the intellectual and social benefits of a well-designed and stimulating undergraduate education, UM's version of liberal education (AACU, 2007), called

General Education (GE) is charged with the mission to reflect the many social, economic, cultural, and technological changes that occur in the world over the years. GE at UM aims to be inclusive and to provide an empowering education to widely diverse students. In the 20th century, many came to contrast liberal education with professional education and to regard it as, by definition, not practical. But in today's knowledge economy, a good liberal education embraces science and new technologies, hands-on research, global knowledge, teamwork, cross-cultural learning, active engagement with the world beyond the academy, and a commitment to lifelong learning.

These forms of learning should provide a strong foundation for success in a dynamic world, and the outcomes are also essential as a foundation for civic participation and for a meaningful life. In contrast to liberal education, professional education, often narrow and situation-specific, is found to be insufficient for a world characterized by complexity, conflicting judgments, and accelerating change. In fact, students in technical fields need and deserve the complementary benefits of a liberal education to help them make sense of the social and environmental contexts in which they will use their skills, and to get themselves prepared for lifelong work rather than just an initial job. In this regard, new frameworks for educational accountability should focus on students' high level of achievement in the college outcomes that characterize a liberal education.

Indeed, creating a framework of accountability in support of a specific learning culture is not confined to higher education, but extensible to the SME business communities. Such a learning culture implies an environment where learning takes place each day, all day, fundamentally changing the way we think about how, what, and when we learn, and how we can apply learning to practice. Such a culture should facilitate key aspects of organizational learning: the modern business context and the importance of learning at every juncture; the organic and adaptive approaches organizational

leaders can take to design enduring success; and the expanding role of individuals within organizations and the implications for business leaders, educators, technologists, and learners. Literally, the same framework of accountability should help identify the steps many SMEs must take to remain competitive for years to come, and it should explain how learning strategies applied to all aspects of every job can provide solid returns and substantial results.

Focusing on Key Educational Objectives

Unquestionably, the public has questions about the quality of education that colleges and universities are providing, and it deserves to know how well students are doing. According to AACU's (2008) recommendations, it is important for leaders of higher education to embrace a set of highly valued and widely affirmed educational goals, establish high standards for each such goal, and assess their achievement across the curriculum. In their 2007 report, *College Learning for the New Global Century*, AACU proposes as a framework for assessment and accountability, the following essential learning outcomes, quite consistent with UM's ideal of elite undergraduate education. There is emerging consensus across many professions, the business community, civic leadership, and the academy that these educational capabilities are valuable for work, citizenship, and a satisfying life (AACU, 2008, p.6 and pp. 15-19).

- *Knowledge of human cultures and the physical and natural world*

Such capabilities are acquired through study in the sciences and mathematics, social sciences, humanities, histories, languages, and the arts. They are focused by engagement with big questions, both contemporary and enduring.

- *Intellectual and practical skills, including:*
 1. Inquiry and analysis
 2. Critical and creative thinking
 3. Written and oral communication
 4. Quantitative literacy
 5. Information literacy
 6. Teamwork and problem solving

Such capabilities are practiced extensively, across the curriculum, in the context of progressively more challenging problems, projects, and standards for performance.

- *Personal and social responsibility, including:*
 1. Civic knowledge and engagement – local and global
 2. Intercultural knowledge and competence
 3. Ethical reasoning and action
 4. Foundations and skills for lifelong learning

Such capabilities are anchored through active involvement with diverse communities and real-world challenges.

- *Integrative and applied learning, including:*

Synthesis and advanced accomplishment across general and specialized studies.

Such capabilities are demonstrated through the application of knowledge, skills, and responsibilities to new settings and complex problems.

It should be noted that this set of essential learning outcomes was developed by AACU through a multi-year dialogue with hundreds of colleges and universities about needed goals for student learning; analysis of a long series of recommendations and reports from the business community; and analysis of the accreditation requirements for engineering, business, nursing, and teacher educa-

tion. The findings are documented in various publications of the Association of American Colleges and Universities (AACU): *Greater Expectations: A New Vision for Learning as a Nation Goes to College* (2002), *Taking Responsibility for Quality of the Baccalaureate Degree* (2004), and *Liberal Education Outcomes: A Preliminary Report on Achievement in College* (2005).

Affirmatively, these outcomes for student learning are not arbitrarily chosen. They are valuable outcomes because they prepare students to bring knowledge, experience, and reflective judgment to the complexity of the contemporary world. They are important for a globally engaged democracy, for a dynamic, innovation-fueled economy, and for the development of individual capability (AACU, 2007, p.6). They give graduates a strong foundation to deal with issues that are challenging, unscripted, and often vigorously contested. They teach students to find and evaluate evidence and to take into account competing perspectives as they form judgments about significant questions. They help develop both a respect for the value of human diversity and a set of internal values that serve as a compass in an era of accelerating change. The outcomes recommended, which can be achieved in different ways, across highly diverse institutional contexts and fields of study, are practically compatible with UM's ideal of elite undergraduate education, especially for her General Education program. It is indeed important that such forms of learning, essential for all students, must be fostered across the entire educational experience.

Cultivating and Assessing Essential Learning Outcomes

According to the AACU report, *Our Students' Best Work: A Framework for Accountability Worthy of Our Mission* (2008, 2nd edition, p.8), a comprehensive accountability and assessment framework should include the following elements in order to

cultivate and assess students' essential learning outcomes as mentioned in the previous section:

- **Orientation:** This should be provided for the student during the first year about the institution's expectations for important learning outcomes, benchmark assessments of each student's demonstrated accomplishment, and expected further progress in relation to these outcomes.
- **A plan of study:** In coordination with the student's academic adviser, this plan should transparently connect the expected outcomes to the student's choice of activities, courses, and major field(s) of study.
- **Milestone assessments:** As students progress in their studies, such assessments should be tied to key outcomes with timely feedback to the student and his or her adviser. Oftentimes, these assessments should be aligned between two-year (first two years) and four-year (first and second two years) study program so that successful transfers are possible, and they can be compiled in an electronic portfolio that demonstrates each student's progress.
- **Capstone or culminating experiences:** The requirements of capstone experiences allow students to actively demonstrate their cumulative accomplishments in college education. The capstone – which can be the centerpiece of an electronic portfolio – is a critical element of this framework because it provides a designated place in the regular curriculum where students do their best work. It should be conceived as both a culminating integrative experience and as the centerpiece of the effort to assess sophisticated learning.

Indeed, even though the outcomes characteristic of college education (in the context of UM,

elite undergraduate education), can be described generically, they must be cultivated and assessed in context. Namely, whatever the field of study, a student's progress in achieving related education outcomes ought to be assessed periodically from the initial to the final year, in both general education and the chosen major field(s) of study. The 2007 National Survey of Student Engagement in the US (NSSE, 2007) reports that 61 percent of college seniors are expected to complete a capstone or culminating experience of some kind. Typically, capstones are completed in the student's major field; however, many institutions also require capstone experiences in general education. Meanwhile, many other institutions and programs already require students to compile portfolios of their work as a requirement for graduation. Increasingly, many universities across the United States and Canada are putting such portfolios online to both encompass the multiple modes through which achievement can be demonstrated and to address the mobility of students across programs and study and institutions.

In fact, capstone projects and electronic portfolios (e-portfolios) provide promising anchors for a meaningful approach to educational accountability. They provide contexts in which student work can be assessed for the crosscutting outcomes of general education as described earlier, and for conceptual knowledge and skills appropriate to the students' selected major(s). The primary focus will be a fuller reading of the available evidence on student's cumulative achievement of the key learning outcomes. The best evidence should come from assessment of students' authentic and complex performances in the context of their most advanced studies: research projects, community service projects, portfolios of student work, supervised internships, and many others.

Higher education institutions should use a common framework of college education to report externally on students' level of achievement. Yet, they should also help the public understand that the standards for advanced accomplishment

take different forms in different fields. The key accountability question to ask of universities is whether they currently expect all their students to undertake complex projects and capstone assignments that are assessed for advanced learning outcomes, be they for general education or for professional education.

According to the suggestions from AACU (2008, p.9), the set of accountability questions that should be asked of every higher education institution, include the following:

1. Are all students expected to produce advanced, culminating work?
2. Is this culminating work assessed for broad general education outcomes as well as knowledge relevant to the specific field?
3. Have standards or rubrics been established and made public for what is expected at this advanced level in each program?
4. Are examples of this advanced work and the related standards regularly peer reviewed in the context of accreditation?
5. Have milestone assessments been established that prepare students to meet advanced standards and, where relevant, to plan for successful transfer from one institution to another?
6. Does the curriculum effectively prepare students to meet the standards that will be expected in milestone and culminating assessments?

Summarizing and Reporting Results to the Public

To respond with integrity to calls for greater accountability, and to demonstrate the level of student achievement of key learning outcomes, many a higher education institution is willing to adopt the recommendations offered by AACU as stated in the 2008 report, *Our Students' Best Work: A Framework for Accountability Worthy of our Mission* (pp.12-14). The rationale is simple:

namely, it is not enough for an institution to assess its students in ways that are grounded in the curriculum; colleges and universities also must provide useful knowledge to the public about goals, standards, accountability practices, and the quality of student learning. Common rubrics will be needed to summarize levels of student achievement across different academic fields and institutions and for particular groups of students. In this regard, the VALUE rubric released by AACU in 2007 upon launching its initiative called *Valid Assessment of Learning in Undergraduate Education* (VALUE: <http://www.aacu.org/value/index.cfm>) is designed to explore the development of assessment rubrics for the broad range of essential learning outcomes stated earlier, and to articulate expectations and criteria for student achievement from admission through advanced levels of performance. The VALUE project helps test the application of rubrics to actual student work completed in their courses and co-curricular activities.

By evaluating work that students produce in their regular courses and co-curricular activities, the VALUE approach to assessment is found more directly useful to faculty as they seek to improve courses and programs, and assess student growth and development over time. Meanwhile, by gathering and disseminating work through electronic portfolios (e-portfolios), the same student work can be assessed at course, program, and institutional levels. More conveniently, with e-portfolios, student work from on-and-off campus and from all the institutions a student may have attended can also be included, thus presenting an overview of student accomplishment over time and space. A summary report, including results from many students majoring in different disciplines, to an accreditation body, to a government official, or to the general public can be prepared that summarize the data across the institution. When such data are made available, each campus can take steps to engage faculty and students in interpreting the meaning and implications of assessment

outcomes. Faculty members should use the findings as a basis for discussion and as a catalyst for needed changes in educational programs. Elaborated below are AACU's (2008, pp.12-14) ten recommendations for creating a new accountability framework for student learning. It is found to be very instrumental to an institutional effort in assessing student learning:

1. *Make liberal education the new standard of excellence for all students.* Liberal education (as a broader embodiment of general education; http://www.aacu.org/leap/what_is_liberal_education.cfm) should become the new standard of excellence for all students, whatever their major or anticipated career. The set of essential learning outcomes as described earlier in the chapter, are important indicators of what students need to accomplish as citizens, as workers in a particular profession or field, and as thoughtful, creative, responsible human beings.
2. *Articulate locally owned goals for student learning outcomes.* For higher education to be accountable for intended learning outcomes individual institutions (and systems) must translate these outcomes into goals and language that are meaningful in local contexts. Goals for student accomplishment should be developed and articulated in dialogues that include both faculty members and members of the wider community. Clarity about essential learning outcomes is the foundation of both a robust educational program and of a responsible framework. To meet the highest possible standard of excellence, campus goals for student learning should also be challenging and constantly evaluated.
3. *Set standards in each goal area for basic, proficient, and advanced performance.* One of the important benefits of having clearly described goals and levels of achievement

is that students themselves will begin to understand the standards for quality in different fields and become more capable of assessing their own learning. Likewise, levels of performance should be specified in concrete and detailed ways so that student work can be reviewed and judged similarly by different individuals.

4. *Develop clear and complementary responsibilities between general education and departmental and other programs for essential learning outcomes.* It is important for students to experience their general education and major as integrated and coherent. Although specific responsibility may be assigned respectively to general education and professional education to support essential learning goals, it is best if there is discussion and understanding among faculty and other professionals about what is expected in all parts of the curriculum and co-curriculum. This is especially important if students are encouraged to make connections among courses and programs, and if advanced courses intentionally build on prior work. Needless to say, it does little good to agree on valued goals for student learning if responsibility for cultivating them is not well planned.
5. *Charge departments and programs with responsibility for the level and quality of students' most advanced work.* Once the goals for student learning have been articulated at the campus level, they should be translated into program-specific goals for student accomplishment. In particular, such goals should be set for general education so that they respect the aims, design and character of specific study programs on campus. In addition, student learning goals should be articulated within the context of academic majors. Put it more simply, each program should translate campus-wide goals for liberal/general education into goals appropriate

to the field. Programs also need to articulate field-specific goals for their students, communicating how and why these standards contribute to effective accomplishment in that field.

6. *Create milestone assessments across the curriculum.* Assessment of student progress over time requires that campuses distinguish among advanced, proficient, basic, and below basic levels in relation to specific goals. Students should be taught to gauge their progress against high expectations for their most advanced work. It is intended that no student should learn for the first time about shortfalls in meeting proficiency standards at the point of graduation. Thereby, assessments of student progress in achieving goals should be built into the ongoing curriculum and embedded in designated courses or assignments in general education, departmental majors, and other programs such as the residential college systems.
7. *Set clear expectations for culminating work performed at a high level of accomplishment.* Each department should identify expected proficiency standards and culminating work – encompassing liberal/general education and major-specific outcomes – that will both cultivate advanced knowledge and skill and demonstrate students' cumulative learning. Culminating work may include research projects, supervised internships, capstone courses, public performances, licensure or other validated tests in a field, and/or cumulative e-portfolios providing examples of student achievement in relation to specific goals.
8. *Provide periodic external review and validation of assessment practices and standards.* There should be periodic evaluation by external reviewers of the goals, the proficiency standards, and work samples submitted by students to meet standards. Such external reviews provide validation of both the goals

and standards. A representative sample of student performances in different fields will provide sufficient evidence for external feedback.

9. *Make assessment findings part of a campus-wide commitment to inquiry and educational improvement.* Accountability efforts should be part of a continuous improvement scheme, engaging students with the best quality in achieving the related educational goals. Each campus and program should review the quality and level of students' best work, and seek ways to ensure that the educational program provides repeated opportunities for students to practice and reach expected levels of learning. Campus reward systems should incorporate the importance of faculty members' intellectual and professional leadership in both assessment and educational improvement.
10. *Increase public visibility and transparency of learning goals and student achievement levels.* According to AACU (2008, p.14), each college and university should make public on its Web site the following: a) general and program goals for student learning; b) proficiency expectations for rating levels of student achievement in relation to these goals; c) a description of the kinds and range of performances that are used in assessing student progress (with links to different programs); and d) a report on student achievement levels (e.g., advanced, proficient, basic, and below basic) in relation to each goal.

Assessing for Student Learning as UM's Core Mission

One of the important missions to support elite undergraduate education at the University of Macau (UM) is to support assessment for student learning, especially, to evangelize the practice of

outcomes-based assessment (OBA) (Driscoll & Wood, 2007; Allen, 2004; Huba & Freed, 2000) in preparation for assessing various academic programs, as part of UM's institutional research efforts. Assessment can answer important questions, questions about the learning of individual students, the effectiveness of a single course or program, or even the entire institution. The basic assumption is that evidence of student learning should be used for multiple levels of assessment, in which precision in formulating the questions of interest should help pinpoint the level of analysis, determine the appropriate methods, and guide data sampling, aggregation, interpretation, and use. In the context of OBA, the best evidence of learning comes from direct observation of student work rather than from an inventory (say, list of courses completed) or summary of self reports.

According to the AACU report (Miller & Leskes, 2005), *Levels of Assessment: From the Student to the Institution*, course-embedded assignments provide the most valid evidence for all levels of analysis because they are closely aligned with faculty expectations and with the teaching-learning process. The ways of sampling, aggregating, and grouping the evidence for analysis will depend on the original questions posed. The questions will also determine how the data are interpreted to produce action. Internally, faculty members and support staff should accomplish aggregation by describing standards, translating them into consistent scoring scales, and anonymously applying the resulting rubrics to the evidence at hand. Such a process does not assign a grade to an individual student but rather attempts to understand better the learning process and how to improve its effectiveness (Leskes & Wright, 2005; Leskes & Miller, 2005). Elaborated below are representative investigation of the different levels of assessment which have been found conducive to the development of various assessment programs for elite undergraduate education initiatives.

Assessing Student Learning Within Courses

The basic questions of concerns would probe what individual students are learning and how well they are meeting the goals of a course, be they related to disciplinary content or to using transferable intellectual and practical skills. Table 1 shows the setup of our investigation.

Assessing Student Learning Across Courses

The questions of interest should probe what and how well individual students are learning during the progression of a particular program (say, the major or general education) or over their years

at college. Table 2 shows the setup of our investigation.

Assessing Courses

The questions of interest, both formative and summative, should address the achievements of an entire class or the effectiveness of individual or multiple-section courses (Table 3).

Assessing Programs

The questions of interest mostly summative in nature (with only a small portion of formative elements) should guide assessment of our academic programs in place, such as general education or disciplinary majors (Table 4).

Table 1. Setup of the investigation within courses

Items of Interest	Details Expressed
Typical assessment questions	<ul style="list-style-type: none"> • Is the student learning as expected? • Has the student's work improved over the semester? • How well has the student achieved the learning outcomes set for the course? • What are the student's strengths and weaknesses? • How well is the instructor communicating with and engaging the student?
Sources of evidence	All student work embedded in the course (say, quizzes and exams, papers, projects, presentations, and portfolios) can provide evidence. This is the level of assessment at which instructor-assigned grades typically provide feedback to students about their progress and success.
Aggregation of data	Aggregation is often sequential as evidence is collected for each student during the course to track individual learning and improvement. Typically a final course grade holistically sums up a semester of learning.
Data uses	<ul style="list-style-type: none"> • As formative and/or summative feedback to students so they can understand their progress in the course and ways to improve learning • For feedback to the course instructor on how well he or she is communicating with and motivating each student, which can shape subsequent lessons and assignments within the course.
Responsibilities	<ul style="list-style-type: none"> • Individual students are responsible for the effort they exert, the quality of their work, and meeting the instructor's expectations. They are more likely to fulfill these responsibilities when consistently informed of learning goals and academic norms. By teaching students how to conduct self- and peer-assessments, the professor can improve student understanding of the learning process. • Individual instructors are responsible for setting expectations and making them transparent to students. As educators, our professional responsibility extends to the quality of our own teaching and to monitoring how well the pedagogical methods we employ assist students in learning. While the holistic assignment of grades (an A, B, or F) is one way to evaluate student work, such grades represent averaged estimates of overall quality and communicate little to students about their strengths, weaknesses, or ways to improve. A better way to aid learning is through analytical assessments, which can be as simple as written comments on student papers or as structured as the use of a detailed rubric for an assignment; such analysis can reveal precisely which concepts a student finds challenging.

Table 2. Setup of the investigation across courses

Items of Interest	Details Expressed
Typical assessment questions	<ul style="list-style-type: none"> • Has the student’s work improved and/or met standards during the program or since admission to college? • How well has the student achieved the disciplinary outcomes of the major program? • How well has the student achieved the general learning outcomes of the institution across four years?
Sources of evidence	<ul style="list-style-type: none"> • Embedded work in individual courses, for example quizzes and exams, papers, projects, presentations • Portfolios that assemble samples of the student’s work in a number of courses • Capstone experiences or projects • Student self-reflection on the learning process • Relevant externally developed exams (say, licensure) <p>NB: Typical grades can provide some holistic feedback to the student but are difficult to interpret across courses except at very broad levels (like GPA) or to disaggregate into learning outcomes, such as how the student has learned to communicate orally.</p>
Aggregation of data	<p>Given appropriate formats and data, students can aggregate evidence of their own learning (say, of a particular skill such as writing) across courses, programs, or their entire time in college to track improvement. Conventionally, departments aggregate an individual’s grades across courses when they require, for example, that their majors must maintain a minimum GPA of 2.5 in disciplinary courses.</p>
Data uses	<ul style="list-style-type: none"> • As formative and/or summative feedback to students so they can understand their progress over time and ways to improve learning • For feedback to program faculty on how well individual students are achieving the goals and outcomes.
Responsibilities	<ul style="list-style-type: none"> • Individual students are responsible for the quality of their work and for gathering evidence of their learning. They are also responsible for integrating their learning over time and across courses. • Collectively faculty members share the responsibility for clarifying goals and outcomes and providing rubrics for student self assessment. • Individually faculty members are responsible for objectively assessing the assembled work samples or the test results and providing both holistic and analytic feedback to the student.

Assessing the Institution

The questions of interest for institution-level assessment are often designed for internal improvement purpose, but they are also intended to meet external accountability demands. It is not uncommon that results from internal improvement questions can also serve the external accountability purpose (Table 5).

THE LEARNING ENTERPRISE INNOVATION CHALLENGE

The modern university comprises many activities. It teaches students, conducts research for various clients, provides opportunities for self-actualiza-

tion, engages in economic development, stimulates social change, and in Macau, even renders mass charity opportunity, such as participating in the annual charity walk, raising fund for the needy. It is not uncommon that the organization of the contemporary university compares in scale and complexity with many major corporations; hence, it could also be called a learning enterprise.

In fact, the very complexity of the university has made substantive involvement in the broader governance of the learning enterprise an innovation challenge for all participants. The increased complexity, financial pressures, and accountability of universities demanded by the government, the media, and the public at large require stronger management than in the past (Balderston, 1995). Yet, as Duderstadt (2004) has pointed out, as

Table 3. Assessing courses

Items of Interest	Details Expressed
Typical assessment questions	<ul style="list-style-type: none"> • How well is the class collectively achieving the course’s intended learning outcomes and objectives (at any point, at the end)? How well is the class collectively achieving general or transferable learning outcomes and objectives? • Are the assignments helping students achieve the expected level of knowledge or skills? • How well are students prepared for the following courses in the sequence? • Is the course level appropriately targeted for the ability or abilities of the students when they begin? • With what degree of consistency do different sections of a course achieve similar outcomes? • How well is the course fulfilling its purpose in a larger curriculum?
Sources of evidence	<ul style="list-style-type: none"> • Embedded assignments of students in the course: papers, exams, projects, journals, portfolios • Externally or commercially developed tests, as long as they are well aligned with the teaching and learning of the course • Course portfolios constructed by the instructor that include syllabi, expectations, and examples of student work • For multi-section courses, common assignments that provide evidence across sections NB At the course level, traditional student grades are unlikely to provide sufficiently detailed insights to answer the questions unless tightly tied to explicit analytical standards and scoring rubrics.
Aggregation of data	<ul style="list-style-type: none"> • To assess individual courses: Sampling the work of all students in a course can reveal how well the course content and assignments are helping students achieve the expected outcomes. • To assess multiple-section courses: Common assignments across sections (or common requirements such as a student or course portfolio) can be sampled, averaged, compared, discussed, or otherwise reviewed by the faculty involved and/or by departments or committees to ensure consistency across sections. • To assess both individual courses and multi-section courses: Student portfolios and end-of-course reflections can provide evidence of both cognitive and affective learning outcomes aggregated at the level of the individual students.
Data uses	<ul style="list-style-type: none"> • For formative feedback so instructors can improve learning • For summative feedback to inform planning for the future by an instructor or a course committee • to support cross-sectional analysis of how consistently multi-section courses are achieving important learning outcomes or the purposes of the course in a sequence
Responsibilities	<p>Instructors and committees are responsible for setting expectations for the course, establishing common standards for multi-section courses, understanding how the course fits into a coherent pathway of learning, and using analysis of the evidence to improve teaching and course design.</p>

universities develop the administrative staffs, policies, and procedures to handle such issues, they also have created a thicket of paperwork, regulations, and bureaucracy that could possibly weaken the authority and attractiveness of academic leadership.

Broad participation in university governance is often hampered by bureaucratic policies, procedures, and practices, as well as by the anarchy of committee and consensus decision making. Put it simply, the academic tradition of extensive consultation, debate, and consensus building before any substantive decision is made or action

taken poses a particular challenge in this regard because such a process is frequently incapable of keeping pace with the profound changes occurring in higher education, let alone the creative anarchy arising from a faculty culture that prizes individual freedom.

In a rapidly changing society, many university presidents believe, although they are understandably discreet in stating, that one of their greatest challenges is protecting their institutions from the deteriorating quality of their student learning. This is an accountability issue not to be ignored, but also squarely exhausting to defend, as clarified

Table 4. Assessing programs

Items of Interest	Details Expressed
Typical assessment questions	<ul style="list-style-type: none"> • Do the program-related courses, individually and collectively, contribute to its outcomes as planned? • How well does the program fulfill its purposes in the entire curriculum? • How well do the program sub-requirements (distributive requirements in general education) contribute to the overall purposes? • Does the program design resonate with its expected outcomes? • Are the courses organized in a coherent manner to allow for cumulative learning? • Does the program advance institution-wide goals as planned?
Sources of evidence	<p>Direct evidence of student learning from many sources can contribute to program-level assessment:</p> <ul style="list-style-type: none"> • assignments from individual courses • student portfolios built over the program duration • entering student tests or assignments • capstone projects • results of common assignments • commercial tests <p>Selected assignments from other programs can be re-scored (given a second reading) by program faculty (say, to assess the general education program’s success in developing such institution-wide goals as communication, quantitative literacy, critical thinking, or ethical responsibility).</p> <p>Given the number of potential data sources and the amount of evidence that could be amassed, careful planning is needed to identify the important points for sampling and analysis. Such program assessment may likely involve several sources of evidence gathered at the point of entry, a midpoint, and at the end of the program. Each point data is particularly valuable as a summative indicator of how well the program, taken as a whole, is achieving its goals. Individual student grades are not informative at this level.</p>
Aggregation of data	<p>Course-level assessments of the courses in a program can be analyzed individually or collectively to reveal whether program goals are being achieved; sampling might be prudent in a large program.</p> <p>Information about the sub-requirements in a program (say, distribution areas) can be aggregated to the program level (say, general education). Sampling of student portfolios considered excellent, average, and sub-par can vividly portray growth in student performance from beginning to the end of a program.</p> <p>Disaggregated data can reveal how sub-groups of students are succeeding in the program. Some external, commercially available assessments can be compared to norms (say, the Major Field Tests from ETS).</p>
Data uses	<ul style="list-style-type: none"> • to confirm the purpose of the program (say, its place in the entire curriculum or connection to mission) • to check alignment of program design with program outcomes • to discern how well the program, from its beginning to end, fosters cumulative learning of the desired outcomes • to discover how well the program as a whole enables students to achieve end-point levels of competence for all program outcomes • to identify superfluous and/or missing curricular and co-curricular elements in the program
Responsibilities	<p>Responsibility largely rests on the program faculty, collectively and individually. Collectively, the faculty assumes responsibility for the entire program achieving its and relevant institution-wide goals and outcomes. Individual instructors are responsible for advancing the program and institutional goals embedded in their courses. Faculty members cooperate in establishing program standards and scoring rubrics for the quality of work expected.</p>

by the extensive amount of work demonstrated in (Miller & Leskes, 2005). In Macau, there has been a pronounced shift in recent years toward a greater emphasis on oversight and public account-

ability for student learning. This is particularly the case with the governing board (university council) of the University of Macau, as the first public university in the SAR.

Table 5. Assessing the institution

Items of Interest	Details Expressed
Typical assessment questions	<ul style="list-style-type: none"> • What do the institution’s educational programs add up to in terms of student learning? • How well are the institution’s goals and outcomes for student learning being achieved? • How much have our students learned over their college years? • How well does the institution educate students for the complexities of the twenty-first century? • What evidence is there that the institution is fulfilling its educational mission? • How can institutional effectiveness be demonstrated authentically to external stakeholders?
Sources of evidence	<p>A significant body of evidence from multiple sources will be required to answer institution-level questions. Documentation of how well students are meeting institution-wide goals and outcomes requires a clear statement of these learning expectations.</p> <p>The picture of student learning will be based primarily on summarized data from program assessments, supplemented by results from appropriate exams (say, those taken for graduate or professional school admissions, licensure, or certification).</p> <p>Sampling student work, both at the entry and graduation levels, can serve to answer value-added assessment questions. Some selected course-level assessments – particularly those from common experience courses such as a required core – could contribute to the institution-wide picture.</p>
Aggregation of data	<p>Much of the data will already have been aggregated when analyzed for institution-level assessment: aggregated by courses, by programs, or by student cohort.</p> <p>For example, sampled, aggregated, and summarized student achievement of the desired learning outcomes in a freshman general education course could be compared to sampled, aggregated, and summarized achievement in a senior course.</p> <p>Or an analysis of the cohort completing the Collegiate Learning Assessment instrument could reveal the level of critical thinking in the graduating class. Constructing both narrative and quantitative summaries of the stories from programs will shape the broad picture of teaching and learning at the institution. Disaggregated data can reveal how well sub-groups of students are succeeding.</p>
Data uses	<ul style="list-style-type: none"> • to reveal what students know and can do when they graduate in order to guide the design of the institution’s undergraduate program • to understand the value added by an institution’s undergraduate program • to discover the interactions among various programs (say, general education and the majors), especially in how they help students achieve institution-wide learning goals • to guide and support decisions about resource allocation, faculty hiring, and professional development • to demonstrate to external stakeholders the institution’s effectiveness in educating students
Responsibilities	<p>The responsibility for institution-level assessment rests with administrators working in close collaboration with the faculty, student affairs professionals, and other campus staff members. Collaborative groups should design an ongoing comprehensive program of institutional assessment, use data to improve learning, keep student success a top priority, ensure linkages to strategic planning and resource allocation, and communicate with external groups.</p>

Nonetheless, though faculty involvement in academic matters is essential for program quality and integrity, it is not surprising that faculty values are not necessarily well aligned with those required to manage a complex institution. For example, faculty members tend to be individualistic (independence), highly entrepreneurial lone rangers (freedom) rather than the team players required for institutional management (responsibility and accountability). They also tend to resist strong,

visionary leadership and firmly defend their personal status quo. In short, it is frequently difficult to get faculty commitment to (or even interest in) broad institutional goals that are not congruent with personal goals, even though those areas of faculty governance are clearly within their unique competence such as curriculum development, student learning, academic values, and ethics. One of the key challenges to effective university governance, according to Duderstadt (2004), is to

make certain that all of the constituencies of shared governance – governing boards, administration, and faculty – understand clearly their roles and responsibilities.

Meeting the Governance Challenge

The academic tradition of extensive consultation, debate, and consensus building before any substantive decision can be made or action taken is perceived to present a governance challenge in many a university today (Tierney, 2004; Marginson & Considine, 2000; Ramsden, 1998). This challenge somehow derives from a voluntary culture of the university which is compatible with the process of consultation, communication, and collaboration as visible from the organic campus community, rather than that of command, control, and communication so familiar in many a mechanistic corporation in the history of industrial development.

Nonetheless, this organic process of campus harmonization is hardly capable of keeping pace with the profound changes facing effective governance of the public university. Literally put, not everything could be improved by making it more democratic, as commented by Duderstadt (2004, p.149). Interestingly, this tension between the rationality of collectively organizing to achieve declared organization goals and the ultimate recalcitrance of human beings as members of organizations (Checkland & Holwell, 1998), was long referred to, by the writings of a pioneering sociologist, Ferdinand Tonnies in his major work *Gemeinschaft and Gesellschaft* (1887) (translated as *Community and Association* by Loomis (1955)), in which two types of society or organizations were depicted.

Making Sense of Gemeinschaft and Gesellschaft in University Governance

Gemeinschaft, referred to as the natural living community (in this light, the university), is the campus group with which the faculty are affiliated.

It is a big family in which we are considered as brethren and sisters. On the other hand, *Gesellschaft*, referred to as the workspace in which men and women join in some complicated contracted sense – as when we choose to become employees of a company or a public sector organization. Although both *Gemeinschaft* and *Gesellschaft* serves as the basis of a typology for analysis rather than a description of actual organizations, the interesting point is that actual organizations in the world – so artificially designed and created – still continue to possess some of the natural characteristics of the family, thanks to the ultimate autonomy and unpredictability of human beings: no *Gesellschaft* is ever simply a rational machine whose members willingly combine together totally to pursue organizational goals.

In trying to make sense of a university capable of better governance of her institutional goals, we have to understand that our university, as a public institution, is a social unit, or collectivity, concerned with some collective action, and there are associated social practices which relate to this. To be a member of an organization is to have a contractual relationship with it, whether a legal contract of employment or a more complex psychological contract, or both. Members of an organization in a role structure are assumed to share an image of their organization in terms of its context, goals and objectives, its structures, processes and resources, and the measures of performance, which indicate whether or not the goals are being achieved. Within this framework, the members make their contributions to decision making in pursuit of objectives.

Nonetheless, it is the readiness of people, members and non-members (wider community in the case of a university) of the organization alike, which causes the organization to exist. People talk and act as if there were a collective entity, which could behave like a conscious being, with the ability to decide to do things and then make them happen. Oftentimes, there are conceptualizations based on the interests and agendas of individuals,

or sub-groups within the organizations as well as the overall declared, public, official account of the organization. The existence of these different interests and agendas means that the organization as a whole, the collectivity, has constantly to seek accommodations among conflicting interests upon which action can be based. It cannot simply assume consensus. And, following Vickers (1965), the action is here expressed more richly as managing a changing set of relationships, rather than taking rational decisions to achieve goals.

Learning to Lead in Higher Education

A quick look at the remarkable pace of change required in the private sector (measured usually in months, not years) often suggests that universities must develop more capacity to move rapidly. This will require university leaders to occasionally make difficult decisions and take strong action without the traditional consensus-building process. Universities need to better define those areas in which the special competence of the faculty requires their consent (say, academic programs and policies), those areas in which faculty advice will be sought and considered but not considered authoritative (say, funding priorities), and those areas in which faculty does not need to be consulted at all (say, parking policy).

Indeed, the leadership of the university must be provided with the authority commensurate with its responsibilities (Keller, 2004). Academic leaders, whether at the level of department chairs (or heads), deans, vice-presidents, or even the president, should have the same degree of authority to take actions, to select leadership, and to take risks and move with deliberate speed, that their counterparts in the corporate world and government enjoy. As James Duderstadt (2004, p.150) has commented, “The challenges and pace of change faced by the modern university no longer allow the luxury of consensus leadership, at least to the degree that building consensus means seeking the approval of all concerned communities

before action is taken. Nor do our times allow the reactive nature of special interest politics to rigidly moor the university to an obsolete status quo, thwarting efforts to provide strategic leadership and direction.” For example, as shared by Duderstadt, deans often expect the provost to offer additional resources to gain their cooperation on various institution-wide efforts. Obviously, this bribery culture is quite incompatible with the trend toward increasing decentralization of resources.

Hence, it is logical to expect that the leadership and management of universities increasingly will need to rely on lines of true authority just as their corporate counterparts do. Namely, presidents, executive officers, and deans will have to become comfortable with issuing clear orders or directives from time to time. Thereby, throughout the organization, subordinates will need to recognize that failure to execute these directives will likely have significant consequences, including possible removal from their positions, given all the consistent respect for faculty responsibility in academic programs and academic freedom. Unquestionably, collegiality will continue to be valued and honored; however, the modern university simply must accept a more realistic balance between responsibility and authority.

Recognizing and Developing Faculty Performance

To better balance authority and responsibility, as Ramsden (2000) puts it, leadership strength should be rebuilt at middle levels within the university. This may be done by involving some degree of restructuring in the organization of the university to better respond to its responsibilities, challenges, and opportunities (Menand & Gates, 2010). In this regard, there should be more effort made to identify the administration as a broader body than simply as the executive officers of the university, including deans, chairs, directors, and coordinators. It is important to get this broader group to be perceived as spokespersons for uni-

versity objectives for such simple reason that the contemporary university is a public corporation that must be governed, led, and managed with competence and accountability to benefit its various stakeholders (Tuchman, 2009), including students, alumni, government body, and community supporters, such as fund-raisers. Literally, the complexity and importance of today's universities requires capable management and administration supported by trained professionals, with firm backgrounds in academic involvement. And it is convinced that such experience can be provided only by those who have toiled in the vineyards of teaching, research, and assessment as faculty members. The key to achieving adequate competence and accountability in university governance is to infuse in all of its components the perspectives of practicing faculty members, just as at the level of individual academic units through the use of various faculty committees to address crucial issues such as faculty hiring and promotion, student admission and performance, and curriculum and degree program development. In the context of university management, this can be achieved by appointing capable faculty members to lead administrative positions, provided that they are given the training necessary to manage complex organizations and functions in a competent and accountable fashion.

Safeguarding the Fundamental Values of Higher Education

In his book, *The Last Professors: The Corporate University and the Fate of the Humanities*, Frank Donoghue (2008), an Ohio State English professor, sees a troubling new conception of higher education emerging among administrators whose thinking reflects the bottom-line calculations of business executives, not the intellectual ideals of liberal arts scholars. Indeed, the history of the university, not just in the United States, is one of a social institution created and shaped by public needs, public policy, and public investment to

serve a growing community, such as in Macau. Yet, according to Zemsky and Wegner (1998), in few places within the academy, either at the level of governing boards or in government higher education policy, does there appear to be a serious and sustained discussion of the fundamental values so essential to the nature and role of the university at a time when it is so desperately needed.

Duderstadt (2000) points out that as scholarship became increasingly professionalized and specialized, any coherent sense of the purposes and principles of a university became fragmented. Values such as tolerance, civility, and personal and social responsibility have been largely absent from the academic curriculum. Most of our undergraduates experience little discussion of values in their studies. Our graduate schools focus almost entirely on research training, with little attention given to professional ethics or even preparation for teaching careers, for that matter. Still, in any serious consideration of how our universities are governed and led, it is important always to begin with the basics, to reconsider carefully the key roles and values of the university that should be protected and preserved during a period of change. For example, how would an institution prioritize among roles such as educating the young (undergraduate education), preserving and transmitting our culture (libraries, visual and performing arts), basic research and scholarship, and serving as a responsible critic of society? In a similar vein, what are the most important values to safeguard? Clearly, academic freedom, openness to new ideas, a commitment to rigorous study, and an aspiration to achieving excellence would be on the list for most institutions. We all need to do our shares to preserve the core missions, characteristics, and the values. It is only through a concerted effort to understand the important traditions of the past, the challenges of the present, and the possibilities for the future can we enable our institutions to thrive during a time of such change.

Engineering the Entrepreneurial University

In the emerging digital economy of the 21st century (Tapscott, 1997), organizations co-evolve with their environments. With the rapid advances in networking technologies and the commercialization of the Internet, many a university around the globe, are actively reflecting on their organizational design and operating philosophy to devise new strategies, develop new capabilities, design new organizational structures, and deploy new governance models (Eifert & Puschel, 2004; Rivard, Aubert, Patry, Pare & Smith, 2004). Oftentimes, the governance model in a public sector organization could be considered as a prototype being creatively constructed and deconstructed over time. The disruptive effect of fast technological innovations and adoptions has literally redefined the essence of governing effectiveness, from sense and respond, to anticipate and lead. If we are planning to sense the changes and then respond, it might be already too late according to the enterprise experience (Lumby, 2001; Duke, 2002); rather, anticipating the coming changes and executing with speed to lead, is a fact of life today. Like an enterprise, it is a governing necessity to be equipped with the ability to respond quickly and effectively to change. This necessity has rendered the concept of electronic governance (e-governance) (Riley, 2003, 2001) indispensable, relating to the practical rendering over an electronic environment, such practices as consistent management, cohesive policies, responsive processes and decision-rights for different areas of responsibilities. Of particular interest is the electronic medium (say, an e-campus) to support e-governance activities, referring mainly to the decisions that define expectations, enable empowerment, or verify performance of the people or organizational units involved. Our framework of analysis here examines the university's electronic transformation (e-transformation) efforts to turn its bricks-and-mortar entity into its clicks-and-mortar

counterpart, amidst the technological advances of the Internet and the World Wide Web.

Understanding E-Governance in University Setting

Today, the connotation behind the “e” transformation of governance is an important policy issue and surely one that will influence how the governing body and the governed community will interact in the coming decade (Oliver & Sanders, 2004). Clearly, the Internet and the information and communication technologies (ICTs) have an important part to play in the process. Still, as the “e” prefix becomes affixed to more and more aspects of governance, it is helpful to clarify the implications between governance and e-governance. Governance is often used to refer to the outcome of the interaction among the governing body, the public service, and the governed community, throughout the political process of policy development, program design, and service delivery. As for their “e” counterparts, Riley (2001) provides a useful description for their connotation: In its simplest sense, e-governance is about the use of emerging ICTs to facilitate the process of governing and public administration. In the context of a university environment, it is about providing the campus community with the ability to choose the manner in which they wish to interact with their governing body. And it is about the choices the governing body makes about how ICTs will be deployed to support the choices preferred by the campus community.

In practice, the transformation of governance structures and processes, enabled by technology, will be embedded in new modes of information exchange, perhaps, more integrated and distributive approaches to operations and service delivery, and a more open and participatory system of policy making. By capitalizing on the Internet revolution, the university authorities can create new channels of communication and new methods for participation via suitable e-governance measures.

It is foreseeable that the changing environment, coupled with faculty, student, and local community demands, would continue to encourage the university governing body's involvement in e-governance initiatives and related uses of ICTs.

Accepting E-Transformation Challenge in E-Governance Initiatives

As a result of the e-governance initiatives, many a campus is actively transforming their bricks-and-mortar entity into its clicks-and-mortar counterpart. We call such a transition effort the electronic transformation of the organization, or simply the e-transformation effort (Henderson & Venkatraman, 1993; Hoque, 2000). Obviously, such an effort requires an objective methodology (Vat, 2000, 2002), which must be instrumental to creating an efficient electronic organization (e-organization) model that could enable the organization to launch and to learn based on some innovative initiative, and then incorporate the lessons learned and launch again. Consequently, the organization transformation could be considered as the essence of a learning organization (Senge, 1990; Garvin, 1993; Duke, 2001; Shattock, 2003), implying its constant efforts to better itself for any coming challenges. An example in the context of our university e-governance is to consider the challenge of managing a learning university (Duke, 2002) and putting the university online (Cornford & Pollock, 2003).

A university comprises valuable human capital coming from its teams of knowledge workers, who have a strong formal education, have learned how to learn, and have a habit of continuing to learn throughout their lifetime. Nevertheless, such human capitals as the university's intellectual assets could be made more visible only through their application and reuse (Conklin, 1996; Stewart, 1997). These then are good reasons to stewarding people's intellectual knowledge, however implicit it may be, and making it available within and outside the organization whose competitive edge comes from

having and effectively using such knowledge. The idea of electronic portfolio (e-portfolio) systems (Aalderink & Veugelers, 2006; Dalziel, Challan, & Sutherland, 2006), as part of a university initiative to improve teaching and learning, fits timely to advance this goal in higher education. However, this vision requires e-transformation efforts on the part of the conventional university to take advantage of not only the new technological, but also the renewed governance opportunities. The result could eventually be an essential constituent of an e-governance initiative, which comprises an electronic form of the original university renewed based on the working model of a virtual corporation (Davidow & Malone, 1992; Cheng, 1996; Hedberg, Dahlgren, Hansson, & Olve, 1997), to enable a re-engineered vision of the university's education, administration and governing process.

Innovating Quality E-Portfolios for Continuous Improvement

As online technologies and information resources rise in salience with the advent of the Internet, we are witnessing the emergence of a multi-faceted techno-pedagogic reality in the development of online support for student learning. The e-portfolio model of education (Vat, 2010, 2009, 2008) could be considered as one example phenomenon as a result of several important converging forces. Such forces are causing the education community to re-examine where learning takes place and how it could be assessed, how work and knowledge should be managed, who we, education practitioners, really are as we present ourselves to the world, and how we use technology for teaching and learning. This idea of the e-portfolio is said to be a flashpoint "at the converging of imperatives and opportunities in the management of learning for human and social capital development" (Jafari & Kaufman, 2006, p.xxvi).

Technically, its context ranges from the simple conceptualization of e-portfolio as a means of capturing student progress through a program of

study, involving student work, student reflection, and faculty comments related to activities of teaching and learning (Henry, 2006), to the technological potential (Plater, 2006) which allows faculty and institutions to actually enable each student to have a personally managed, meaningful, coherent, integrated lifelong record of learning that demonstrates competence, transcends educational levels, and is portable across institutions of learning. In fact, e-portfolios are more than storage devices of the learner's best work (O'Brien, 2006). They provide the means for students to set learning goals, monitor and regulate their progress toward these goals (a form of self-directed learning), as well as develop their self-assessment skills. Practically, e-portfolios should serve as the student's pathway from classroom to career.

The Personalized Aspect of E-Portfolios

As life-long learners, we are always looking for tools to transform our learning experience, to enable learners to become autonomous and enjoy a truly personalized development path. It is believed that the e-portfolio is one of the most significant tools for achieving this goal. It should support the realization of a portfolio-based career, and act as an instrument for social inclusion, allowing us to "tell our story" and celebrate our achievements (Flanigan & Amirian, 2006). In fact, the e-portfolio could facilitate a continuum in the learning space where someone starting an e-portfolio at school, college, university, or work would not have to throw away the investment of years when moving from one episode of life to another. The e-portfolio should be our faithful digital companion, reflecting our digital identity and supporting our learning, and enabling transactions with others in a variety of social networks. For instance, in the professional circles, e-portfolios could become the indispensable tools for reflective practitioners extracting learning from the workplace, and sharing their reflections with their peers to contribute to the

development of different professional learning communities.

The Learning Aspect of E-Portfolios

In a typical learning environment, there are many roles the e-portfolio can play, examples of which include the means of assessing student learning, the means of showcasing outstanding student achievements, and the means of ensuring learner accountability (Acosta & Liu, 2006; Sherman, 2006). Yet, whichever role the e-portfolio might play, there is one aspect that all e-portfolios have in common: namely, the learners must create portfolio elements or artifacts to be presented within the portfolio itself. As instructor or facilitator of e-portfolio learning, the design of sample e-portfolio requirements to document and communicate the learning of skills reflected in the learning process becomes critical. Examples include a learning contract with specific lesson plan detailing what the expected learning should be and the way to demonstrate the acquired learning. Such e-portfolio requirements should delineate the specific artifacts to be created by the learners to complete the process of learning. Indeed, this act of "creation" would necessitate the learning and/or application of a variety of skills related to the learning episode. Importantly, using the e-portfolio requirements as an aid of setting personal learning goals becomes a form of instructional scaffolding. Oftentimes, learners need to articulate clearly the goals of every piece of new learning experience by demonstrating the series of created artifacts to be included in the e-portfolio as evidence of the lessons learned. In this regard, examples of similar works from different learners could be collected into the e-portfolio repository for comparison and evaluation.

The Design Aspect of E-Portfolios

The advent of Web technology has brought about the currency of e-portfolio, which can not only be

considered as an effective way to assess student learning, but also as a vehicle for knowledge development and for career building (Napper & Barrett, 2004). The key behind the e-portfolio movement lies in the empowerment of the learner to take charge of his or her own learning (Ramsdon, 2003; Barrows, 1988). Specifically, the e-portfolio scheme of learning shifts the locus of control from what we faculty teach to what students learn (Acosta & Liu, 2006); namely:

- **Enable students to determine what they need to learn through questioning and goal setting:** It is believed that students should work to identify their knowledge and skill deficits, and to develop strategies in the form of personal learning goals for meeting those deficits. The emphasis is to foster a sense of students' ownership in the learning process. In particular, e-portfolios emphasize analysis and reflection, and the development process, but not merely the product of learning. This process perspective not only raises the cognitive bar, but also shifts the locus of control from not so much what the instructor is doing, to what the student is doing to meet learning objectives. Moreover, the student can reflect on his or her learning and can demonstrate learning to persons outside of the immediate learning environment with the production of relevant electronic artifacts. For example, interested employers could review a student's resume, group project contributions, and other items of interest the student wants to make accessible. Likewise, if teachers, through the e-portfolio support environment, can guide the students in identifying what they already know and what they need to learn, then knowledge gaps and mistakes can be viewed in a positive way such as another opportunity to learn. And students can assume more re-

sponsibility in addressing their own learning needs during any instructional episode.

- **Enable students to manage their own learning activities:** It is believed that students must be enabled to develop their learning plans, which should describe priorities, instructional tactics, resources, deadlines, roles in collaborative learning situations, and proposed learning outcomes, including presentation and dissemination of new knowledge and skills, if applicable. Traditionally, these instructional events are arranged by teachers to be obeyed by students, in order to accomplish a specified set of pre-determined objectives. Yet, it is not advantageous for students to learn to be self-directed. To manage their own learning activities, students must be guided and supported by the teacher, through the e-portfolio environment, slowly taking on more and more responsibility of their own learning. For example, collaborative learning, inside and outside of the academy, is another feature of the new portfolio model, which should document such efforts as peer-to-peer projects promoting teamwork and communication skills, student-mentor projects (say, internships in the industry) giving students the opportunity to experience the world of work for better understanding of their future profession and workplace culture, student service-learning projects offering students first-hand understanding of societal issues and problems. Whichever type of projects the student is involved, he or she should maintain housekeeping of his or her e-portfolio and allow peers, mentors, and the community to give input, while the instructor at school provides the opportunity for the interactions, and assesses the intended learning outcomes.

The Curriculum Aspect of E-Portfolios

It is anticipated that the e-portfolio, as a tool to transform teaching and learning, should become a catalyst for curriculum change and a new model of assessment at the University of Macau (UM), which should connect the educational mission and objectives with the needs of society. It should also bring students closer to their future profession, and carry learning into students' future careers and possibly into their lifelong devotions. Thereby, the e-portfolio review process should serve as the feedback mechanism to update the academy on the skills required by students as they enter society. Put it simply, if students are immersed in projects that extend into the dynamic workplace and community (rather than the limitations of the campus) then they must demonstrate not only applicability of knowledge, but also flexibility and adaptability. The pedagogical challenge then is to set up connections between academic objectives and societal needs that will update the curriculum by incorporating current global perspectives. It is also expected that faculty members will then be in discussions with interested parties in the community to determine student outcomes. Therefore, the assessment of a course, program of study, and the related discipline will be somehow corroborated with persons outside of the academy. In this regard, the deliberation of an e-portfolio scheme of student learning, including its elements of flexibility should always be an important area of concerns.

FUTURE TRENDS FOR CONTINUOUS INNOVATION

Today, the predominant university model is still the combination of traditional teaching and academic research as mapped out by Wilhelm von Humboldt, the founder of the University of Berlin in 1809 (Denning, 1997). But, change is unavoidable in

the 21st Century. This change is mainly driven by the new technological possibilities, and the new learning environments which result (Tsichritzis, 1999). We have witnessed the convergence of computing, communication, and document management technologies, as well as certainly the computer networks, pervading in the Internet. Such technologies have an enormous potential for transforming education to meet the growing need for customized, on-demand learning.

Yet, a new model of knowledge production, delivery, and presentation, is needed to combine an individualized approach, flexibility, and ease of dissemination without sacrificing the effectiveness of learning. This model must also offer the learners, the technological and pedagogical possibilities to collaborate with participants and experts all over the world via the World Wide Web, and to access online resources integrated into the study materials. However, it is well understood that if our universities were to absorb this model and to retain the longstanding position as our intellectual watering holes, the university today must be redefined with new concepts. And our discussion so far attempts to expound the re-engineering required through looking at university education as an enterprise for learning, the prime candidate for being the application of today's electronic organization transformation. The key to the success of any learning enterprise is innovation. Our university needs to make innovation happen now and ever.

Yet, what does innovation look like? Or, how do we know innovation when we see it? A quick look around the world reveals that innovation has many forms, including a better or new product, such as an automobile; a combination of products, such as an Internet phone; a fashion, such as a designer dress; a business model, such as the virtual university; a service, such as a school that offers customized (or personalized) distance learning or tutoring; an attribute, such as oil that helps clean your car engines; and a package, such as a paint that can never spills. Indeed, there are hundreds

of competing definitions of innovation, most of which are narrowly focused and somewhat restrictive because they associate innovativeness with a particular element or attribute. Words such as “technological” or “breakthrough” are common examples.

Yet, innovation is increasingly not restricted to any one type; it is often a combination of forms, which, when put together produce hybrid solutions. Thereby, in an organization setting (say, a university), innovation should have a much wider role and application, and needs a more operational definition to identify how it works in practice. For example, all types of innovation employ some form of useful novelty aimed at making things better or new. Namely, useful innovation is intended to create some form of tangible or intangible value. More importantly, an innovation is always specific to the situation and time in which it was given rise. Innovation has a transformative quality because it will both replace existing products and services, as well as replace ways of doing things, and in turn, it will be replaced by a subsequent innovation. In this light, innovation is always involved in an endless cycle of emerging and dissolving (DeGraff & Quinn, 2007), and it comes with two partners: creativity and change. To put these concepts in context, we can visualize how an engine works: creativity is the spark that ignites the fuel; change is the heat that the combustion produces; and innovation is the engine turning the heat into power and moving the vehicle up the road towards a specific destination. Thereby, creating a learning culture in support of innovation for continuous improvement in actualizing organizational development, is a very legitimate goal that is so much an integral part of modern-day organization e-transformation efforts, be they applied to the university setting or to the SME context. Yet, we need to ask: What organizational engines of innovation are supposed to be in place?

Engines of Innovation

Any engines of innovation must be designed with some blueprint, which is the ultimate map in that it contains the totality of an engine’s forms and functions. Borrowing from the organic metaphor of Burns and Stalks (1977), the blueprint of the human engine for innovation is often referred to as a genome (or a genome map), which, at its inception, contains all the information it needs to grow into a mature organism. This map exists in every cell of the organism and provides specific instructions for each cell to integrate with other cells. It is both whole and complete in all its forms, and yet part of a larger system.

On researching the innovation context for organizations, it is much appreciated to discover the work done behind the term *Innovation Genome* (DeGraff & Quinn, 2007, pp. 8-32), which is used to describe how the entire system of organizational innovation functions at all levels: the individual, the organization, and the larger strategic environment where value is recognized by markets and consumers. One of the key pieces of the *Innovation Genome* is a map, which shows four different approaches to innovation, known often as the four-quadrant model. Each quadrant represents characteristics and practices that produce different forms of value. The quadrants operate essentially the same way for individuals, organizations, and markets. The strengths, weaknesses, and interactions of these four quadrants determine an organization’s ability to produce specific forms of innovation in specific situations. The four quadrants, recognizable by the key measures, workplace environments, organizational practices, and leadership behaviors associated with each of the four types considered as best practices, include: the Collaborate, the Create, the Compete, and the Control quadrants.

The Collaborate Quadrant

According to DeGraff and Quinn (2007), the Collaborate quadrant is based on a social approach in which the leaders believe that an enterprise has as much purpose to build relationships, nurture community, and empower individuals as it does to produce goods and services. To accomplish this goal, the leaders must ensure that new ideas benefit the community and that any communication and partnerships must be sensitive to the needs, abilities, and ambitions of everyone in the organization. Put it simply, the Collaborate approach to innovation is based on a human-relations view of organizations that emphasizes the need for individuals to unite in a positive way to build cooperative communities of practice. This profile connects individuals to a greater good or a high-principled mission. Namely, empowering people to do what they believe to be right is essential for the Collaborate leader. Mutual trust and integrity are cornerstones of this culture, which creates highly committed individuals. Leaders develop their teams and team members through organizational learning practices, education, and coaching. This network also includes customers, who are treated as part of the family. Subsequently the organizations are considered as good to work for because of the emphasis on balance between job duties and personal life.

The Create Quadrant

The Create quadrant is a generative environment; i.e., it keeps regenerating itself such that one idea always leads to another and to another and so on. In a sense, the Create approach to innovation is about producing many radically different ideas instead of one big one. It is highly responsive to turbulent and fast-changing conditions. When the future is unclear or rapidly changing, the ability to launch a wide array of experiments and speculate on new markets provides a strategic advantage. Organizations in the Create quadrant excel at

brainstorming, creating elaborate strategic plans, starting spinout ventures under the radar, and assembling a diverse array of characters that are willing to let go of perfection in order to create something new. Breakthrough products, services, ideas, and people are found in this fluid and ever-shifting environment. Essentially, the Create form of leadership judges their success on the innovativeness and future readiness of their products, services, and ideas. They keep an eye on future trends, judging which way they think the wind will blow and then applying their imaginations to the difficult task of making the wind blow in the desired direction. Individuals who work in a Create organization are usually involved in all aspects of the enterprise. Power and responsibility flow from individual to individual or from team to team according to their capability and the project at hand. The glue that holds Create organizations together is a shared pursuit of a grand vision, seemingly impossible goals, radical innovation, and a culture of risk taking.

The Compete Quadrant

The Compete quadrant is based on a survival-of-the-fittest approach to innovation. This is a quadrant where high achievers thrive. In most cases, Compete companies are publicly traded business and therefore must demonstrate short-term profitability for shareholders. They believe that business is a zero-sum game – everyone is either a winner or a loser. High-achieving competitors, who thrive in this quadrant, are most comfortable in a results-oriented environment. They enjoy challenges and the hard work needed to win. The Compete form of leadership motivates employees by articulating clear objectives, often in the form of strategic moves to beat the competition. Indeed, the Compete environment maintains an outward focus on meeting customer demand; Compete companies judge their success by their market share, revenue, brand equity, and profitability. There are a number of practices such organiza-

tions gravitate toward, and many are aggressive in nature, including mergers and acquisitions, performance management scorecards, and pay-for-performance plans, which provide rewards to those who achieve or produce the most.

The Control Quadrant

The Control quadrant is based on a technological or engineering approach to innovation. It takes a systematic view such as continuous improvement “Getting better every day in every way” through the discipline of applying multi-step processes, which are known to work with little risk. This approach has a safety-net feature to it, and it is particularly useful for large complex organizations that need to create products and services that must have a hit at the first launch. The Control form of leadership tends to be methodical, pragmatic, and precise. Control leaders excel in a workplace that has clearly delineated roles and responsibilities, systems and processes, and policies and procedures that ensure things are done correctly. They are clear-thinking realists. Yet, the Control quadrant is often overlooked as a form of creativity because implementing incremental changes in systems, structures, and standards may not look creative enough, but in the real world, many industry giants, like Toyota, often use a safe and predictable method to win the race. Such companies have often perfected many of the industry’s foremost system and process tools for design and development. Like Toyota, they virtually break processes down to the most elemental level in order to understand how something works and how it can be made better. Thereby, Control leadership focuses inward and requires discipline. It is concerned with improving quality while at the same time cutting costs. It is especially valuable in industries that require standardized procedures, rule reinforcement, and consistent products, such as transportation vehicles. Control measures serve to eliminate errors and increase the likelihood of expected outcomes.

A Path to Innovation

Undoubtedly, recognizing what results an organization wants and the practices, competencies, and the leadership types associated with these outcomes is the first step toward crafting an approach to making innovation work where expected. It is believed that the *Innovation Genome* from DeGraff and Quinn (2007) should serve as a guide to respond to challenges in multiple situations by providing a way to gauge an organization’s progress and to ensure that it gets the outcomes expected. Ironically, the major impediment to making innovation happen in many an organization is the inability to get through its own systems, particularly those designed to aid innovation.

It is convinced that innovation must be perceived as a democratic endeavor, something that every one is expected to do. We need leaders to demonstrate ownership for all aspects of innovation, as travel guides to those yet uninitiated in the ways of innovation. Such leaders are often self-authoring people who add creativity to ordinary organizational activities by capturing the essence of a transformation toward an objective. Indeed, creativity is the fuel, or the raw material of innovation. It is a capability that individuals and organizations must recognize and capture in all its forms. Once an organization has realized this capability, it will be set on a path toward systemizing a culture of innovation. The organization then would develop the expertise necessary to put all these pieces together to lead itself on a path toward innovation. In the end, it is believed that leading innovation is really about leading people. It is about finding a way to engage people to draw innovation from themselves and bring it to life within their work settings.

In the context of the University of Macau, it is the author’s observation that the innovation model makes explicit the need for dedicated management activities that explore and track the abstract requirements needed to realize some objective while simultaneously, but independently,

investigating and specifying the concrete means for satisfying the abstract requirements. It can be expressed as a framework for accommodating dynamic changes in both requirements and available means (or services) in an organizational and technological setting, in which the means for reaching a goal are continually and routinely evaluated in relation to explicit criteria. That way, management could ensure that requirements are satisfied as appropriately as possible. It is convinced that this innovation practice could be applied to the setting of e-transformation efforts in the new campus when new technologies, processes, and methods, could be adopted in the case of developing the e-portfolio systems of creating and delivering educational services. This is also the innovative context of any technology change management, which could be summarized using the IDEAL model (Gremba & Myers, 1997), quite compatible with the *Innovation Genome* from DeGraff and Quinn (2007), even though it was originally conceived as a life cycle model for software process improvement based on the capability maturity model (CMM) for software at the CMU-SEI (Paulk, Weber, Curtis, & Chrissis, 1994), and has since been adapted for broader applications.

IDEAL provides a usable and understandable approach to continuous innovation by outlining the steps necessary to establish a successful improvement program. The model consists of five stages. Initiating (I) is to lay the groundwork for a successful improvement effort. Diagnosing (D) is to determine where we are relative to where we want to be. Establishing (E) is to plan the specifics of how we will reach our destination. Acting (A) is to do the work according to the plan. Learning (L) is to learn from the experience and improve our ability to adopt new measures (technologies) in the immediate future. The strength of the IDEAL stages is their ability to help an organization develop a sustainable and resilient culture for innovation and the corresponding capabilities to afford the same. They could be put to the best use

in getting larger groups of individuals to execute the innovation playbook of an organization, to unleash their creativity, for some timely changes, in order to meet the challenges of a complex array of dynamic forces, operating in a predictable innovative way. Once an organization gets familiar with the IDEAL stages of innovation, it should soon realize how this model could be extremely versatile and applicable in a number of different settings, such as identifying high-potential leadership areas, launching a winning project, integrating best practices for innovation into existing organizational processes, and changing organizational culture and competency.

REMARKS FOR CONTINUING CHALLENGE

The turbulence generated by the integration of information technology into higher education has provoked much wishful thinking, among educational planners, faculty members, and university administrators, regarding many promising e-transformation projects, such as Web-based course management, groupware for faculty or students, and cooperative environments for teaching, research, administration and system support. Unavoidably, it will be necessary for academics to adjust their teaching, and for administrators to re-examine the business of running a university with the advent of the Internet technologies. Yet, collaboration matters. It is intended and understood that many a design of learning experience should not be an erratic response to technical advances, but rather it must be a genuine attempt to achieve specific educational goals (knowledge development and transfer). According to Johnson and Johnson (1989), if universities were to succeed in the emerging marketplace of the educational industry, they would need to be mindful of nurturing some basic conditions throughout the process of providing educational services to students.

The Renewed Mindset for an e-Portfolio-Based Education

In contrast to the traditional ‘direct transfer’ model in which the instructor is assumed to be the sole source of knowledge and skills, the renewed learning model could be an interactive, collaborative knowledge building process (Harasim, 1990, 1999). In the traditional linear model of education, learning design proceeded from defining objectives to lesson planning to course delivery. Educators first engaged in a comprehensive learning needs analysis process, often based on assessments done by others about competencies and learning objectives. Comprehensive course syllabi were developed. Finally, the course was delivered as planned. Associated with this linear approach were a set of teaching strategies characterized by being predominantly one-way, centralized, and broadcast-oriented. When students appeared bored and unengaged in this type of program, the solution was to find ways to use new media to make the one-way broadcast more entertaining. Much early online learning was nothing more than a way to generate a broadcast of an expert and his or her multi-media slides with good production values. However, an expert lecturing to a group of passive students is engaging in didactic one-way teaching no matter how excellently that lecture is delivered, say from a stage in an auditorium, or via broadcast television to students sitting in their living rooms. Today, we need a renewed mindset for education. Teaching and learning is currently seen as an ongoing process rather than a program with a fixed starting and ending point and the importance of widespread participation by learners in the design of their own learning has also been widely recognized (Kimball, 1995). ICT (information and communications technologies) are particularly well suited to a more dynamic approach to managing education. Good teachers have always been open to changing their lesson plans based on student input. New media makes it easier. And online environments can provide

spaces for continuing conversation among students and teachers about what is working and what is not working in the course setting. The idea of participatory course design is not to be neglected. The new campus environment should provide an opportunity to support collaborative learning in ways we have not been able to do before.

The New Roles for Teachers and Students

Instead of performing as the sage on the stage transmitting knowledge to a class of innocent students, in the innovative, collaborative learning environment, teachers’ roles are to be defined in terms of mediating learning through dialogue and collaboration where knowledge is created in the community of students rather than being transferred from the individual.

More specifically, the idea of mediating could include such aspects of facilitating, modeling, and coaching (Chung, 1991; Whipple, 1987). Facilitating involves creating rich activities for linking new information to prior knowledge, providing opportunities for cooperative work and collective problem solving, and offering students a multiplicity of authentic learning tasks. Modeling serves to share with students not only the perceived content to be learned, but also the important meta-cognitive skills of higher-order thinking, in the process of communication and collaboration. Coaching involves giving hints or cues, providing feedback, redirecting students’ efforts, and helping them use a strategy. A major principle of coaching is to provide help only when students need it so that students retain as much responsibility as possible for their own learning.

In fact, we need to teach students to rely less on teachers as the source of knowledge. We need to help them learn to learn as self-directed groups of active, autonomous, and responsible individuals. In the renewed learning settings, students are expected to assume their new roles as collaborators and active participants. It may be useful to

think how these new roles influence processes and activities before, during, and after each episode of learning. For example, before learning, students set goals and plan learning tasks. During learning, they work to accomplish tasks and monitor their progress. After learning, they assess their performance and plan for future learning.

In practice, students constantly need help from the teachers to help them fulfill such new roles. Students must learn to become teachers of their own. Indeed, a frequent formula (Dilworth, 1998) that action learning proposes has been quite useful in constantly reminding students of their new role in the new learning scenario. Namely, $L = P + Q + R$, where L (learning) equals P (programmed instruction) plus Q (questioning) plus R (reflection). Here P represents the knowledge coming through textbooks, lectures, case studies, computer-based instructions, and many others. This is an important source of learning but carries with it an embedded caution flag. That is, P is all based in the past. Q means continuously seeking fresh insight into what is not yet known. This Q helps avoid the pitfall of imperfectly constructed past knowledge. By going through the Q step first, we are able to determine whether the information available is relevant and adequate to our needs. It will point to areas that will require the creation of new P. R simply means rethinking, taking apart, putting together, making sense of facts, and attempting to understand the problem. Following the use of this formula, action steps are planned and carried out with constant feedback and reflection as the learning takes place. It can provide for the mature students elevated levels of discernment and understanding through the interweaving of action and reflection.

CONCLUSION

It is convinced that the organizations that will truly excel in the future will be the organizations that discover how to tap people's commitment

and capacity to learn at all levels in an organization. To harvest the knowledge and experience of people and make it available to the organization as a whole, ICT technologies need to be managed differently to support dialogue rather than mere databases. In particular, communication technologies are needed to support a learning environment, which could stimulate and nurture the complex network of interpersonal relationships and interactions. Also, people must be allowed to make choices about whom they need to communicate and learn with without regard to traditional organizational boundaries, distance and time.

In other words, they need to manage their own learning to form new groups and teams as requirements develop and change. The new framework for managing the university should be about managing the learning process as well as managing course contents. The kinds of questions we need be asking ourselves are not only about how to plug one type of technology into another, but also about how to use technology to leverage resources and group dynamics in new ways to make fundamental changes in every part of the learning process.

It is not surprising to recognize that the easy part of this process might be the technology, and the tough part is to invent and to innovate with the organizational context to create new models of experiences for knowledge sharing with the technology. Humboldt (Denning, 1997) did the most to spread the notion that universities are places of research, whose ultimate value, according to Tschritzis (1999), lie in innovations. And an innovation occurs when the standard practices of a community of people shift, so that they are more effective at what they do. Consequently, we are optimistic that any new campus development, just like any new business enterprise in the making, should offer ample opportunities for the whole community of the organization to grow and to become leaders in innovation for the common good starting from right now and beyond.

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KEY TERMS AND DEFINITIONS

Continuous Improvement: A process of organizational development based on an unwavering commitment to progress, examples of which could include such activities as identifying core beliefs, creating shared vision, using data to determine gaps between the current reality and the shared visions, identifying the innovations that will most likely close the gaps, developing and implementing an action plan, as well as endorsing collective accountability.

Electronic Transformation (E-Transformation): A process of organizational renewal based on transforming the organization from its bricks-and-mortar entity into its clicks-and-mortar counterpart. This is done through the application of suitable information and communication technologies (ICTs). In the Internet era, one example use of the ICTs is to Web-enable the operations and services of the organization, such that members of the organizations could experience the organizational operations and services through virtual encounter.

Electronic Portfolios (E-Portfolios): Electronic records to keep track of some developmental process or processes, such as student learning throughout a period of time, say, throughout the undergraduate years of study, including such artifacts as learning records (homework, projects, presentations), as well as showcases of major achievements such as final year (capstone) works before graduations, together with institutional authentication of the student work, plus reflective comments from students, and feedback from teachers course by course.

Engines of Innovation: An organization mechanism to support individuals' initiative to innovate: namely, the use of new ideas, new methods, and new practices to achieve various organizational goals. It may be some platform where organization members could use to enhance interpersonal exchanges through the application of

some ICTs, to support virtual encounter of distributed communities of practice in the organization.

Framework of Accountability: An organizational structure to support such initiatives whose success or failures must be accounted for, based on clearly defined measures of interest, and based on relevant data collected on a longitudinal basis, in support of the some formative assessment of the situation of concerns, such as whether student learning has been improved in the setting of higher educational institutions.

Innovation: The use of a new idea or method or practice, say, in the application of a new computer technology in organizational development.

Learning Enterprise: An organization that helps transfer learning from individuals to a group, provide for organizational renewal, keep an open attitude to the outside world, and support a commitment to knowledge. It can also viewed as an enterprise that focuses on developing and using its information and knowledge capabilities in order to create higher-value information and knowledge, to modify behaviors to reflect new knowledge and insights, and to improve bottom-line results.