From MegaWeb to e³Learning:
A Model of Support for University Academics to Effectively Use the Web for Learning and Teaching

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Abstract: This paper discusses the university academic's role as teacher, especially considering pressures and trends for implementing web technology for teaching and learning. It introduces two Hong Kong government-funded projects which provide the staff development, management system, and expertise needed to design, build, implement, and evaluate educational websites.

Introduction

Remember the days when university lecturers would drone on reading their notes to a class of obedient note takers? Or better yet, they would read from the board while they copied their notes to the board while the students copied from the board into their notebooks. Maybe not the best educational environment, but the duties of the lecturer were well-defined: conduct research, prepare and deliver content – even assessment was limited to examinations (the lowest level on the academic food chain was the Marker – the professor didn't have the time to mark assignments).

Over the past 15 or so years, things have been steadily changing – along with the publish or perish mentality that continues to promote research as the primary career advancer (Smith, 2000), we have had shrinking resources, heavier teaching (and marking) responsibilities, with universities being run under business models which have introduced a myriad of administrative duties to fulfill a quality-controlled, client-server philosophy of education. The university academic is even more thinly spread across competing roles of Researcher, Teacher, and Administrator.

This paper views the academic as an ever-improving teacher who is expected to embrace newer teaching methodologies, including the effective use of technology. It describes a Hong Kong government-funded project affectionately called "MegaWeb" which helped create a university-wide infrastructure for supporting staff by providing consultation, educational, management, and technical expertise for creating pedagogically-sound web sites for teaching and learning. Now, a new project has been generated from MegaWeb. This new initiative, called e³Learning, takes the design, management, and production components of MegaWeb and adds both a New Technologies and an Evaluation arm to the project under a three-university cooperative umbrella to provide more support to more staff and students. We offer e³Learning as a model for helping keep lecturers at the forefront of at least one of their roles.

The ever-improving teacher

University academics of today are expected to be effective teachers using teaching methodologies far advanced from the traditional didactic lecture. In Hong Kong, universities are in the second round of TLQPR exercises (Teaching and Learning Quality Process Review) to ensure that universities have processes in place to enhance learning and teaching. Teachers are expected to be facilitators in active, student-centred environments – for example, problem-based learning where students work collaboratively, finding and analyzing different solutions to given problems. This is in sharp contrast to "traditional"-delivery classrooms where Bonwell and Eison (1991) found that "student talk" accounted for only about 5% of class time across disciplines. Teachers are also increasingly expected to understand students' approaches to learning (surface, deep, achieving – for more information, see Biggs [1999]) and to cater for these approaches.

Now, as technology has become so pervasive in all aspects of education, university staff are experiencing further widespread changing roles (Yetton, 1997). McInnis (1999) states that 74% of Australian academics use problem-based learning, 72% multimedia technology, and 65% collaborative learning strategies. McInnis also reports that of the main reasons for recent changes in teaching methods, the "Availability of technology" ranks #1 in the UK, and #2 in Australia (behind "Own initiative/ decision"). McInnis stated that two-thirds of those surveyed reported that the development of course material for new technologies has a major impact on their changing work hours and that 60% said that they have little time outside work hours. Clearly, staff would welcome help in preparing for, understanding, and effectively using new technologies to enhance teaching and learning.

Web-based teaching and learning

Most universities' strategic plans contain some reference to information technology, including using information technology for teaching, often including reference to "open learning and flexible delivery" (Anderson, et. al, 1999). The motivations range from using technology to enhance the quality of teaching, to using technology for efficiency of delivery to students at remote locations. The Hong Kong Polytechnic University (PolyU) states in its strategic plan for 2001-2007 to "Actively promote and increase the use of multimedia technology in programme delivery (and) … Speed up Web-delivery and distance-learning capability" and even lists the very specific goal "To ensure that about 8% of all our undergraduate and postgraduate subjects will have an interactive "on-line" delivery version by the end of 2003/4."

Websites that simply enable students to download notes may provide a convenient service for students, but such repositories are of doubtful educational value (Alexander et. al., 1998). However, websites that have communications facilities that promote students' efforts to collect, manipulate, synthesize, and understand knowledge can be extremely valuable to students' learning (Tait & Mills, 1999; Weigel, 2002). From the authors' own experiences, websites that provide relevant graphics, animation, and video clips to enhance content, activities (such as quizzes), and which also provide communications features, enable rich on-line learning environments. Communications features enable student-to-student, student-tutor, student-group, and group-tutor contact in e-mail or forum format, when facilitated by committed teachers.

Consider now the dilemma of the teacher under pressure from the upper levels of the university to deliver effective web-based instruction: How do you build a website? What types of media should be incorporated in order to cater for different learning styles? How are web sites designed to promote new tools and strategies for different students in different learning contexts (McNaught [2002])? How are valuable communications activities effectively facilitated?

For many academics, the increasing emphasis on the use of computer technology for administration, research and teaching is highly threatening. These fears need to be recognized and plans devised that build staff confidence and motivation, and provide adequate support and training opportunities. Even those systems designed for use by staff to build their own websites (like WebCT, Blackboard, or "home-grown" systems) require confidence, experience, and training on the part of the teacher. Many of these systems are surprisingly user-_un_friendly.

In fact, creating educationally worthwhile websites involves the talent and experience from several people; Phillips (1999) explains the phases involved in the process of developing educationally-effective interactive learning environments – educational design, design of the software environment (including hardware and software considerations), project management, production, documentation and quality-

assurance issues, maintenance and evaluation. It would be a talented teacher indeed who could contribute more than the subject content and (hopefully) instructional design.

MegaWeb: support for the development of best-quality websites

In 1998 the University Grants Committee of Hong Kong (UGC) funded a project titled "Enhancing Learning, Teaching, and Curricula with a University-wide Integrated World Wide Web Framework". The fundamental aim of the project was to help academic staff to develop and use modern technologies to support their teaching at a variety of levels, by providing resources and expertise in the areas of both pedagogy/instructional design and technical matters/production, within an integrated framework across the campus. Emphasis was on ownership of innovations by teaching staff. Also, a basic premise was that successful utilization of IT involves the coordinated input of three sets of expertise:

- Subject experts (academic staff members);
- Expertise in instructional design and pedagogy; and
- Experts in technical production of electronic materials.

The deliverables of this project included 241 custom-built websites, and 447 consultations with staff.

The Project's strongest point was its flexible, "Full Package Service"; that is, its complete suite of services, beginning with the initial consultation, and progressing through the design and production phases, to providing staff and student orientation, as well as providing maintenance, technical help, evaluation, and even expansion of sites for future use.

MegaWeb sites varied in several ways – some were simple WebCT sites that included a custom design to achieve a particular look-and-feel desired by the teacher. These websites tended to be aids to supplement the teacher's "normal" face-to-face teaching. Other sites included a range of learning aids that required specialist technical skills to build and implement – audio and video clips, virtual reality scans, interactions, and simulations. Some websites were built for very small classes (less than 20), while others were intended as "big-hit" sites for thousands of students. One example is the Mandarin Pronunciation of Technical Terms site intended for all university students. A second "bit-hit" example is the English Exit Examination Practice site for all third-year students.

Care was always taken to embrace academic staff (MegaWeb clients) in an atmosphere of help and collegiality. Short surveys were used to measure clients' satisfaction with this project. On a 0 to 5 point scale (5 is Outstanding), academic staff rated:

- Consultations with project staff > 4.6
- Satisfaction with production staff > 4.5
- Satisfaction with website > 4.3

In order to address the complex issues of evaluating the impact of MegaWeb on teaching and learning, a variety of instruments to collect data from a variety of sources was used. Many "how are we doing" surveys were administered to students early in semesters in order to make formative modifications to sites and practices. Open-ended and closed-format questions were asked of hundreds of students. Most negative comments were technical in nature – slow download time, problems with passwords, and difficulties with website features (such as uploading student presentations) were common complaints. Students were positive about materials availability, tutor access, forums, quizzes, and multimedia. However, the evaluation philosophy of MegaWeb was to make evaluation consultation available, along with a variety of instruments, but not to make evaluation administration or release of results mandatory. The type and degree of evaluation was each teacher's personal choice and the MegaWeb team made no attempt to act as "evaluation police". Results were welcome, but the number of teachers who forwarded results was small (less than 10%).

After three years, having created a university-wide culture of staff and students building and using pedagogically-sound websites, the project completed. Fortunately, its staff, resources, and its management system continued on to "Enrich", "Extend", and "Evaluate" student learning environments over the wider context of the e³Learning project.

e³Learning: a collaborative project based on three domains

McNaught et. al. (1999) state that close collaboration between universities is healthy, even in today's environment of competition – a position the report states is in contrast to the views held by most within universities, but which supports the views of the Supervisors of the e³Learning project. The

McNaught's report clarifies that "There is a synergy between collaboration and competition. Collaboration can assist healthy competition in higher education because the efficient use of resources can allow institutions to develop their own specialties more effectively"(p.7).

The e^3Learning project is a UGC-funded, three-institution collaboration in the investigation and development of internet learning systems. It is building upon the internet site development management protocols established at PolyU. It is also expanding strongly into the area of New Educational Technologies, especially investigating the concept of "mobile e-learning", under the direction of The City University of Hong Kong (CityU). Furthermore, the project is building a comprehensive collection of evaluation protocols at every level; collaborating staff from the Chinese University of Hong Kong (CUHK) are overseeing expansion of the MegaWeb evaluation instruments, development of new instruments, and data collection and interpretation. One of e^3Learning's missions is to make evaluation of learning impact a natural component of all design, production, and implementation.

E^3Learning is a structure of staff who possess certain skills, combined with a development process to design, create, and maximize purpose-built educational websites at lower cost and with greater ease for individuals or groups of academics to improve the learning of their students. Figure 1. shows the e^3Learning staffing structure.

The Directors of each project component are full-time senior-level academic staff . The project finances the Manager who manages all production and production staff (the Administrator, and the Supervisors who recruit, train, and supervise paid student helpers). Most student helpers come from either Design or Computing disciplines. One spin-off from this project is a group of students who get first-job experience in web design and construction. The Supervisors have specialties particularly relevant to this project's needs – one with research and report-writing experience (under CUHK direction), and one with experience and expertise in mobile communications devices (under CityU direction). The remaining Supervisors are specialists in graphics design and website production. An obvious economy in resources is the availability of these useful and diverse talents to staff members across the three universities.
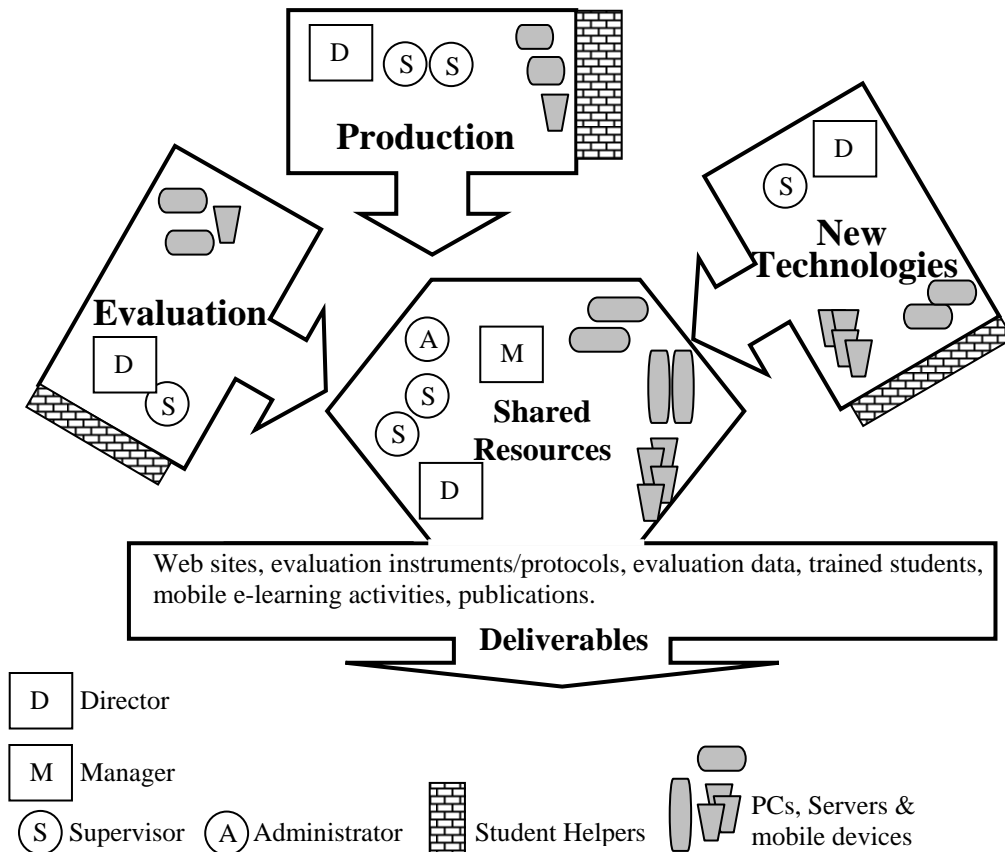

Figure 1: Structure of the e^3Learning project team

The e^{3}Learning project aims to pull the current state of Internet learning systems in Hong Kong forward, especially in the use of mobile systems. Hybrid cellular phone-personal digital assistants (PDAs) are now available. CityU is leading investigations into PDA-learning, cell-phone communications, and hybrid mobile e-learning systems. With the new technologies available, flexible, highly-accessible anytime/anyplace learning systems are possible. These sites can be standalone or combined with "standard" educational web sites. This component of the project also includes collecting tools, utilities, and other software that improves web learning (particularly with respect to enhanced learning productivity).

CUHK staff have made a comprehensive list of evaluation levels that will be implemented in this project; these include: (1) enhancing/expanding current MegaWeb evaluation instruments; (2) an "Are you ready?" checklist; (3) formative and summative site evaluation protocols; and (4) systems for evaluating learning. Furthermore, more widespread evaluation is planned, including Institutional Studies that will be of particular value to senior staff [to answer questions such as "How to assess the implications of this Project's results for the institution (both pedagogically and regarding their infrastructure)"]. Mobile e-learning systems will also be evaluated. The e^{3}Learning project itself will be evaluated using input from an external examiner.

Figure 2. shows the lifecycle of a typical e^{3}Learning website. Staff members first write a proposal and forward it to the project. The proposal is not meant to be a formal document, but instead to be a vehicle to help the teacher think about the basic requirements of the web site, and also to help the project team understand both the needs and level of technical understanding of their colleague. Suggested components of the proposal include:
- brief description of the site
- expected date of launch
- identify students (examples include: "50 first- year nursing students", or "all PolyU third-year students"
- aims/objectives of the website (for example, "Students using this site will have access to activities designed to improve their English Exit Examination scores")
- at least one evaluation question (for example, "Do students communicate more when I incorporate this site into my teaching?
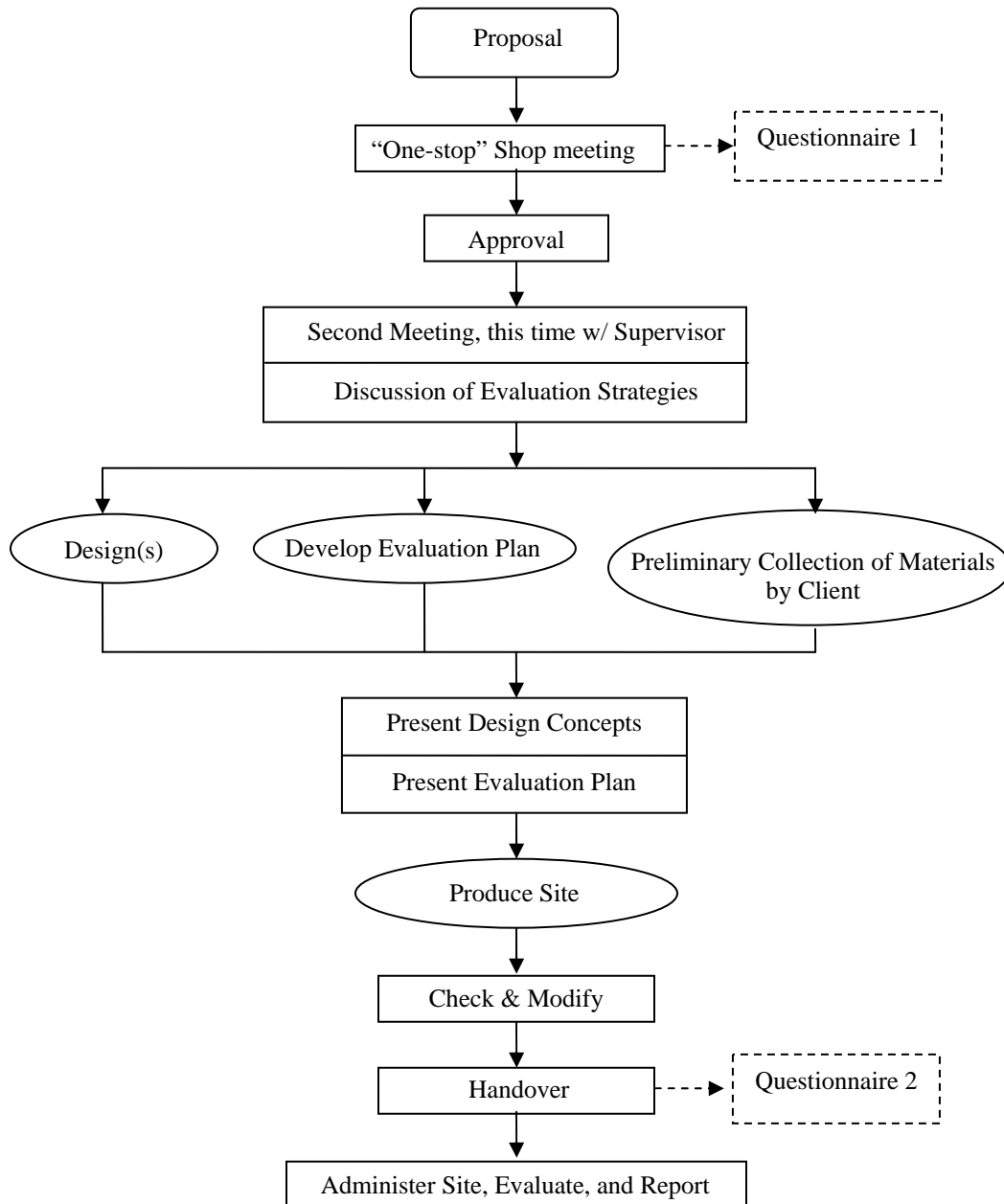
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Figure flow (top to bottom):

- **Proposal** → **"One-stop" Shop meeting** (⇢ Questionnaire 1) → **Approval** → **Second Meeting, this time w/ Supervisor / Discussion of Evaluation Strategies**
- branches to: (Design(s)) , (Develop Evaluation Plan) , (Preliminary Collection of Materials by Client)
- → **Present Design Concepts / Present Evaluation Plan** → (Produce Site) → **Check & Modify** → **Handover** (⇢ Questionnaire 2) → **Administer Site, Evaluate, and Report**

Figure 2: The "lifecycle" of an e3Learning website

The "One-stop Shop" meeting involves a discussion about the proposed site. This meeting generally involves the teaching staff member(s), one Director, and the project's Manager. Features of the website are discussed, and often examples are shown. Soon after the meeting, the staff member is sent a checklist of website features, and "The World's Shortest Questionnaire" to judge their satisfaction with the meeting.

If teacher and project personnel are happy with the proposed site, a second meeting is arranged. The teacher brings to this meeting the checklist indicating which features are required on the site. The Supervisor assigned to this job is part of this meeting. Special features of this particular site are discussed, along with the desired "look and feel". Business cards are usually exchanged, and expected launch dates

are recorded (typically, something general like "For the beginning of Semester 2, 2003"). Evaluation strategies are discussed.

Three processes are then conducted in parallel: (1) design student(s) are recruited to design concepts based on the "look and feel" expressed by the staff member, (2) project staff work on developing the site's evaluation plan, and (3) the teacher collects and organizes the content for the website. It should be noted that e[3]Learning staff take no responsibility for content.

Design concepts are circulate among all participants and in due course a concept is selected (sometimes after several amendments); rejected concepts are kept in a library – often to be first-choice selections by other staff, but sometimes to be used for "just in time" site development.

The site goes through a rigorous Build-Check-Modify cycle as errors as simple as misspellings or as critical and complex as non-working interactions are fixed. It has been estimated that typical sites go through over 100 "checkpoints", as all features are checked using different browsers (and different versions of browsers) with different hardware configurations.

The informal "Handover" occurs when the Supervisor meets the staff member to go over all of the website features, including maintenance activities (such as backing-up the site). Some staff prefer that the Supervisor introduce the site to the students on the first class session. The e[3]Learning team is also available for help during the teaching semester, if needed. The "World's Second-Shortest Questionnaire" is sent to staff to obtain feedback on the client's satisfaction with the team and the final website.

Conclusion

Without doubt, the pressures of competing roles of researcher, teacher, and administrator contribute to academic stress. Expectations of academic staff exhibiting "best-teacher" characteristics, using the latest teaching methodologies that include appropriate use of technology are further contributors. The e[3]Learning project is intended to help give university teachers the support they need to implement educationally-relevant websites into their students' learning without dominating their time to the detriment of their roles as researchers and administrators.

The e[3]Learning project will impact students, staff, institutions, and Hong Kong. Students will benefit from a variety of educationally-sound e-learning activities. Staff will be assisted in building pedagogically-sound interactive sites with appropriate evaluation of students' learning. Mobile e-learning systems will be developed and investigated, giving Hong Kong students leading-edge educational experiences. Finally, each participating university will benefit from the shared resources and skills sets provided by this project.

Note: the e[3]Learning web site is located at: http://e3learning.edc.polyu.edu.hk

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