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A SWOT Analysis of a Complex Project for the Development and Evaluation of Educational Websites

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Abstract: This paper is concerned with the evaluation of a large project (e3Learning) for the design, development and evaluation of educational websites. In the period October 2002 – December 2003, 38 websites were produced. At this point, mid-way through the project, the team conducted a SWOT analysis as part of an evaluation of the whole project. The results, analysis and implications of eight SWOT reports are presented. This SWOT strategy has been valuable for the e3Learning project and other web development projects may also find it so.

The nature of the e3L project

The e3Learning (enrich, extend, evaluate learning; e3L) project is funded by the Hong Kong government to support teachers at three Hong Kong universities in the design, development and evaluation of web-based components of their courses. The project combines:

- a staff development aspect through initial discussions with teachers about pedagogical uses of learning technologies, and also through the ongoing design process.
- a technical component in the building of educational websites. This component has a strong innovative role in that tools and reusable templates are being developed for both websites and mobile devices. Indeed, there is a sub-project on mobile technology also reported at this conference (Csete, Wong & Vogel, 2004; Wong & Csete, 2004 – see proceedings).
- an evaluation aspect also reported at this conference (Lam & McNaught, 2004 – see proceedings).

Each website has gone through a four-stage process: (1) needs analysis, formulating conceptual solutions and an evaluation plan; (2) design and content building; (3) implementation; and (4) conducting evaluation. Initial meetings are conducted to clarify teachers' expectations and experience in the use of learning technologies. A customized evaluation plan is drafted according to the evaluation interests of the teachers. An elaborated Build-Check-Modify cycle is used to ensure the quality of production (James *et al.* 2003). Quality assurance is grounded by the professional input from both teachers and the technical staff through formative evaluation (which may be formal or informal). Academics then implement the custom-made websites which assist or replace some component of the conventional teaching approach. All evaluation results on the effectiveness of the websites are written up as reports and discussed with the teachers.

Further details of the initial design for this project are in James *et al.* (2003) and the project website <http://e3learning.edc.polyu.edu.hk/main.htm>. The e3L project operates across three universities, the Hong Kong Polytechnic University (PolyU), the City University of Hong Kong (CityU) and The Chinese University of Hong Kong (CUHK). In the period October 2002 – December 2003, 38 websites have finished production and 30 have been through an evaluation process (eight were 'heritage' work from an earlier project, MegaWeb). Of those 38 projects, 25 are being used to assist conventional teaching courses; two are replacement of some face-to-face lectures; eight are support sites for other projects or academic departments; one is a site to support self-study; one focuses on laboratory work; and one is designed as a game for a wider community. A further 20 websites are in production. At the time of writing, the project is at its mid-point and will run out of funds around the end of 2004.

The current climate in Hong Kong higher education

In Hong Kong academic salaries and conditions of service are good. It is therefore not surprising that the expectations on academics are also high. Academics are expected to perform well in both research and teaching activities. Research productivity remains as a major personnel decision for promotion or contract renewal. However, teaching duties are taken very seriously and responsibilities are quite varied: daytime teaching, evening teaching, liaising with courses in the Chinese mainland, etc. Many teachers comment on how difficult it is to maintain a balance between the competing demands of teaching and research activities, especially as the teaching environment has changed in recent years. Despite the growing importance of integrating learning technologies in higher education, the speed of learning for many academic teachers has not kept up with the pace of change. Resistance is still being experienced. Now this is true in almost every country of the world, though those of us in the e3L project who have extensive experience working in other countries, feel that eLearning is considered of less importance in many Hong Kong university departments than it is in equivalent Western universities.

However, in Hong Kong academics are facing a tougher challenge than the challenges of becoming familiar with learning technologies. According to an Education and Manpower Bureau document presented to the Legislative Council, university funding for 2004-2005 will be reduced by 15 percent on the current level for 2003-2004. University heads were informed by the Secretary for Education and Manpower that significant further cuts are possible between 2005 and 2008. However, universities are expected to maintain their core activities. This implies that academics in Hong Kong will have lower job security and fewer resources for the support of scholarly teaching activities. This funding crisis is one important factor in our mid-point project evaluation.

The need for reflective spaces in projects

Evaluation is always an indispensable component of a project. The project team needs to consider previous successes and failures, and seek ideas to guide the project's next phase. In view of the current changes in the climate in Hong Kong higher education, evaluation and reflection on the e3Learning project are needed more than ever before. We have now had one year of operation, and need to plan for our final year and beyond.

Owens & Rogers (1999) describe five phases of program evaluation. These are proactive evaluation (planning and synthesis of the project), clarification evaluation (making the aims and processes quite explicit), interactive evaluation (improvement of current processes), monitoring evaluation (justification and fine tuning of settled processes), and impact evaluation (justification and accountability of an overall project). At this mid-point in our e3L project, we are focusing on interactive and monitoring evaluation. We are seeking information about what processes and strategies we should retain as is, and what aspects need more attention or reworking.

The overall evaluation of the e3L project is summarized in Figure 1. We have found it helpful to view this project evaluation as a case study where we take multiple perspectives on the case using information from multiple sources. Much has been written about case studies; however, there does seem to be substantial agreement that case study research is holistic, qualitative, grounded, emergent, descriptive and inductive (e.g. Guba & Lincoln, 1981). Merriam (1988, p. 16), for example, defines the qualitative case study as "an intensive, holistic description and analysis of a single entity, phenomenon, or social unit". Figure 1 makes it clear that the SWOT analysis described below is one part of the overall project evaluation; is just one piece of the jig-saw puzzle. Hopefully, by the end of the project when we are more in the phase of impact evaluation, all the pieces will fit together.

There are many stated aims of the e3L project, and each aim has its own evaluation strategy. The first two columns in Figure 1 match each of the project's main aims to one strategy we are using to gain information about our achievement of that aim. All the evaluation reports, spreadsheets and discussion records are taken into consideration in our 'meta' analysis of the whole project. The meta-analysis also employs data of a more composite nature. For example, the project does meta-analyses on all the website evaluations. These analyses look at the larger issues of eLearning rather than the mere usefulness and quality of individual websites. The project also collects feedback from its stakeholders. They include the teachers who have initiated the various website developments, and the project team members. For the former, the project administers teacher satisfaction questionnaires about the service of the project; while for the latter, one example is the SWOT comments collected and reported in this paper.

One type of information commonly used in case studies is the insiders' reflective feedback and comments of the team members involved in the project, and this is the focus of the present paper. The self-reflection was done by collecting and analyzing project team members' feedback using the SWOT (Strengths Weaknesses, Opportunities, and Threats) method. The purpose of this paper is not to examine the SWOT technique per se, but rather to show how this quite simple technique can be used in evaluating complex development projects.

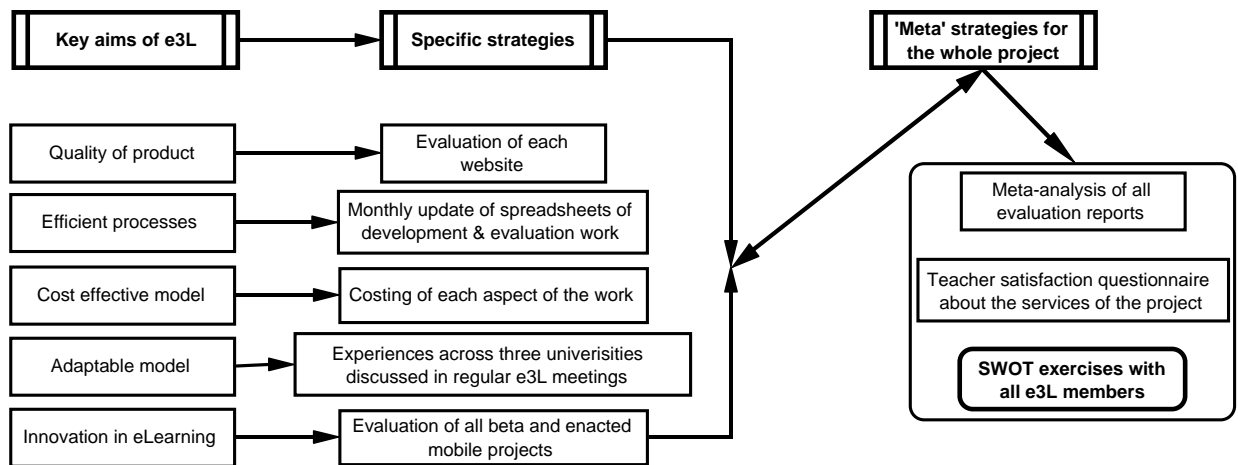


Figure 1: The SWOT exercise as part of the overall evaluation strategy for e3L

Our use of the SWOT methodology

SWOT is a strategy for teasing out the factors operating in complex situations (Manktelow, online). The SWOT analysis reported in this paper elicited and generalized the views of our project team members. The team members expressed their feelings on what the things the e3Learning project was able to do well (strengths), the things it failed to do well (weaknesses), the areas the project might find it fruitful to proceed to (opportunities), and the impediments that hinders the progress of the project (threats).

A SWOT template in Word was developed with the following headings: (1) role in e3L; (2) strengths of e3L seen from this first year of operation; (3) weaknesses of e3L seen from this first year of operation; (4) opportunities available to e3L in the current climate in HK; and (5) threats to the sustainability of the e3L model after our funding runs out.

The template was sent to all nine members of the e3L team who have worked in the project for most of the last year. Eight contributions were received by postings on a website. Members did not read each others' thoughts until they had posted their own contributions. All the SWOT reports were written in bullet-point form. The lengths of the entries in the four SWOT areas ranged from 114 words to 994 words, with the median length being 318 words. All eight contributions were compiled in a large table and printed in A3 format. The first author did a grounded analysis of the results working through four iterations of theme identification and reduction. The final list of themes was cross-checked by the other authors against the original SWOT reports. This exercise can be described as a grounded analysis of data from a case study. We followed a process of 'open coding' (Creswell, 1998) allowing the themes to emerge from the data (Meriam 1988). As Figure 1 shows, this is just one lens on the e3L project and so should be regarded as such. However, the themes that emerge from this exercise are congruent with the other data we are collecting as part of the overall evaluation of the e3L project.

A summary of the themes mentioned by each contributor is listed in Table 1 (end of paper) ; the list in each cell was kept close to the order of the bullet points in the original contribution, allowing the strength of language to decide the order when themes were repeated (see the first cell for the order of reading). The shorthand is explained in Table 2. The themes noted by the various team members do not appear to vary depending on role, though no statistical cluster analysis was undertaken. As a result, the data set is discussed as a whole. A summary of the data for each theme is listed in Table 2, arranged in order of frequency of mention. The final list contains 17 themes. The number

of themes mentioned by individual team members ranged from six to 14, with the median being 10. In several cases, not surprisingly, different aspects of the themes are mentioned under different SWOT categories.

Discussion of SWOT results

The first nine themes noted in Table 2 will be commented on in some detail. The minor themes are summarized in Table 3.

Robust model

The clear process and focus of the model was mentioned as a strength seven times. However, the fact that the model may not be as easy as handing over responsibility for class websites to research assistants or post-graduate students was noted both as a weakness and as a threat; using the e3L service requires more effort on the part of teachers who may not be prepared or able to expend that effort. In four comments the cost-effectiveness of e3L was foregrounded, once as a strength, twice as an opportunity and once as a threat. In the threat comment the project member felt that the powers that be (at institution or government level) may be too limited to recognize the cost-effective value of the model. In one case the potential for this model to be used in collaborative projects with the Chinese mainland was mentioned. Three of the five mentions as threats were statements of mourning that the technical, educational and procedural knowledge that has built up in this team over the past few years (in MegaWeb and now in e3L) may well be lost within the current funding climate in Hong Kong. One member mentioned SARS as an opportunity, in that eLearning became a predominant learning mode during that time; indeed since then, we have had enquiries from teachers who have had their interest in using the Web heightened because of that time. It is possible that the return of SARS, the emergence of some other serious viral epidemic, or some other disaster, could occur which could heighten interest in eLearning and the services that the e3L project provides.

University culture

The fact that the team members know universities well and so are better placed than external development companies is a real strength. The espoused funding policy that favours inter-institutional grants may well also be a strength. However, there were five team members who felt that the current situation in Hong Kong universities was a weakness of the work we are trying to move forwards. We are working against two strong features of Hong Kong universities.

- One is an atmosphere of suspicion and competitiveness that the current financial crisis is not alleviating. The individuality of Hong Kong universities extends from technical matters such as differing web protocols and WebCT processes, to unwillingness to form joint projects when the content is very similar. In both the technical and educational arena there have been issues on which a great deal of time has been expended for little return.
- The other is the emphasis on research. CUHK is a strongly research-intensive comprehensive university and so asking teachers to become involved in a teaching development project does not result in a large number of teachers queuing up. We have to work hard to get CUHK teachers involved and several have dropped out after several initial discussions. They are interested but other pressures get in the way. Both PolyU and CityU are relatively new universities with an applied focus and strong links to various professions. There is a strong drive in these two universities to raise institutional status by improving research productivity. The result is that, as at CUHK, we work hard to get teachers involved.

It is encouraging that PolyU, where the MegaWeb project was based, seems to have got over this activation barrier and has had a much better response than the other universities. This is encouraging if we at CUHK and CityU felt we had time to build up the same cultural change. However, six of the eight SWOT reports had comments about threats which were categorized under 'university culture'. This is depressing. Some of the tensions in the higher education in Hong Kong are shown in Figure 2. The art in organizational change is that of managing a number of complex dimensions and finding a balance point between all the opposing factors. Johnson (1992) calls this polarity management (see also McNaught, 2003). The feeling among the group at present is that a central balance point where decision-making recognizes and works with opposing tensions is not likely and the positions shown by Xs may dominate. Figure 2 is a rough sketch of the team's perceptions. This is a rather gloomy picture but the situation is rather fluid and we may well be wrong.

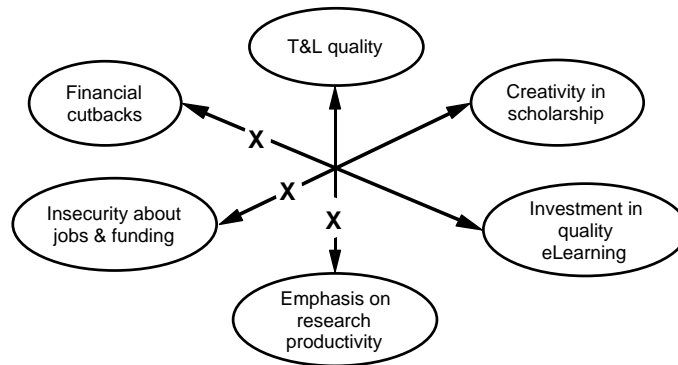


Figure 2: e3L team members' perceptions of the current climate in Hong Kong universities

Of course, every cloud has a silver lining, and two members felt there were opportunities for e3L in the current climate in Hong Kong. One focused on the increasing global move towards eLearning. In Hong Kong, as elsewhere, the 'hype' over the Web is diminishing and the use of online tools and facilities is gaining acceptance as routine aspects of teaching and learning. The other opportunity is that if the quality of e3L websites is accepted through the evaluation evidence that we collect, then we can be seen as an asset in a quality-driven climate where the government has stated that it intends to give funding based, in part at least, on quality assurance measures.

Team processes

Several aspects are included here and there is a strong overlap with the 'Robust model' theme. However, the differences between the two themes is that comments in the 'Team processes' theme concentrate on day-to-day operations rather than an overall model for website development and evaluation. The clearly articulated and visible management strategies (for example, the development and evaluation spreadsheets that are updated monthly) are valued. There is a strong feeling in the group that this is a happy team who work well together. There is one caution to this very satisfactory situation and that is the comment that, as the project grows and the staff become even busier, we have little time for sharing and this could reduce the effectiveness of the team if we do not take note of this. The production staff do work in the same work area but other team members work in more isolated situations. The two mentions under opportunities refer to the competitive edge that an effective team has in a difficult financial climate. Providing a quality service may keep the project viable.

Mobile aspect

Responses here mirror the situation often found in projects where work is at the cutting edge. There were strong comments in the areas of strengths, weaknesses and opportunities, illustrating an ambivalence about the uncertainty of the new mobile technologies. On the one hand, there is the excitement of working with something new and a clear recognition that these technologies will become more widespread. We all feel quite certain that this is an area where education needs to have an experienced voice and the only way to do this is by experimenting with these new technologies in educational contexts. However, the newness of all this also creates some nervousness about the visibility and viability of what we are doing in this area. Members who are not directly working on the mobile projects feel unclear about what is happening. There are clear implications for internal communications here.

Enriched websites

Comments under this theme were all positive. They voiced the satisfaction we all have with sites with interactive elements which are educationally better than the basic websites. The potential for developing shareable resources was also seen as a current strength as well as a potential opportunity. The e3L team has high WebCT skills and so the current popularity of the WebCT platform provides an ongoing opportunity.

Time

This was a complex theme covering several aspects. Six of the seven comments were in the categories of weaknesses and threats. The one positive comment was that the efficiencies of the e3L model should allow keen teachers to spend their time more efficiently as they can get both educational and technical services from skilled people in these areas; good division of labour can create real efficiencies. However, having noted that positive comment (which relates to the 'robust model' theme), there is no doubt that team members feel time pressures in

many ways. The e3L project has funding for two years (though good management does mean this may be extended a little). This is a short time frame in which to collect the evidence we need about the value of our work. There are restrictions on the quality of service in that our relatively small number of staff places restrictions on the scale of our service and there is limited time available for indepth R&D on some possible technical solutions to interesting challenges. Several team members mentioned the time pressures on teachers who find it difficult to meet deadlines for the content materials they need to provide to the project. Time pressures remain a constant in this project.

Staff development

Comments here ranged across all four categories. Our work with teachers is a very effective form of staff development as we show teachers evidence of what works and what does not work in the context of the courses they actually teach. This is a strength. Also, our growing collection of good exemplars (e.g. see <http://e3learning.edc.polyu.edu.hk/examples.htm>) offers good opportunities for staff development. However, we cannot always influence teachers' views in the time available. Assessment is one area where we struggle to make an impact and even to get access to assessment results for evaluation purposes. There were three comments that saw staff development challenges as threats. There were concerns about the growing gap between teachers' current practices and the possibilities that technology offer. There were also views that changing teachers' educational views is an ongoing challenge and, without constant reinforcement and support, teachers may revert to more didactic uses of technology. This last comment overlaps with the 'Maintenance' theme.

Evaluation/ research

This aspect of the model is considered a real strength. The evidence base that is generated also offers opportunities for the future. However, two weaknesses were noted. One is that teachers may pay lip service to the evaluation aspect and are really more interested in the product. The other is that there are restrictions (time, teacher interest, student availability, etc.) that can result in evaluations being based too much on teacher and student perceptions and not enough on actual learning outcomes.

\$ (Money)

Five of the seven comments related to weaknesses or threats. The two opportunity comments relate to the e3L team earning money through consultancy in order to maintain operations. The funding models for Hong Kong are in a state of uncertainty. As we intend to do further SWOT exercises, it will be interesting to see if current levels of concern are maintained.

Minor themes	Comments
Skills of team members	The mix of skills from senior academics to highly trained technical staff who all feel they work well together and are complementary to each other is a real strength. Some student helpers may need more support. Also, we may lose staff towards the end of the project's funding.
Sharing	In the comments on this theme two or three of the aspects of sharing resources, templates, skills and experience were usually grouped together. Sharing is seen as a weakness (we are not doing it) and an opportunity (we could). In one case the barriers caused by intellectual property issues was mentioned as a weakness.
Quality of product	This was genuinely viewed very positively but there was one comment that we may need to benchmark ourselves against commercial products more.
Product focus	This is tangible and we have exemplars to show. However, we need to try to get more projects at CUHK and CityU. Also, we need to be mindful of an over-emphasis on product than on evaluation.
Scale of project	This is good but there is room for improvement.
Maintenance	The need for maintenance of the websites that have been developed is an ongoing issue. One that is likely to emerge is the question of whether the WebCT platform will continue and how.
Basic websites	We have too many that are static. This is a way to get teachers on board but now may be the time to work on the balance between basic and enriched websites.
Technical matters	Surprisingly, there were only two comments. We need a better counter system (weakness) and we are developing a range of tools (opportunity).

Table 3: Comments on the minor themes

How valuable has this exercise been?

This was a simple exercise and yet surprisingly effective. The most mentioned strengths of the project seem to be the robustness of our model for design, development and evaluation; and our good team environment. This we must capitalize on and strengthen further as we work out how to meet challenges and threats. It seems clear that issues associated with the culture of Hong Kong universities is the greatest threat to the e3L project. It is interesting that our ninth e3L team member, who had not been able to contribute his SWOT report earlier, read this paper before doing a 'meta' SWOT report. He concurred with the overall directions but added an observation that the comments we had made about the challenges that pressures and tradition create for teachers also apply to students. This overall reflection thus adds to our understandings. We see the team using the SWOT strategy in an iterative way to build on and refine our understandings, our processes and the quality of our products and services.

As a result of this exercise some of our resolutions are to:

- Have an internal e3L working session on the future directions for the mobile aspect. This will build the knowledge of all the team members and integrate this innovative aspect more closely into the whole project. It may be wise to focus more attention on implementing what is currently possible at this stage.
- Consider ways to foreground the evaluation aspect more. One way might be to seek a course with a large number of students and carry out a very thorough case study. Also, as with the mobile aspect, internal discussions with the whole team could strengthen this area.
- Organise more sharing sessions where we showcase the e3L products and share with university colleagues the design features we have used. This is not likely to have any immediate impact on university culture, but we have strengthened our resolve not to be discouraged.
- Work even harder to move some of our 'basic' websites into a more interactive state and to try to ensure that more of our new projects are genuinely 'enriched'.
- Begin some investigations about how to ensure that websites are adequately maintained. This could be done through representation to our three universities about the need to avoid potential waste and maximize the benefits of e3L in the light of a somewhat bleaker financial future.
- Actively explore the potentials of the reusable learning objects that reside in e3L websites. This could work well within a climate of financial stringency. There are synergies here with another Hong Kong project, LEARNet <<http://learnnet.hku.hk/>>.

We feel affirmed by this exercise and also have learnt through it. We recommend the strategy to other web development groups.

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Role	S		W		O		T	
Principal supervisor / ed. designer	1.team 2.robust 3.enriched	4.skills 5.eval/res	uni cult prod foc	mobile	qual prod robust	eval/res	\$ uni cult	robust
Co-supervisor / eval.	scale skills team enriched	robust eval/res qual prod	uni cult mobile	basic	robust uni cult	prod foc	uni cult	\$
Project manager	team robust enriched	mobile sharing	uni cult robust	maint	team sharing	time robust	time robust	uni cult
Eval officer	skills qual prod team scale	eval/res uni cult robust	SD time prod foc basic	team tech eval/res	robust SD eval/res	sharing	\$ robust	qual prod uni cult
Technical & ed. designer	robust enriched	SD	basic time	mobile	robust	mobile	robust time	SD
Ed. designer	skills team mobile	robust qual prod	sharing uni cult time	prod foc eval/res	uni cult mobile	enriched \$	maint SD	uni cult
Technical solutions officer	enriched mobile team	uni cult robust	scale	\$	tech team	\$	maint SD	robust
Admin & finance officer	enriched	SD	time skills uni cult	\$ sharing	enriched	sharing	uni cult	skills

Table 1: A summary of the themes mentioned by each contributor

Themes	Shorthand	S	W	O	T	Totals
1. Robust model	robust	7	1	5	5	18
2. University culture	uni cult	2	5	2	6	15
3. Team processes	team	6	1	2	0	9
4. Mobile aspect	mobile	3	3	2	0	8
5. Enriched websites	enriched	6	0	2	0	8
6. Time	time	0	4	1	2	7
7. Staff development	SD	2	1	1	3	7
8. Evaluation/ research	eva/res	3	2	2	0	7
9. \$	\$	0	2	2	3	7
10. Skills of team members	skills	4	1	0	1	6
11. Sharing	sharing	1	2	3	0	6
12. Quality of product	qual prod	3	0	1	1	5
13. Product focus	prod foc	0	3	1	0	4
14. Scale of project	scale	2	1	0	0	3
15. Maintenance	maint	0	1	0	2	3
16. Basic websites	basic	0	3	0	0	3
17. Technical matters	tech	0	1	1	0	2
Totals		39	31	25	23	118

Table 2: A summary of the data for each theme