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Evaluation of an inter-institutional granting scheme for collaboration in educational technologies

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This study describes the evaluation of an inter-institutional funding scheme to promote collaboration through the development of educational technologies across two major Australian universities. Empirical studies of this nature are sparsely reported within the literature. The evaluation of the Melbourne & Monash Project Grants for Collaboration in Educational Technologies scheme provided an opportunity to investigate both the value of the specific scheme and to consider wider issues regarding collaboration in the higher education sector. Four methods of evaluation were employed to ensure that the complexities involved in the scheme were appropriately considered. The methods were: an audit of all project documentation; a standardised objective rating of the completed or almost completed educational technology artefacts by two experts; qualitative in-depth evaluation of five specific projects through analysis of participant interviews; and a staff survey based on the interview findings. The evaluation demonstrated that the quality of the output was high but that teams struggled to complete their projects and associated reporting requirements and project evaluation.

Keywords: higher education; collaboration; educational technology; evaluation methodologies.

Introduction

Developing educational technology through inter-institutional collaboration is relatively common in the higher education sector. Examples include: a major multi-institutional consortium collaborating in the development of learning materials and reusable learning objects (Harden 2005); an e-simulation conducted across institutions (McLaughlan 2001); and teacher resource websites (Learning Designs 2003). While such initiatives are well reported as teaching and learning innovations, there is little

literature which explores the factors that contribute favourably or act as barriers to collaborative development in an inter-university context. Anderson and Bonefas described 'lessons learnt' from a cross-college technology development initiative. No empirical data was given but success factors included: interest from faculty; support from leadership; time release; incentives for involvement; internal and external evaluations; and seed funding (Anderson & Bonefas 2002). Maclaughlan et al (2001) discussed institutional barriers impeding the development of a multi-disciplinary and inter-institutional e-simulation. These included negotiating across different teaching and assessment practices and the difficulties of sharing institutional resources, particularly technological platforms.

The literature points to organisational and logistical factors in managing collaborative relationships but it also raises broader questions. These include: what types of policies can enhance inter-institutional collaboration in developing educational technology materials? What type of impact might this have on the broader relationship between the partner institutions? The Melbourne & Monash Project Grants for Collaboration in Educational Technologies funded thirty projects in a seven year period between 1998 and 2004. The general aim of the scheme was to assist joint teams from the University of Melbourne and Monash University to develop collaborative and innovative educational technologies. The scheme was developed as a concrete outcome from the Melbourne and Monash Protocol (Melbourne University web site), which seeks to enhance the relationship between the two institutions through collaborative arrangements, with a strong focus upon teaching and learning.

The evaluation of this inter-institutional educational technology funding scheme described in this paper provided an opportunity to assess the value of such a scheme; both in terms of its capacity to generate innovative teaching materials as well as its utility in supporting communities of practice in working across organisational boundaries.

Methods

The evaluation process used four methods. The first was an audit of the project documentation, including project applications, progress reports, final reports and minutes of committee meetings. The second approach was a standardised objective rating of the completed or almost completed educational technology artefacts, where available for review. An evaluation rating form was developed, informed by existing validated tools for assessing e-learning (Benson et al, 2001). The form consisted of twenty three heuristic items, such as user control, consistency, interactivity and opportunities for practice as well as a global rating for the program overall. Projects were assessed by two independent raters with expertise in e-learning methods and development, who resolved any differences via a consensus process.

The third method was the qualitative in-depth evaluation of five specific projects based on participant interviews. Five projects were purposively sampled to include a range of subject matter/disciplinary content, project completion levels, educational approaches, technological platforms and innovation levels. Interviewees were selected to represent the key available staff involved in the project. A semi-structured interview schedule was developed and seventeen available participants were interviewed from August to October 2004. Tapes were transcribed and corrected by

both reviewers and participants. The analysis methodology had a strong evaluation focus, using standard qualitative analysis techniques to inductively group the data into themes but with a focus on stakeholder concerns. The interview process received ethics permission from the Monash Standing Committee into Ethical Research for Humans.

The final method was a survey of participating staff. Items were based on preliminary interview results. Respondents rated their level of agreement with statements using a 5 point Likert scale (1 = strongly disagree, 3 = neither agree nor disagree and 5 = strongly agree). Surveys were e-mailed to a total of 98 staff involved in Melbourne-Monash projects. Of these recipients 13 were not contactable and 5 were unavailable as they were on extended leave.

Results

Method 1: Results from the audit of documentation

Thirty projects were funded. At the time of study, eighteen of these should have been completed according to timeframes in their original applications. However, only nine projects had submitted final reports and were judged as completed; of these, two had not yet produced concrete outcomes. The average project team size was 5 members; the proportion of Monash staff to Melbourne staff was on average even; and the average grant was approximately $45,000.

Lack of comprehensive reporting made it difficult to quantify outcomes based on the audit documentation. The following specific in-course outcomes were reported:

- Computerised integration of simulation modules used by 180 engineering students.
- Statistics software used by more than 300 students across a range of at least 12 various departments at Melbourne.
- In 2002/2003, 180 engineering students at Melbourne accessed the mechanical engineering modelling software; 12 students at Monash in 2002 and an unspecified number at Monash in 2003.
- Ten interactive learning algorithm modules were integrated into relevant algorithm and data structured courses in the Computer Science and Software Engineering Departments at both universities.
- 180 students at Monash and 330 students at Melbourne used an online legal tutorial.
- 25 Year 2 Monash University students and 84 Year 3 University of Melbourne students used seven scenarios in group-based learning in environmental chemistry.

Evaluation schedules in the proposals were often overly optimistic and on the whole, the proposed evaluations were beyond the resource and time-scale of the projects described. No project matched their proposed evaluation process, or if they did so, it was not indicated in their reports. Of the nine completed projects, four provided concrete evidence of evaluation.

Many projects disseminated their results widely, including providing on-line information or through product marketing, internal seminars, conference presentation and peer-reviewed journals. Six projects detailed outcomes such as joint publications,

government liaison, further research initiatives, exchange of course materials or engagement with industry. The vast majority of interim and final reports described barriers to proceeding with their proposed development (Table 1).

Table 1: Major Categories of Barriers to Project Completion

Barriers	Described by Projects (N)
Personnel changes	8
Intellectual Property issues	7
Structural / Institutional barriers	6
Workload of academic staff	5
Difficulties in setting up cross-institution meetings	5
Teamwork issues	3
Unrealistic expectations	3

Method 2: Results from the standardised objective rating

Six of the eight programs reviewed were rated as either good or excellent overall. All programs scored very highly in areas related primarily to usability and instructional design, including a consistency of interface and a clearly organised content for learning. Only a few programs scored well in providing "support" mechanisms such as recognising program errors, monitoring progress and providing adequate learning resources.

Method 3: Results from the in-depth interviews

The results are presented as eight categories, each with a number of relevant themes.

What project members brought to the team

Motivations - Participants reported many different motivations for their initial involvement with the project but in general these can be categorised in the following ways:

- provision of specific learning materials for the students;
- provision of learning benefits through educational technology;
- roles within the university which mandated support for such projects; and
- acquiring new skills.

Theoretical frameworks - Most, but not all, teams approached their work without a clearly articulated educational theoretical framework. One participant described his team's approach:

> *'Everyone came from a simple pragmatic non-theoretical [approach]… stuff the constructivists…. forget about the whateverists… they were all just pragmatic educationalists.'*

Pre existing relationships - In many collaborations the individuals had strong pre-existing relationships, which lead to the formation of the teams. Many participants had pre-existing links with the other institution through such means as prior employment or postgraduate studies.

Group dynamics

Selecting group membership - Constitution of membership was considered to be a critical factor for making a team work. Common purpose, joint understandings, smaller team size and a capacity for teamwork were raised as well as the impact of individual personalities.

> *'It's all of the things about effective collaboration, it's not just putting a team of experts together, it's really got to be a team that you know is going to work.'*

There were problems based on joining two separate projects together, an approach adopted on advice from the funding scheme committee during the selection process:

> *'...the hope was that there was enough common ground that in fact it wouldn't be a loss. ... It didn't turn out to be that way.'*

Group collaboration - The collaborative experience varied from project to project. For those who felt it went well - and not all within a project group shared a common view - the collaboration experience was very enjoyable. The personal dimension was felt to be very important. When the group dynamic ceased to work, it had negative implications for the project. Managing this dynamic was seen as the responsibility of the project leader rather than the project manager. However, as one participant noted:

> *'You can't legislate collaboration.'*

Cross-institutional and cross-disciplinary issues - For the most part, participants did not feel there were any great cultural differences between institutions. There was a prevailing view, that:

> *'I really don't get involved with [institutions], we get involved in people. Institutions irrelevant.'*

Many participants in the cross-disciplinary projects were in agreement that disciplinary differences were more significant than institutional ones. However, the logistics of integrating projects into teaching across institutions presented problems as did different technological platforms. Some participants also experienced difficulties in dealing with different bureaucracies.

Experience of separate locations - Different interviewees felt the dislocation more keenly than others as some participants lived close to their counterparts' institution. Many regarded the travel time as inconvenient or a waste of time. On the other hand one participant noted that the travelling to a different location was beneficial:

> *'I don't think there's enough sharing in universities to be quite honest, so for me it's a positive being forced to go to different places... '*

Many participants described the loss of informal meetings:

> *'We missed the spontaneity of getting feedback from the educational programmer in the lab, or in the next room to where you are located.'*

In one project the development site had a 'greater sense of ownership'. In another, there was no project 'home':

> *'.. there wasn't a locus of work, you couldn't actually visit the project.'*

Team processes

Methods of working - Project teams followed a similar pattern of meeting on a regular basis in order to move the project forward. Larger project teams experienced more logistic difficulties and as these projects proceeded, subgroups were formed for efficiency. Several teams had loose organic structures; others were tightly defined. Some participants saw themselves with specific roles such as project management, provision of academic content or particular expertise. Those teams with project managers were very positive about having a dedicated individual in this capacity; likewise those teams that consulted with educational designers were very positive about their contribution.

Most aspects of project process were extremely varied across the five teams evaluated using this method:

- Project A employed a programmer who was a key contributor but located within a department at one of the collaborating institutions. The project was therefore skewed towards his presence.
- Project B had a very broad cross-disciplinary scope which was not well understood by most of the project team, as the project had been developed through melding two separate projects during the grant selection process on the advice of the funding committee. A significant amount of time was spent setting up a common framework then team members sought to independently create separate software products.
- Project C chose to create a detailed storyboard of their entire content before outsourcing all their programming to a commercial company.
- The entire original project team of Project D left both institutions. A new project team was successfully established
- Project E did not have a strong technology element. The focus was very strongly on integrating a new educational framework into current teaching.

Significant relationship with programmers - The five project teams had very different relationships with those providing technical or programming services. In most instances this shaped the project outcomes significantly.

> *'... the limitation in any project is the person who really does the implementations ... And most of the character of [the product] is the character of in fact the programmer/interpreter... which is both good and bad.'*

Timelines and prioritisation - Most projects encountered difficulty achieving their timelines; some suggested tighter management procedures as a solution. Sometimes, impeded progress was due to unrealistic expectations in the planning stages. Content development often took longer than anticipated. Interestingly, the one project that did adhere to its timelines was the simplest, and did not involve complex technological development or cross-disciplinary content creation. Many projects struggled with completing summative evaluation within the timeframes, some citing the nature of the twelve month teaching cycle nested within the funding structure.

Integration with teaching - Some projects prioritised integration with specific courses. If an individual was responsible for teaching the relevant subject, integration into coursework was simpler.

The role of departmental or faculty support – Support, or interest, at Department and Faculty level varied considerably. It was clear that some projects relied upon additional funding at departmental level to achieve completion and that in those instances this money was critical.

Barriers to completion

Participants identified a number of key barriers which prevented the project from moving forward as intended. The most notable of these included:

- Technical and platform barriers across institutions with changes over time.
- The Intellectual Property (IP) agreement caused some delays to the project.
- Project staff changing positions.
- Staff leaving the university, shifting internal roles or going on sabbatical.
- Lack of academic staff time.

> *'Through this project there was time relief, but there's never time relief. You just decide to do more things…'*

- Insufficient funding levels.
- Losing momentum.
- Unforeseen additions to the academic content.
- Communication difficulties within the team.
- Concerns regarding 'blending' teams.

In this last instance, some members from the team which combined two separate projects were negative about the 'forced' or 'shotgun' marriage.

> *'If there was a negative side to pick out of this it was clearly the forced marriage. ...Each of the individual groups I think had come to understand their own initial application stuff well enough to have high levels of competence to pursue and finish, but there was no mechanism whereby [the four groups] could ... come to an understanding of what we needed to do.'*

Success factors

The following factors were identified by participants as those that promoted positive outcomes. The most notable of these included:

- Shared purposes, general philosophies and/or enthusiasm within a team.

> *'...we shared the same passion for teaching'*

> *'[my colleagues] and myself, think exactly the same way. That is, what we want students to achieve educationally - the outcomes, procedures - are the same.'*

- Good 'personal relationships' within a team.
- The key role of the project manager:

> *'[The project manager was] a passionate and systematic man who would not let anything defeat him ... He was punctilious, he undertook to produce a product, he was the Project Manager ... he was not going to let anything fail that he was manager of.'*

- Value of an open working relationship.

'... there was never, and has never been any form of private ownership concept.'

- Good match of project content to educational technology design; appropriate scope of project.
- Funding and other encouragement, both from funding scheme and from department or faculty.

Sustainability of the projects

Dealing with change - Sustainability was discussed both with respect to academic content and also to technological platform:

'It's a continuous battle to make sure it's working ... That's one of the battles with the multimedia on-line learning tools, it's specialised technology. It's well and good to do on a one year, maybe two years, but standards change and you need the programs to keep updating with them. You've got to meet [the] environment that's out there…'

General management of resources was also an on-going concern.

The need for champions - Two participants identified the sustainability of the program being tied to a passionate individual.

Outcomes beyond the immediate scope of the project

Individual participant outcomes - Interviewees described the following personal outcomes as a result of participating in the granting scheme:

- career advancement;
- acquiring new expertise including improved teaching skills, management skills and new research directions;
- detraction from other interests;
- inspiration towards using technology in teaching;
- personal satisfaction upon completion.

The majority of participants from all projects welcomed the prospect that collaboration should continue. There were hurdles to further joint work, including limited availability of ongoing funds and lack of staff time. Several participants without prior educational technology experience described their desire to develop more packages as a result of participation in the projects.

Participant community outcomes - There was a general sense that the projects had positive impacts within the communities beyond the specific aims of developing shared educational technology materials. These included:

- Networking, including further research and teaching collaborations, between members of the different institutions:

  '...We've collaborated on other ideas and projects ... It has opened doors, it has strengthened ties.'

- Influencing views of colleagues, through both formal and informal means:

'We have more academic staff involved, we've got academic staff at our university which haven't previously been involved in multimedia projects [now interested]… '

One participant mentioned what might be described as organisational learning, in terms of understanding educational technology infrastructure and development issues. The more senior academics spoke of encouraging organisational change relating to educational technology development.

Linking to the wider community - Different projects had different publication goals, depending on the innovation level. Presentation at internal, national and international conferences were recorded.

Two projects were used as exemplars in marketing the institutions to potential students and also as points of contact with industry representatives.

Wider student benefit - There was a range of student benefits identified in addition to simple use of a project, often due to increased teaching skill or understanding on behalf of the project team. One project described enhanced social opportunities for students.

Funding and grant arrangements

Support for the funding scheme - The participants gave almost universal feedback that the scheme was worthwhile.

'…It's a program which is very valuable. It is forcing people to think seriously about how they do things, and why they do things, and as well as that benefit of saying let's see if we can get economies of scale by looking between different groups that want to do the same thing, principally universities.'

Flexible funding - Some stated the need for small amounts of extra funds to be made available to projects, essentially due to the nature of encountering software 'cul de sacs' and having to 're-track.' Some costs were unforseen and included the time necessary for communication needs such as bringing teams together in a collaborative project.

Timeframes - There was general sense that a one year time frame was too short. For those with two year projects, having to go through an application process twice was an unnecessary burden.

Evaluation - There was some suggestion that evaluation would not occur unless mandated.

'No one's told us we've got to do it. At the moment … unless some one tells us we're to use $6,000 of that small amount of money on evaluation, I'm afraid there is no pressure.'

Method 4: Results – survey

A total of 28 staff responded to the survey representing approximately 35% of a possible 80 surveys. These respondents were involved in a total of 34 projects. Table 2 describes means and standard deviation of responses.

Twenty one respondents provided open ended comments. There were many positive statements regarding rewards of participating in the scheme. For example:

> *'In general terms, I have found the scheme personally satisfying and strategically important for both my teaching and research and I would like to see it continue.'*

> *'Partnership across institutions is difficult to bring about but worthwhile to aspire to. In an era of increased responsibilities and pressures, schemes like this that provide positive incentives to collaborate are the only plausible way forward.'*

Other issues and concerns included:

- Issues concerning staff time and lack of 'real' or meaningful time relief.
- Inexperience with this type of educational technology development funding.
- Unrealistic deadlines.
- Sustainability.
- Excessive bureaucratic processes.
- Difficulties of working across institutions.

Table 2: Survey items: means and standard deviations of responses

	N	Average response rate*	SD
Management			
A well-defined project manager role was critical to the management of my project(s).	20	4.0	1.2
Completing the Intellectual Property agreement before commencing the project(s) was/would have been useful.	28	3.7	0.7
An extended timeline, which matched the teaching cycle, would have been more realistic for my project(s).	24	4.1	1.0
Funding			
It would be useful to have access to small additional funds for project completion.	27	3.9	1.0
It would be useful to have a separate release of funds specifically to evaluate the project.	27	3.6	1.1
Collaboration			
The project(s) enhanced pre-existing relationships between the two institutions.	25	3.8	0.9
The project(s) developed new inter-institution relationships.	26	3.4	1.2
It was time-consuming establishing a framework of collaboration between disciplines.	27	3.5	1.2
Team members on our project(s) did not share goals for a common outcome.	28	2.1	1.3
Good interpersonal relationships formed the basis of our collaboration.	28	4.3	0.8
The funding scheme creates valuable opportunities for collaboration.	28	4.5	0.6
Other			
I could communicate my educational needs to the programmer(s).	25	4.0	1.0
An independent evaluation process would have been/be beneficial.	26	3.4	1.0
I liked/would have liked the opportunity to view each other's works in structured forums.	26	3.3	1.0
It would be useful to separate research and educational outcomes for the project(s).	26	2.8	1.2
The funding scheme creates valuable opportunities for enhancing my students' learning.	28	4.3	0.8
Participation in my project(s) added too much work for too little reward.	27	3.0	1.3

* 1 = strongly disagree, 3 = neither agree nor disagree, 5 = strongly disagree

Discussion

The audit of the documentation and assessment of project outcomes indicated that the products of the project grants scheme were of high quality but that many of the teams had difficulty in completing their projects. Overall the standard of reported evaluation

was poor. Reserving funds specifically for evaluation purposes may resolve this type of difficulty and survey participants were somewhat supportive of this concept. The interview analysis confirmed some of the success factors and barriers raised in the literature, such as the value of support from leadership, the necessity for seed funding and the difficulties of using different technological platforms. The survey data reinforced many of the themes of the in-depth analysis. In particular, it indicated: wide support for extending project timelines; the importance of good interpersonal relationships in collaborative processes, and the value of the funding scheme to participants, both with respect to enhancing student learning and creating collaborative opportunities.

Wenger described a social learning group or 'community of practice' as one bounded by joint enterprise, mutual engagement and a shared repertoire of communal resources (Wenger 2000). These first two conditions were apparent in the evaluated projects, with almost all of the interviewees from the qualitative methodology reporting shared purposes and deep enthusiasm for their projects. While many participants did not have formal shared theories of education, a common framework and shared values were key to teamwork processes. Where the projects were uni-disciplinary, interviewees also described a good match in terms of the shared repertoire of communal resources. The inter-disciplinary projects had more hurdles to overcome in this regard – when there was no 'common ground', teamwork was made more difficult and development became more time consuming. This finding would be consistent with interprofessional education projects in general including those without a multimedia focus.

Those working on these types of projects, particularly in inter-disciplinary teams, are working as 'brokers' between communities of practice (Wenger 2000). Additionally Wenger suggests that cross-disciplinary projects force 'people to confront problems that are outside the realm of their own competence but that force them to negotiate their own competence with the competences of others'. This matches with participants' observation that the choice of 'personality' for the teamwork was also significant. Interestingly, there is another 'boundary' to be crossed in creating educational technology– that which separates the technical or programming staff from academic teaching staff. In some instances, the capacity to work with these supporting individuals or organisations, predicated the success or failure of the program. Negotiating across so many different domains is not easy, particularly if working with technology is an entirely new experience, as it was for some, but not all, of the funding recipients. The role of project manager and project leader may have been particularly important in light of these complexities. Interestingly, the project team who were able to manage their timelines and achieved some of the most tangible results did not have the burden of negotiating across disciplines or even with programmers.

The separated locations also caused difficulty for some project teams. Empirical studies into collaboration indicate that geographic separation can present difficulties to achieve goals (Olson & Olson 2002); this was clearly the experience of these teams. Additionally, the high rate of personnel attrition and the difficulties with creating time in a very busy academic calendar, even with time 'relief', also were barriers, albeit not insurmountable for some. In a nutshell, this type of collaboration

can be very difficult and it is a testament to the 'passion' of many teams that they produced such quality outputs and on-going enthusiasm for future shared work.

Conclusion

The evaluation of the Melbourne & Monash Project Grants for Collaboration in Educational Technologies indicated that such a funding scheme can produce quality educational technology and benefit collaborative processes. These outcomes would not be possible without organisational support of individual educational 'champions'. However, many teams had not completed their projects within their proposed timeframes. The in-depth analysis and audit indicated the many necessary hurdles facing such collaborative projects, with extra work necessary to 'broker' boundaries between disciplines and between technical staff and academic staff. There were also some limitations caused by separated work locations. Project members were in general supportive of the overall scheme, which also produced less easily measurable outcomes such as 'networking' and 'personal satisfaction'.

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